Quarterly report, second quarter 2018

RCRA Corrective Action Program
Boeing Renton Facility
Project # 0088880100.2018 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

August 15, 2018

Quarterly report, second quarter 2018

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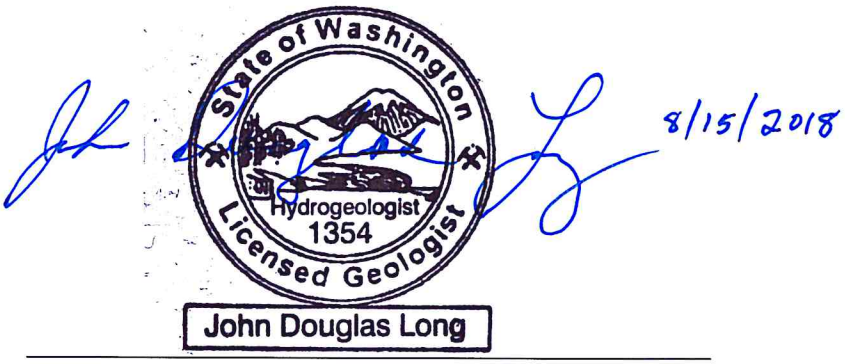

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1.0 Introduction

This report provides progress reporting in conformance with Section VII.B.1 of Agreed Order No. 8191 (Order) and summarizes cleanup actions and monitoring conducted at the Boeing Renton Facility (the Facility) during the second quarter 2018. This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the Boeing Renton Facility in Renton, Washington. Corrective action activities are performed for those solid waste management units (SWMUs), areas of concern (AOCs), and other areas where cleanup actions are ongoing. Monitoring, cleanup activities, and reporting are being conducted as part of the final remedy implementation described in the Engineering Design Report (EDR) (AMEC, 2014). The groundwater monitoring program is detailed in the Second Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017) which contains changes to the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) that superseded the original plan presented in Appendix D of the EDR (AMEC, 2014).

Groundwater monitoring and final cleanup action implementation are being conducted at the following areas (the ongoing remedies for each of these areas are noted in parentheses):

- SWMU-168: (monitored natural attenuation [MNA]);
- SWMU-172 and SWMU-174: (bioremediation, soil vapor extraction [SVE] and monitored attenuation [MA]);
- Building 4-78/79 SWMU/AOC Group: (bioremediation, SVE, MNA, and MA);
- Former Fuel Farm AOC Group: (MNA);
- AOC-001 and AOC-002: (bioremediation and MA);
- AOC-003: (bioremediation and MA);
- AOC-004: (bioremediation and MA);
- AOC-034 and AOC-035: (MNA);
- AOC-060: (bioremediation and MA);
- AOC-090: (bioremediation and MA);
- Building 4-70: (bioremediation and MA);
- Lot 20/Former Building 10-71 Parcel: (bioremediation and MA); and
- Apron A: (bioremediation and MA).

The background and investigation history for each affected unit or group of units is described in the Cleanup Action Plan (CAP) (AMEC, 2012) and/or EDR (AMEC, 2014). It should be noted that monitoring for the Building 10-71 area and Building 4-70 area is included in this monitoring report to maintain continuity with the monitoring program that has been conducted for these areas for several years and as approved by the Washington State Department of Ecology (Ecology); these two areas are not addressed explicitly in the Compliance Monitoring Plan but are being addressed per Ecology's December 30, 2015, email to Boeing with comments on the revised Compliance Monitoring Plan. Monitoring for Apron A is also included, as semiannual monitoring began in this area starting in the fourth quarter of 2016, as reported in the Apron A Investigation Results report (Amec Foster Wheeler, 2016b).

This quarterly report:

- Describes work completed during the reporting quarter;
- Describes any deviations from corrective action tasks required under the Order and/or CAP;
- Describes revisions to the corrective action schedule;
- Describes work projected to occur during the next quarter, including any planned deviation from the CAP;
- Discusses remediation operation and maintenance activities conducted at the Facility during the reporting period;
- Documents monitoring activities conducted during the quarter;
- Describes and discusses trends in monitoring data;
- Assesses remediation at each area; and
- Assesses attainment of cleanup levels (CULs) at the conditional points of compliance (CPOCs).

This report presents this information for the second quarter of 2018, the period from April through June 2018..

1.1 Quarterly progress reporting

In accordance with the requirements of the Order, corrective action activities were conducted at the Facility, as described in this report. As approved by Ecology in their letter dated November 18, 2015, progress reporting is conducted on a quarterly basis in conjunction with monitoring, operations, and maintenance activities conducted under the CAP.

1.1.1 Work completed in the second quarter 2018

The following work was completed during the second quarter of 2018, the period from April through June 2018:

- Groundwater monitoring for the second quarter of 2018 was completed during May 2018.
- On June 20, 2018, soil samples were collected at the Building 4-78/79 area and at SWMU-172/174 to evaluate concentrations of constituents of concern (COCs) in soil after the SVE systems were shut down on December 15, 2017.
- On behalf of Boeing, Wood submitted the First Quarter 2018 Report to Ecology on May 15, 2018.
- A third round of nitrate/sulfate injections was completed in Building 4-78/79 injection wells B78-11, B78-13, and B78-17 through B78-21 in April 2018. Groundwater samples were collected from these injection wells and from monitoring wells GW244S and GW031S in May 2018. These injection and sampling events are described in a memorandum submitted to Ecology on April 13, 2018.

1.1.2 Deviations from required tasks

No deviations from tasks required in the Order occurred during this activity period.

1.1.3 Deviations from CAP

There were no deviations from the CAP during this activity period, and there are no planned deviations from the CAP expected for the next activity period.

1.1.4 Schedule revisions

There were no significant revisions to the schedule for this reporting period and no revisions are expected for the next activity period.

1.1.5 Work projected for the next quarter

The following work is projected for the third quarter of 2018:

- Reporting will be completed in accordance with the Order, CAP, EDR, and any changes approved by Ecology.
- Groundwater sampling and analysis for the third quarter of 2018 will be completed.
- Nitrate and sulfate injections are planned for July 2018 for the Building 4-78/79 Area as described in Section 3.0. Performance monitoring to support the benzene plume study will be conducted in August 2018.
- Bioremediation injections are planned for July 2018 for the SWMU-172/174 Area, Building 4-78/79 Area, AOC-001/002, AOC-60, and AOC-90.

2.0 Groundwater sampling methodology

Groundwater was sampled and analyzed as described in Appendix A. These procedures are in accordance with the methods specified in the soil and groundwater sampling methodology, which is described in more detail in the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a). Table A-1 summarizes the current groundwater monitoring program and COCs specified in the CAP and revised in the Second Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017) for all Facility corrective action areas. Table A-1 also includes Building 4 70, Lot 20/Former Building 10-71, and Apron A, which were not included in the CAP. Table A-2 summarizes the current groundwater monitoring program for the corrective action areas that include MNA or MA as part of the cleanup remedy specified in the CAP. Table A-2 also includes Building 4 70 and Apron A, which were not specified in the CAP. Any changes or exceptions to the sampling or analytical methods cited in Appendix A during the quarter are described in the applicable subsections in Section 3. The field data sheets, which document the groundwater sample collection and field parameter monitoring for each well sampled during this quarter, are included in Appendix B.

The analytical methods, field duplicate, lab duplicate, and matrix spike/matrix spike duplicate frequencies are specified in the Quality Assurance Project Plan (Amec Foster Wheeler, 2016c). The full analytical reports provided by the laboratory are provided separately on compact disc. The data validation memoranda are included in Appendix C.

3.0 Corrective action activities completed during quarter

This section describes the corrective action activities conducted at the Facility during the second quarter of 2018. Rebound evaluation of the SVE systems at the SWMU-172/174 area and the Building 4-78/79 SWMU/AOC Group continued during the second quarter. Quarterly compliance monitoring was also conducted in accordance with the Second Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017).

3.1 SWMU-168

SWMU-168 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the second quarter of 2018.

3.2 SWMU-172 and SWMU-174

This section describes corrective action activities conducted at these two SWMUs. The cleanup remedy for SWMU-172 and SWMU-174 is a combination of bioremediation, SVE, and MA. Figure 1 shows the layout of the groundwater monitoring wells and the remediation system for these SWMUs.

3.2.1 Cleanup action activities

3.2.1.1 Installation/construction activities

No installation/construction activities were conducted for these SWMUs during the second quarter.

3.2.1.2 Soil vapor extraction and bioremediation operations

Rebound testing of the SVE system at SWMU-172 and SWMU-174 continued during the second quarter. Details for system operations/tests are included in the SVE operations and monitoring report prepared by Calibre and included as Appendix D. Soil samples were collected on June 20, 2018, in this area to assess attainment of the soil cleanup for SWMU-172 and SWMU-174 soil COCs, including selected volatile organic compounds (VOCs) and metals (copper, thallium, and zinc), following Appendix D of the EDR (AMEC, 2014).

The soil analytical results are presented on Table 1. A total of 12 soil compliance samples were collected from six locations in the SVE target area at locations shown in Figure 1. Samples were collected using direct-push sampling methods from the vadose zone at depths of 2.0 and 8.5 feet from each sample location. The soil samples displayed non-detect to low level concentrations at most sampling locations; however, exceedances in cleanup levels for tetrachloroethene (PCE), trichloroethene (TCE), *cis*-1,2-dichloroethene (*cis*-1,2-DCE), copper, and zinc were observed during the confirmation sampling (Table 1). The June 2018 detections of PCE ranged from 5.9 micrograms per kilogram (µg/kg) to 57.4 µg/kg, with the exception of sample PP-03 at 2 feet below ground surface (bgs), which showed PCE at 1,070 µg/kg. In comparison with historical probe locations near the June 2018 sample locations, current concentrations show PCE has been significantly reduced (or was already very low). Historical probe PP-172 (near PP-03) showed PCE at 27,000 µg/kg at 1.5 feet bgs in April 2008; current concentrations of 1,070 µg/kg represent a 96 percent reduction. In addition, concentrations of TCE and *cis*-1,2-DCE at this location are reduced by 99 and 98 percent, respectively, compared to prior historical concentrations in this area.

While current chlorinated VOC concentrations show significant reductions from historical monitoring results, the data indicate that SVE operation should continue at this location to continue removal of the chlorinated VOCs present. An operational change in the SVE process for this area is recommended to allow for altered flushing patterns in the area of PP-03, which showed the single elevated concentration of PCE (between SVE-2 and SVE-3). In order to achieve this, extraction well SVE-3 will be adjusted to operate

as a surface vent, which will allow SVE-2 to pull ambient air towards its location, thereby creating additional flushing through the area of PP-03.

Copper and zinc were detected at concentrations above the CUL in soil samples collected from PP01, PP02, PP03, PP05, and PP06.

3.2.2 Compliance monitoring plan deviations

Dissolved arsenic was analyzed in groundwater samples collected from downgradient plume well GW173S and CPOC area wells GW232S and GW236S.

3.2.3 Water levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the second quarter 2018 are summarized in Table 2 and shown on Figure 1. The contoured data for May 2018 show that groundwater generally flows east from SWMU-172 and SWMU-174 toward the Cedar River Waterway, with an approximate horizontal gradient of 0.008.

3.2.4 Groundwater monitoring results

Groundwater in this area is monitored following the schedules presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 3; results for the SWMU-172 and SWMU-174 area COCs are presented in Table 4.

3.2.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 3. TOC concentrations ranged from 0.55 milligrams per liter (mg/L) to 7.81 mg/L for all SWMU-172 and SWMU-174 monitoring wells. The other natural attenuation parameter results indicate that geochemical conditions were generally uniform and appropriate for reductive dechlorination of chlorinated VOCs. The pH in all monitoring wells were near neutral. The oxidation reduction potential (ORP) and dissolved oxygen (DO) results indicate reducing conditions were present.

3.2.4.2 COC results for source and downgradient plume areas

Table 4 lists second quarter 2018 analytical results for the SWMU-172 and SWMU-174 COCs. Figures 2 and 3 show historical trend plots for PCE, TCE, vinyl chloride (VC), and cis-1,2-DCE in source area wells GW152S and GW153S, and in downgradient plume area wells GW172S and GW173S. Flow generally moves from the vicinity of source area well GW152S to downgradient plume area well GW172S, and from source area well GW153S to downgradient plume area well GW173S. PCE and TCE are the chlorinated solvents that were used at the Facility, and cis-1,2-DCE and VC are breakdown products resulting from biodegradation processes.

As shown in Table 4, cis-1,2-DCE, TCE, PCE, and VC concentrations exceeded the CULs in the groundwater collected from both source area and downgradient plume area wells. As shown in Figure 2, the concentrations of COCs in groundwater from source area well GW152S increased slightly in the second quarter while concentrations in source area well GW153S generally remain stable. As shown in Figure 3, COC concentrations decreased in the groundwater sample collected from downgradient plume area wells GW172S and GW173S during the second quarter monitoring event.

Arsenic was detected above the CUL in all source area and downgradient plume area wells. However, all arsenic concentrations are below the revised Surface Water Human Health Criteria and Maximum Contaminant Level of 10 µg/L. As shown in Figure 4, the arsenic concentrations in the groundwater from

both source area and downgradient wells remain stable after decreasing during the fourth quarter 2017 sampling event. Copper was not detected above the CUL in the groundwater samples from source area and downgradient plume area wells, and lead was detected above the CUL in the groundwater from source area well GW152S, but was not detected at concentrations above the CUL in the groundwater detected in the downgradient plume area wells. The observed variations for metals concentrations may be influenced by the naturally occurring reducing conditions. Dissolved arsenic was analyzed in groundwater samples collected from select downgradient and CPOC area monitoring wells during the second quarter to compare total and dissolved concentrations of arsenic in groundwater with the local and/or regional naturally occurring background concentrations of arsenic in groundwater. Arsenic occurs naturally in soil and groundwater; and is known to be regionally elevated. No further evaluations of dissolved arsenic are planned.

3.2.4.3 COC results for conditional point of compliance area

Results from the CPOC area wells are presented in Table 4 and trend charts for cis-1,2-DCE, TCE, and VC for all CPOC area wells are presented in Figure 5. As shown in Table 4, cis-1,2-DCE was detected at concentrations above the CUL, ranging from 0.0297 to 0.367 µg/L in the groundwater collected from all CPOC area wells; TCE was detected above the CUL in the groundwater from monitoring well GW235I; and VC was detected above the CUL in the groundwater from monitoring well GW232S. Concentrations of VC in well GW232S are expected to decrease over time, as concentrations in the immediate upgradient well GW173S continue to decrease. One option under consideration would be to convert GW173S to an injection well to more rapidly reduce VOCs at this location. PCE was not detected in the groundwater collected from the CPOC wells and is not shown in Figure 5. As shown on Figure 5, concentrations of cis-1,2-DCE have exceeded the CUL in the CPOC wells since compliance monitoring began, but are generally stable, except for the slight increase in concentration observed in the groundwater from GW232S. TCE concentrations exceed the CUL in the groundwater from CPOC wells GW235I and GW234S, and VC concentrations exceed the CUL in the groundwater from CPOC well GW232S. The concentrations of both TCE and VC generally appear to be stable. Cleanup levels may need to be re-evaluated based on overly conservative contaminant concentration assumptions that were made prior to remedial action implementation, but that have changed over time, resulting in an over-estimation of total site risk based on current relative concentrations of individual COCs.

Arsenic was detected above the CUL in the groundwater from CPOC area wells GW232S and GW236S. Copper was not detected above the CUL in the groundwater collected from CPOC wells. Lead was detected above the CUL in the groundwater from GW236S (Table 4). Figure 6 shows arsenic, copper, and lead trends since the beginning of compliance monitoring in groundwater from CPOC wells. As shown in Figure 6, though arsenic, copper and lead concentrations appear to vary over time, there are no increasing trends in the groundwater collected from CPOC wells.

3.3 Building 4-78/79 SWMU/AOC group

This section describes corrective action activities conducted at the Building 4-78/79 SWMU/AOC Group during the second quarter of 2018. The cleanup remedy for this SMWU/AOC group is bioremediation, SVE, MNA, and MA. Figure 7 shows the location of groundwater monitoring wells, bioremediation wells, and SVE wells for this area.

3.3.1 Cleanup action activities

3.3.1.1 Installation/construction activities

No installation/construction activities were conducted for these SWMUs during the second quarter.

3.3.1.2 Soil vapor extraction and bioremediation operations

Rebound testing of the SVE system at the Building 4-78/79 SWMU/AOC Group continued during the second quarter. Details for system operations/tests are included in the SVE operations and monitoring report prepared by Calibre and included as Appendix D. Soil samples were collected in this area on June 20, 2018, to assess attainment of the soil cleanup for Building 4-78/79 soil COCs, including selected VOCs and total petroleum hydrocarbons in the gasoline range (TPH-G), following Appendix D of the EDR (AMEC, 2014).

The soil analytical results are presented on Table 5. A total of 24 soil compliance samples were collected from 12 locations in the SVE target area at locations shown in the Compliance Monitoring Plan in the EDR (AMEC, 2014). Samples were collected using direct-push sampling methods from the vadose zone at depths of 1.0 and 3.0 feet bgs from each sample location, with the exception of two samples—sample location PP-13 was collected from 4.5 feet bgs instead of 3.0 feet bgs, as a petroleum odor was noted in the clay-rich sediment at 4.5 feet bgs. The second adjusted sample was at 1.5 feet bgs instead of 1 foot bgs at location PP-17, in order to get below the asphalt. In general, the concentrations of chlorinated VOCs and TPH-G in the soil samples collected from the Building 4-78/79 SWMU/AOC Group were either not detected or a low detections below cleanup levels, except for the sample collected at 4.5 feet bgs from sample PP-13. The TPH-G concentration detected in this sample was 147 milligrams per kilogram (mg/kg), greater than the cleanup level of 30 mg/kg. As previously noted, a petroleum odor was noted in a clay/silt layer in the depth above this sample at 3 feet bgs. The sample collected from 1 foot bgs at PP- did not have a detection of TPH-G. In comparison, historical probe point PP184 was sampled near this location in April 2008 with samples collected from 1.6, 3.4, and 5.2 feet bgs. The TPH-G results from these historical samples were 160, 24, and 850 mg/kg, respectively. Although the April 2008 and June 2018 samples in this area are not in the exact same location, they are within the area of influence for the SVE system and the reduced concentrations, at least in the area above the clay layer, are likely attributed to SVE operation and vapor removal.

TO-15 analyses have been conducted at SVE-08, the SVE vent well directly adjacent to PP-13, twice since the start of SVE operation, in September 2016 and April 2017; TPH-G was below detection in both samples. These results indicate the SVE vent wells are unlikely to achieve complete removal of the TPH-G in soil in this area (the PP-13 sample from 4.5 feet bgs with the elevated TPH-G concentration was from within a clay layer). The soil confirmation results from all other areas show attainment of the soil cleanup levels have been achieved; therefore, we recommend that SVE operation in this area be stopped.

Additional soil samples may be considered for the area around PP-13 to define the extent of soil exceeding the TPH-G cleanup level. Active utilities are present in this area; therefore, an evaluation of feasibility and access for soil excavation will be needed if further actions are required.

A third round of nitrate/sulfate injections was performed in April 2018, and groundwater samples were collected from the injection wells and monitoring wells in May 2018. The results of the performance monitoring are shown in Table 2-7 of Appendix D. Concentration of benzene in the groundwater from all injection wells related to ongoing benzene treatment in this area are shown in Figures 8 and 9. As shown in Table 1 of Appendix D, benzene concentrations in groundwater samples collected from injection and monitoring wells ranged from 0.34 µg/L to 54.2 µg/L. The benzene concentrations detected in May 2018 remain below the baseline concentrations in three of the five new injection wells, with current concentrations at approximately 50 percent of the baseline results at these wells, indicating biodegradation of benzene is occurring. In addition, the May 2018 sampling event showed benzene concentrations in groundwater from injection well B78-13 (historical ERD well) and monitoring wells GW244S and GW031S were below concentrations detected in groundwater in the November 2017 sampling event following the start of treatment, with reductions in concentration at 50, 50 and 85 percent,

respectively. The concentration of benzene increased in the groundwater collected from injection well B78-20. This injection well is located near monitoring well GW031S, and benzene concentrations have decreased in the groundwater from GW031S. Concentrations of benzene have increased during each monitoring event at B78-20, indicating continued treatment with increased concentration of reagents should be considered at this well. Nitrate was detected during the May 2018 monitoring event in the groundwater collected from one injection well, B78-13. Concentrations of nitrate were below detection limits in the remaining wells during the May sampling event, while sulfate concentrations continued to accumulate in most wells, with detections ranging from 2.85 mg/L to 34.1 mg/L.

The three benzene treatment injection events completed since October 2017 were implemented utilizing low target concentrations of nitrate and sulfate applied to each of the injection wells with concentrations of 100, 200, and 400 mg/L in October 2017, January 2018, and April 2018, respectively. The results of the latest performance monitoring event show the injected nitrate amendment is rapidly consumed (e.g., non-detect to low measurable detections of nitrate). Based on these results, Boeing proposes to optimize the remedial action to provide additional reagent for the plume treatment.

The reagent concentration for the remedial optimization event is recommended at 800 mg/L for nitrate and 400 mg/L for sulfate to provide additional nitrate and sulfate to the affected area due to the rapid reaction time observed. Injections will be performed at B78-11, B78-13, B78-17, B78-18, B78-19, B78-20, and B78-21. Performance monitoring data will be collected approximately 30 days after the injection event and will include the same list of wells sampled in the previous performance monitoring events.

3.3.2 Compliance monitoring plan deviations

No deviations from the compliance monitoring plan occurred for this area during the second quarter.

3.3.3 Water levels

Table 6 presents the groundwater elevations measured during the second quarter 2018 groundwater monitoring event at the Building 4-78/79 SWMU/AOC group. As shown in Figure 7, the observed direction of groundwater flow from the source area during May 2018 is generally to the west, with a hydraulic gradient of 0.002.

3.3.4 Groundwater monitoring results

Results for primary geochemical indicators are presented in Table 7; results for the COCs for Building 4-78/79 SWMU/AOC Group are presented in Table 8. Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.3.4.1 Natural attenuation/geochemical indicators

The geochemical indicator results are presented in Table 7. In general, source area, downgradient, and CPOC area wells had low levels of DO and ORP, indicating that reducing conditions are present over the area and are generally favorable for reductive dechlorination of chlorinated VOCs. The pH in all monitoring wells was above 6.0 standard units during the second quarter monitoring period. Results for the other primary geochemical indicators were fairly consistent throughout this area. TOC concentrations in source area wells ranged from 5.64 to 24.38 mg/L, indicating that additional substrates injections would be beneficial for continued enhanced bioremediation.

3.3.4.2 COC results for source and downgradient plume areas

Table 8 lists second quarter 2018 analytical results for the Building 4-78/79 SWMU/AOC Group COCs. The CULs established in the CAP are also presented on Table 8. Figures 10 and 11 are trend charts showing

historical trends for COCs for four groundwater monitoring wells that have a history of frequent detections. Trend charts have not been prepared for groundwater monitoring wells or COCs that do not have a history of frequent detections.

As shown in Table 8, benzene, cis-1,2-DCE, TCE, and VC were detected in groundwater samples from several source area wells at concentrations above their respective CULs, except for groundwater from source area well GW039S, which had concentrations below CULs for all COCs. TPH-G was detected in the groundwater from source area well GW031S, at a concentration of 917 µg/L (the field duplicate concentration was 830 µg/L). TPH-G was also detected in the groundwater from source area wells GW033S and GW243I, at concentrations below the CUL.

The only COC detected in the groundwater samples collected from the downgradient monitoring wells was VC detected at a concentration of 0.21 µg/L in the groundwater collected from downgradient plume area well GW209S. The detection of VC in the groundwater sample from GW209S is consistent with historical concentrations of VC in the groundwater from this well.

Figure 10 shows trends for selected COCs for source area wells GW031S and GW033S, and Figure 11 shows trends for selected COCs for source area well GW034S and downgradient plume area well GW209S. COC concentrations in the groundwater collected from GW031S are generally consistent with historical results and trends. Though concentrations of all of the COCs increased in the groundwater collected from source area well GW033S they are also generally consistent with historical results. Groundwater samples from GW033S historically had the highest concentrations of cis-1,2-DCE and VC prior to the Duct Bank dewatering project. COC concentrations in groundwater samples collected from source area well GW034S (Figure 11) are stable. Nitrate and sulfate injections described in Appendix D are continuing, in order to address remaining benzene present between GW210S and GW244S.

Figure 11 shows a trend chart for downgradient plume area well GW209S, which was installed in 2008 and is located west of Building 4-79. Monitoring results for benzene and VC for GW209S decreased in 2015 and have remained low through the second quarter 2018 monitoring event, with VC detected at a concentration slightly greater than the reporting limit and all other COCs below reporting limits.

3.3.4.3 COC results for conditional point of compliance area

Groundwater monitoring results from the second quarter for the CPOC area are summarized in Table 8. Trends for CPOC wells GW143S, GW237S and GW240D are shown in Figures 12 through 14. Benzene was detected above the CUL in GW237S at a concentration of 8.57 µg/L in the groundwater sample from CPOC well GW237S; all other benzene results for the CPOC area were below detection. As shown in Figure 12, benzene has been sporadically detected in the groundwater from CPOC well GW237S and has not been detected in the groundwater samples from any other CPOC wells at concentrations above the CUL. The benzene concentrations in the groundwater from CPOC well GW237S have increased over the last three quarters. The only other COCs detected in the groundwater samples from the CPOC area during the second quarter were TPH-G at a concentration of 1,740 µg/L in the groundwater sample from CPOC well GW237S, cis-1,2-DCE at a concentration of 0.33 µg/L (below the CUL) in the groundwater sample from CPOC well GW143S, and VC at a concentration of 0.23 µg/L in the groundwater sample from CPOC well GW240D. As shown in Figure 14, TPH-G has been detected in the groundwater sample from CPOC GW237S well at sporadic concentrations since the fourth quarter of 2015.

3.4 Former fuel farm AOC group

The Former Fuel Farm AOC group is monitored semiannually in May and November. The final remedy for the Former Fuel Farm is MNA.

3.4.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the second quarter.

3.4.2 Compliance monitoring plan deviations

No deviations from the compliance monitoring plan occurred for this area during the second quarter.

3.4.3 Water levels

Groundwater elevations for the Former Fuel Farm AOC Group measured during the second quarter 2018 are summarized in Table 9 and shown on Figure 15. Groundwater elevation contours are not shown on Figure 15 due to anomalous measurements.

3.4.4 Groundwater monitoring results

Results for primary geochemical indicators are presented in Table 10; results for COCs for the Former Fuel Farm AOC Group are presented in Table 11. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.4.4.1 Monitored natural attenuation indicators

The geochemical indicator results are presented in Table 9. Results in Table 9 indicate that geochemical conditions are generally consistent throughout the Former Fuel Farm AOC Group. The pH in CPOC area well GW212S was below 6.0 standard units; low pH may interfere with biological degradation of site COCs. The other geochemical indicators indicate that conditions are generally conducive to natural attenuation of the COCs for the Former Fuel Farm AOC Group.

3.4.4.2 COC results for source area

Table 11 lists second quarter 2018 analytical results for the Former Fuel Farm AOC Group COCs. The CULs established in the CAP are also presented on Table 11. As shown in Table 11, TPH in the diesel and Jet A ranges were not detected above the reporting limit in the groundwater from source area well GW255S.

3.4.4.3 COC results for conditional point of compliance area

CPOC area monitoring results are presented in Table 11. Figure 16 shows trend data for CPOC area wells GW211S, GW221S, and GW224S. TPH in the diesel and Jet A ranges exceeded the CUL in the groundwater collected from CPOC wells GW221S and GW224S, and were detected at concentrations below the CUL in CPOC well GW211S. Figure 16 shows that the second quarter results for these wells are consistent with the historical monitoring results since late 2013.

3.5 AOC-001 and AOC-002

This section describes corrective action activities conducted at these AOCs during the second quarter of 2018. The cleanup remedy for this corrective action area is bioremediation and MA. Bioremediation commenced for this area in late 2004, following source area excavation. Figure 17 shows the location of groundwater monitoring wells and the bioremediation injection system for AOC-001 and AOC 002, as well as the groundwater elevations measured during this monitoring event.

3.5.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the second quarter.

3.5.2 Compliance monitoring plan deviations

No deviations from the compliance monitoring plan occurred for this area during the second quarter.

3.5.3 Water levels

Table 12 presents the groundwater elevations measured during the second quarter 2018 monitoring event at AOC-001 and AOC-002. Figure 17 shows the groundwater elevations from this event. Groundwater flow directions cannot be determined from the available groundwater elevation data.

3.5.4 Groundwater monitoring results

Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 13; results for the AOC-001 and AOC-002 COCs are presented in Table 14.

3.5.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 13. The pH was near neutral in all CPOC wells and is conducive to microbial activity. Table 13 also suggests that geochemical conditions are appropriate for reductive dechlorination of the COCs in the AOC-001 and AOC-002 CPOC area, as indicated by the reducing conditions, low DO levels, and generally appropriate TOC concentrations.

3.5.4.2 COC results for source and downgradient plume areas

Source area and downgradient wells are monitored semiannually in May and November; therefore, no monitoring for source area or downgradient plume wells was conducted in the second quarter.

3.5.4.3 COC results for conditional point of compliance area

As shown in Table 14, 1,1-dichloroethene, benzene, and TCE concentrations in the groundwater samples collected from CPOC wells were either below detection or below the CUL. Concentrations of cis-1,2-DCE were above the CUL in the groundwater samples from all CPOC area wells except for GW194S. VC was detected at concentrations above the CUL in the groundwater samples from CPOC area wells GW185S and GW197S. VC was also detected in the groundwater from the remaining CPOC wells, except for from GW194S, at concentrations below the CUL.

As shown in Figure 18, aside from the increase in concentrations of cis-1,2-DCE and VC observed in the in the groundwater samples collected from GW185S in the second and third quarters of 2015; concentrations of cis-1,2-DCE and VC in the CPOC area monitoring wells have been generally stable since compliance monitoring began. COPC area wells GW194S and GW245S are not shown on Figure 18 because COCs are generally not detected in the groundwater samples from these wells. Similarly, the remaining COCs are generally below the CUL in the CPOC area monitoring wells and are not included on Figure 18.

As previously noted, cleanup levels may need to be re-evaluated based on overly conservative contaminant concentration assumptions that were made prior to remedial action implementation, but that have changed over time, resulting in an over-estimation of total site risk based on current relative concentrations of individual COCs.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the second quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 19 shows the location of groundwater monitoring and bioremediation wells at AOC-003, as well as the groundwater elevations measured during this monitoring event.

3.6.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the second quarter.

3.6.2 Compliance monitoring plan deviations

Groundwater samples were collected from the source and downgradient area wells during the second quarter. Following the schedule presented in Table A-1, source and downgradient area wells are sampled semiannually in the first and third quarters.

3.6.3 Water levels

Table 15 presents the groundwater elevations measured during the second quarter 2018 monitoring event at AOC-003 and AOC-092. Figure 19 shows the groundwater elevations from this event. Groundwater flow directions cannot be determined from the available groundwater elevation data.

3.6.4 Groundwater monitoring results

Groundwater at AOC-003 is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for geochemical indicators are presented in Table 16; results for the AOC-003 COCs are presented in Table 17.

3.6.4.1 Monitored attenuation//geochemical indicators

The geochemical indicator results are presented in Table 16. Results in Table 16 indicate that geochemical conditions are generally consistent throughout this AOC. The data indicate that conditions are generally conducive to biodegradation of the COCs for this AOC.

3.6.4.2 COC results for source and downgradient plume areas

Groundwater collected from the source and downgradient plume area wells did not have detections of PCE, TCE or cis-1,2-DCE above their respective CULs. VC was detected above the CUL in the groundwater sample collected from source area well GW249S, and from downgradient plume are well GW188S. All other COCs were either not detected or were detected at concentrations below the CUL.

3.6.4.3 COC results for conditional point of compliance area

Groundwater collected from the two CPOC monitoring wells did not have detections of PCE, TCE or cis-1,2-DCE above their respective CULs. VC was detected at concentrations above the CUL in the groundwater samples collected from CPOC wells GW247S and GW248I, at concentrations of 0.460 and 0.573 µg/L, respectively.

3.7 AOC-004

AOC-004 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the second quarter of 2018.

3.8 AOC-034 and AOC-035

This section describes corrective action activities conducted at AOC-034 and AOC-035 during the second quarter of 2018. The cleanup remedy for these AOCs is MNA. Figure 20 shows the locations of the groundwater monitoring wells at AOC-034 and AOC-035, as well as the groundwater elevations measured during this sampling event.

3.8.1 Cleanup action activities

No construction or operations work was conducted for this AOC during the second quarter.

3.8.2 Compliance monitoring plan deviations

No deviations from the compliance monitoring plan occurred for this area during the second quarter.

3.8.3 Water levels

Table 18 presents the groundwater elevations measured during the second quarter 2018 monitoring event at AOC-034 and AOC-035. Figure 20 shows the groundwater elevation contours based on the groundwater elevations. Based on these contours, groundwater in the vicinity of AOC-034 and AOC-035 flows to the west-northwest, toward the Cedar River Waterway/Lake Washington, with a horizontal hydraulic gradient of approximately 0.0008.

3.8.4 Groundwater monitoring results

Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for geochemical indicators are presented in Table 19; results for COCs are presented in Table 20.

3.8.4.1 Monitored natural attenuation/geochemical indicators

The geochemical indicator results are presented in Table 19. In general, the results indicate uniform conditions are present across this corrective action area and that conditions are conducive to natural attenuation of chlorinated VOCs, as indicated by the pH, ORP, and DO measurements.

3.8.4.2 COC results for source and downgradient plume areas

Table 20 presents the second quarter 2018 analytical results for the AOC-034 and AOC-035 groundwater COCs. Trend charts have not been developed for this area, because the COCs are not commonly detected in the AOC-034 and AOC-035 groundwater monitoring wells. As shown in Table 20, neither cis-1,2-DCE nor VC were detected in the groundwater collected from source area well GW217S or cross-gradient plume area well GW216S.

3.8.4.3 COC results for conditional point of compliance area

Table 20 shows that COC concentrations in groundwater samples from the CPOC area wells were below reporting limits and CULs for the second quarter of 2018. This is the seventh consecutive semiannual monitoring event with COC concentrations below CULs in the CPOC area well samples.

3.9 AOC-060

AOC-060 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the second quarter of 2018.

3.10 AOC-090

AOC-090 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the second quarter of 2018.

3.11 Building 4-70 area

The Building 4-70 Area is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the second quarter of 2018.

3.12 Lot 20/former building 10-71 parcel

This section describes corrective action activities conducted for this area during the second quarter 2018. Figure 21 shows the locations of the groundwater monitoring wells and the bioremediation injection system at the Lot 20/Former Building 10-71 Parcel, as well as the groundwater elevations measured during the second quarter. The Lot 20/Former Building 10-71 Parcel was not included in the EDR, but was later added to the Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) and has been regularly monitored in conjunction with the Facility corrective action areas. The cleanup remedy for the Lot 20/Former Building 10-71 Parcel is bioremediation and MA. This area is monitored semiannually in the second and fourth quarters, in accordance with Table A-1 in Appendix A.

3.12.1 Cleanup action activities

No construction or operations work was conducted for the Lot 20/Former Building 10-71 Parcel during the second quarter.

3.12.2 Water levels

The groundwater elevations measured during the second quarter at the Lot 20/Former Building 10-71 Parcel are presented in Table 21 and on Figure 21. Groundwater contours are not shown on Figure 21 because the three monitoring wells measured are arranged nearly in a straight line and do not provide enough water level data to prepare contours. Based on the second quarter water level measurements, the apparent groundwater flow appears to be generally to the northwest.

3.12.3 Groundwater monitoring results

Results for primary geochemical indicators for groundwater from the Lot 20/Former Building 10-71 Parcel monitoring wells are presented in Table 22; results for COCs for the Lot 20/Former Building 10-71 Parcel monitoring wells are presented in Table 23. Groundwater in this area is monitored following the schedule presented in Tables A-1 in Appendix A.

3.12.3.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 22. The pH in groundwater from the Lot 20/Former Building 10-71 Parcel monitoring wells was near neutral and the remaining parameters appear uniform in the groundwater samples collected from these monitoring wells.

3.12.3.2 COC results

Second quarter analytical results for the Lot 20/Former Building 10-71 Parcel COCs are presented in Table 23. The concentrations of all of the COCs—cis-1,2-DCE, toluene, TCE, and VC—in the groundwater samples collected from Lot 20/Former Building 10-71 Parcel monitoring wells were below detection, except for a detection of VC at 0.24 µg/L (below the CUL) in the groundwater sample collected from 10-71-MW2.

3.13 Apron A area

This section describes corrective action activities conducted at the Apron A area during the second quarter 2018. The cleanup remedy proposed for the Apron A area is bioremediation and MA. Figure 22 shows the locations of the groundwater monitoring wells in the Apron A area.

3.13.1 Cleanup action activities

No construction or operations work was conducted in the Apron A area during the second quarter.

3.13.2 Water levels

The depth to groundwater measured during the second quarter at Apron A are presented in Table 24 and on Figure 22. Groundwater elevations are not available because the top of casing elevations were never surveyed.

3.13.3 Groundwater monitoring results

Results for primary geochemical indicators for groundwater from groundwater monitoring wells GW262S and GW264S are presented in Table 25; results for COCs from these wells are presented in Table 26. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.13.3.1 Monitored attenuation/geochemical indicators

Geochemical parameters are presented in Table 25. TOC concentrations in the monitoring wells were slightly elevated during the second quarter 2018 monitoring event. The other primary geochemical indicators show that reducing conditions were present and that conditions were conducive to biological degradation of the chlorinated VOCs.

3.13.3.2 COC results

Table 26 lists second quarter analytical results for the Apron A COCs: cis-1,2-DCE and VC. Cis-1,2-DCE was not detected in the groundwater samples collected from either GW262S or GW264S. VC was detected in the groundwater samples collected from monitoring wells GW262S and GW264S at concentrations of 0.25 and 1.63 µg/L, respectively.

4.0 References

AMEC Environment & Infrastructure, Inc. (AMEC), 2012, Draft Cleanup Action Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, September.

AMEC, 2014, Draft Engineering Design Report, Boeing Renton Cleanup Plan Implementation, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, July.

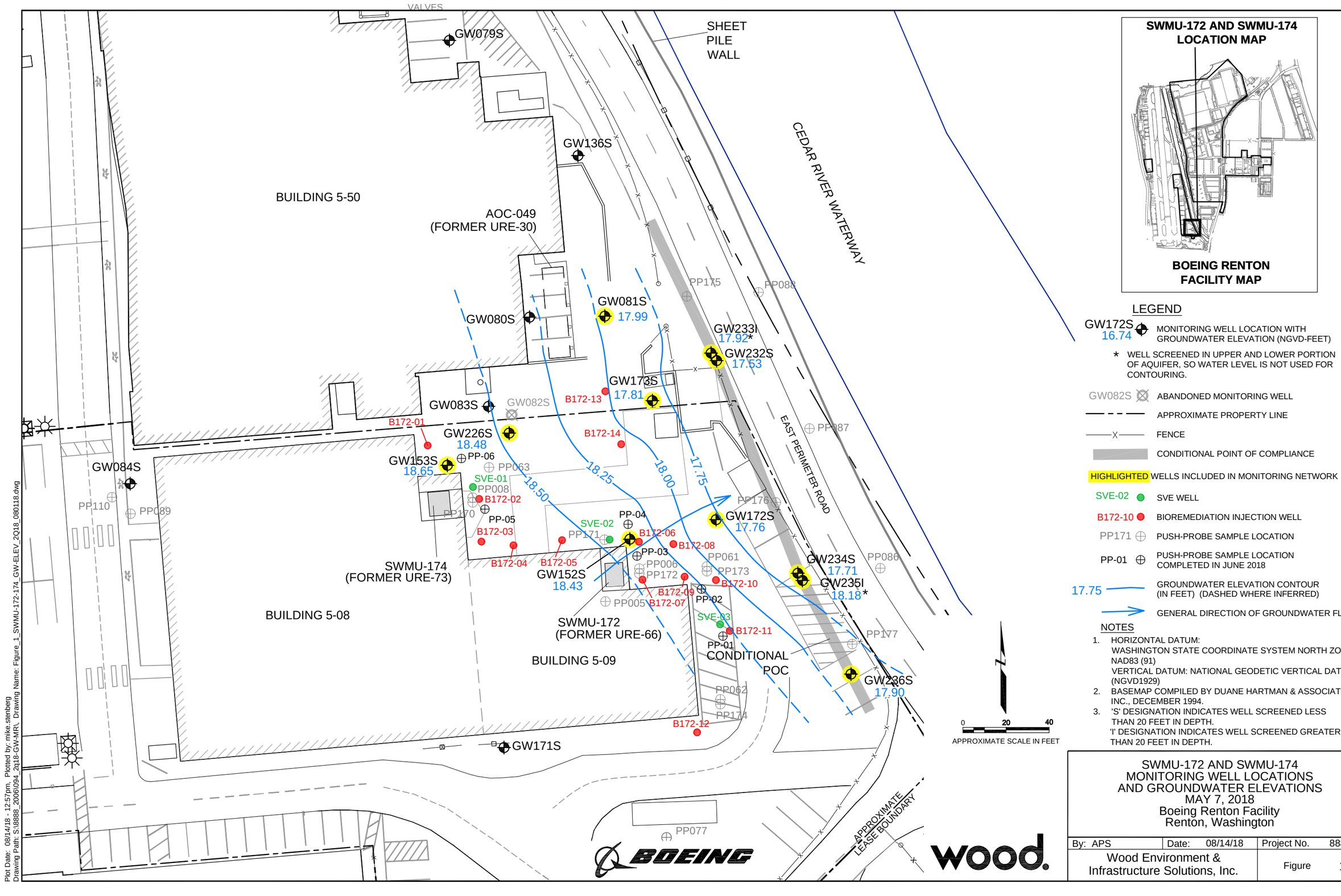
Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016a, Compliance Monitoring Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, February.

Amec Foster Wheeler, 2016b, Apron A Investigation Results, Renton Municipal Airport – Boeing Apron A Renton, Washington, June.

Amec Foster Wheeler, 2016c, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, February.

Amec Foster Wheeler, 2017, Second Addendum to the Compliance Monitoring Plan, Boeing Renton Facility, Renton Washington: Prepared for the Boeing Company, December.

Figures



SWMU-172 AND SWMU-174 LOCATION MAP

BOEING RENTON FACILITY MAP

LEGEND

- GW172S 16.74 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW082S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- SVE-02 — SVE WELL
- B172-10 — BIOREMEDIATION INJECTION WELL
- PP171 — PUSH-PROBE SAMPLE LOCATION
- PP-01 — PUSH-PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018
- 17.75 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NAD83 (91)
   VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.

SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 7, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	1

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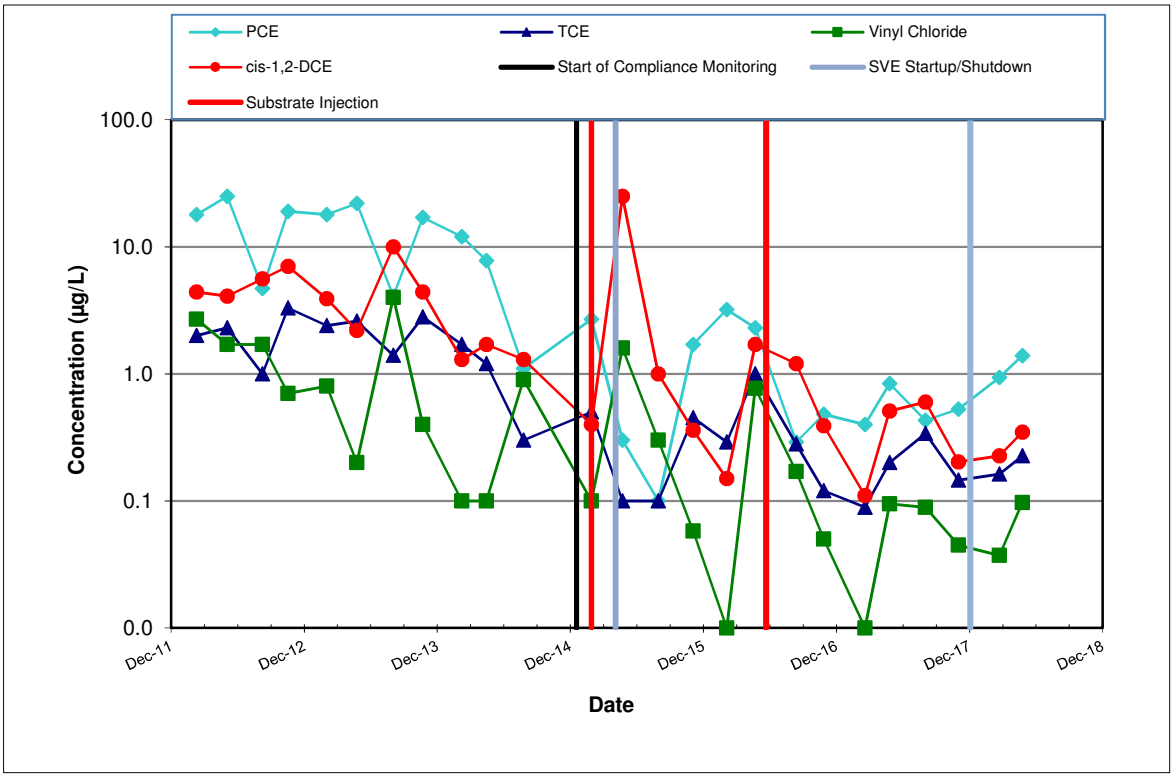
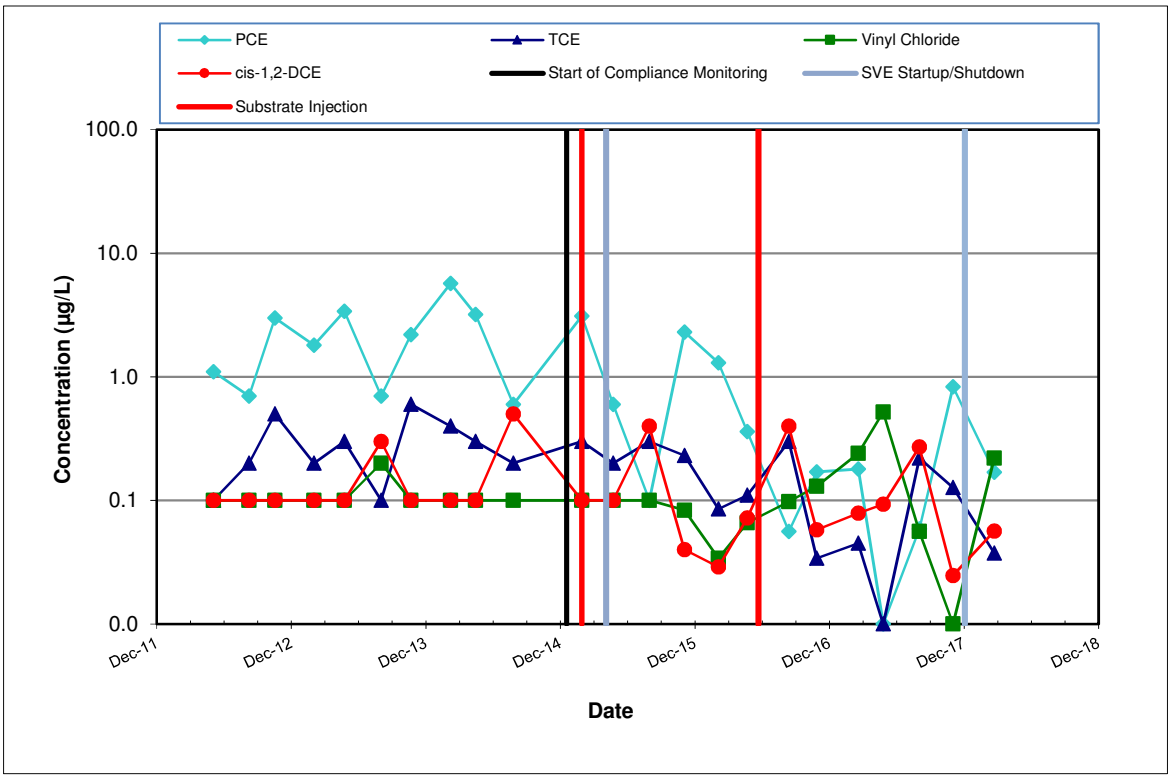


SOURCE AREA WELL GW152S



Note: non-detected values shown at one-half the reporting limit

SOURCE AREA WELL GW153S

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR SOURCE AREA WELLS GW152S AND GW153S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 2

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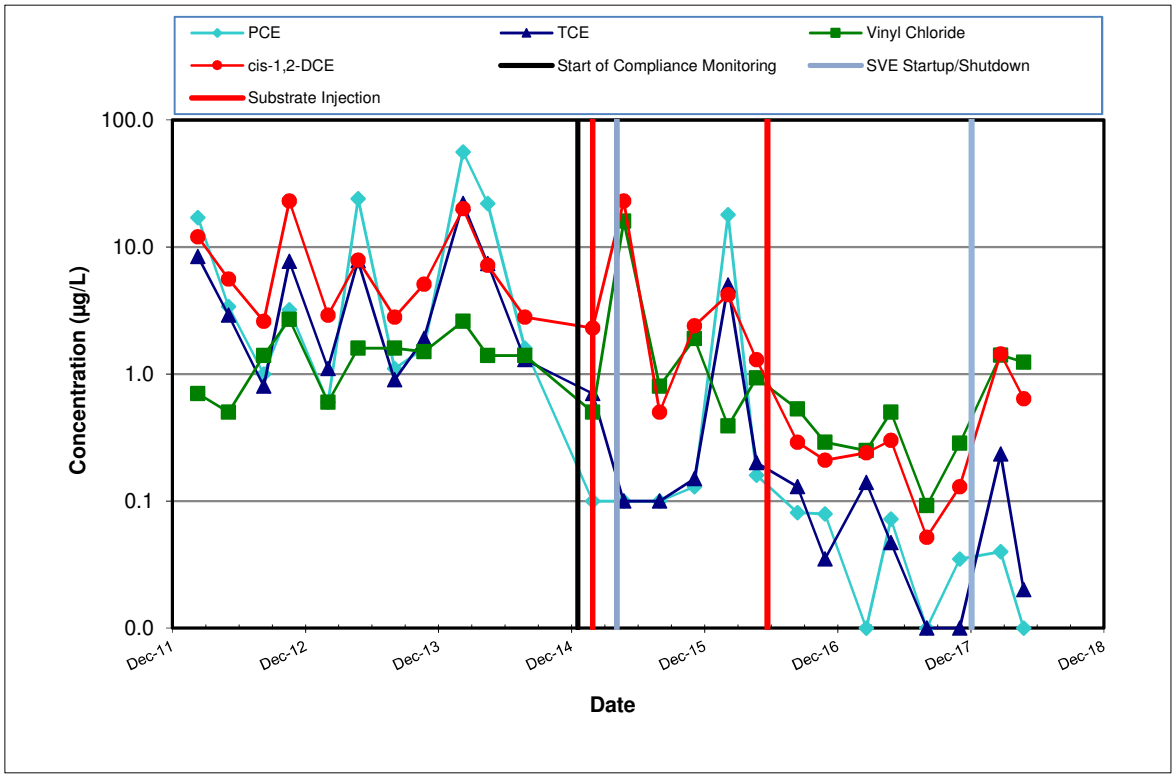
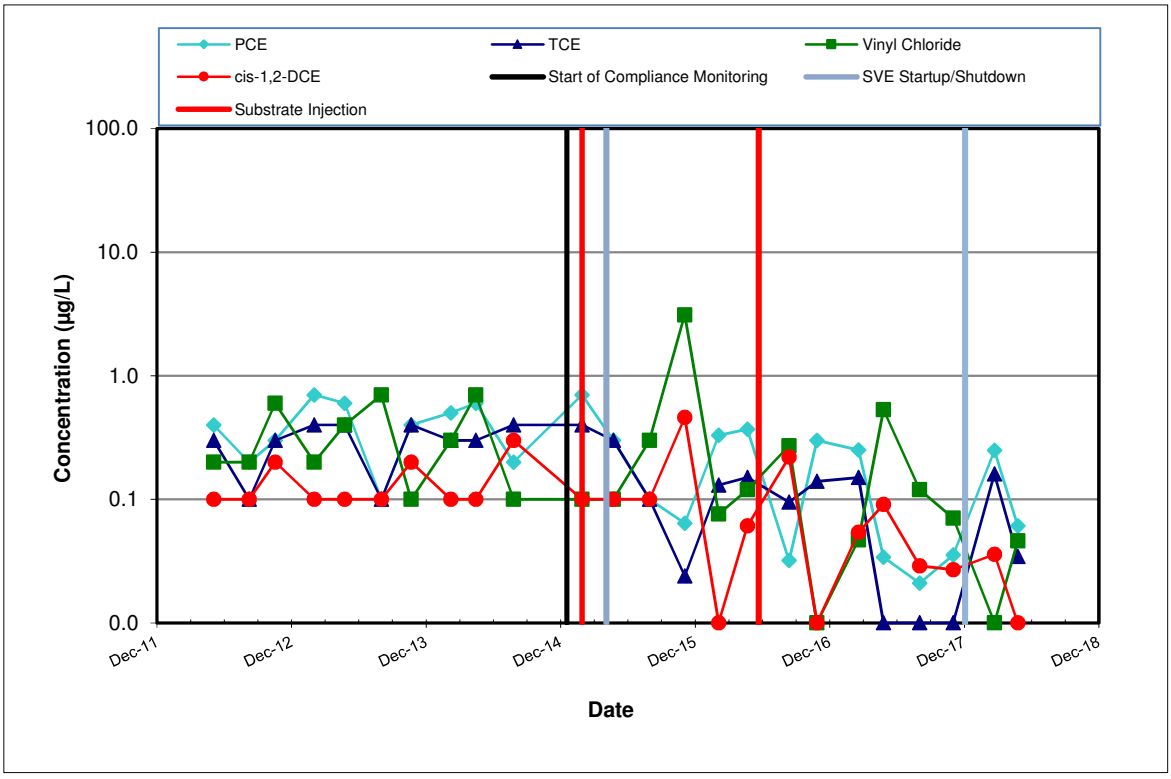


DOWNGRADIENT PLUME AREA WELL GW172S



Note: non-detected values shown at one-half the reporting limit

DOWNGRADIENT PLUME AREA WELL GW173S

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW172S AND GW173S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 3

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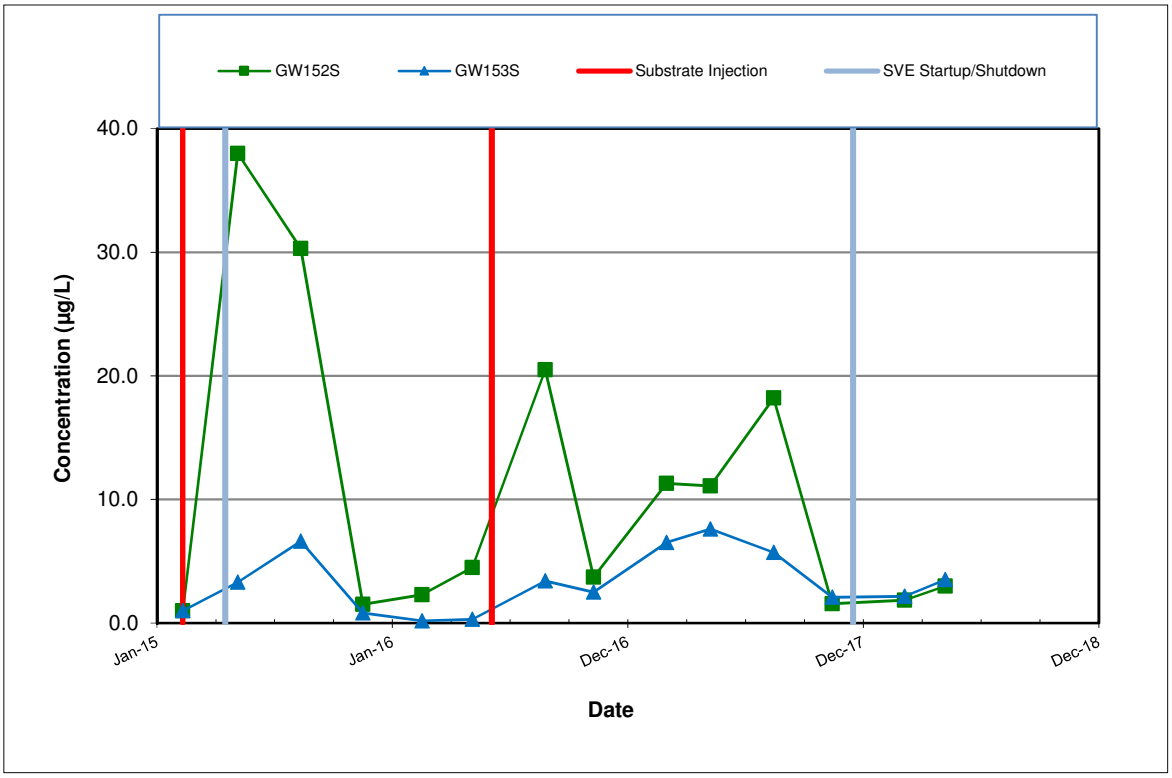
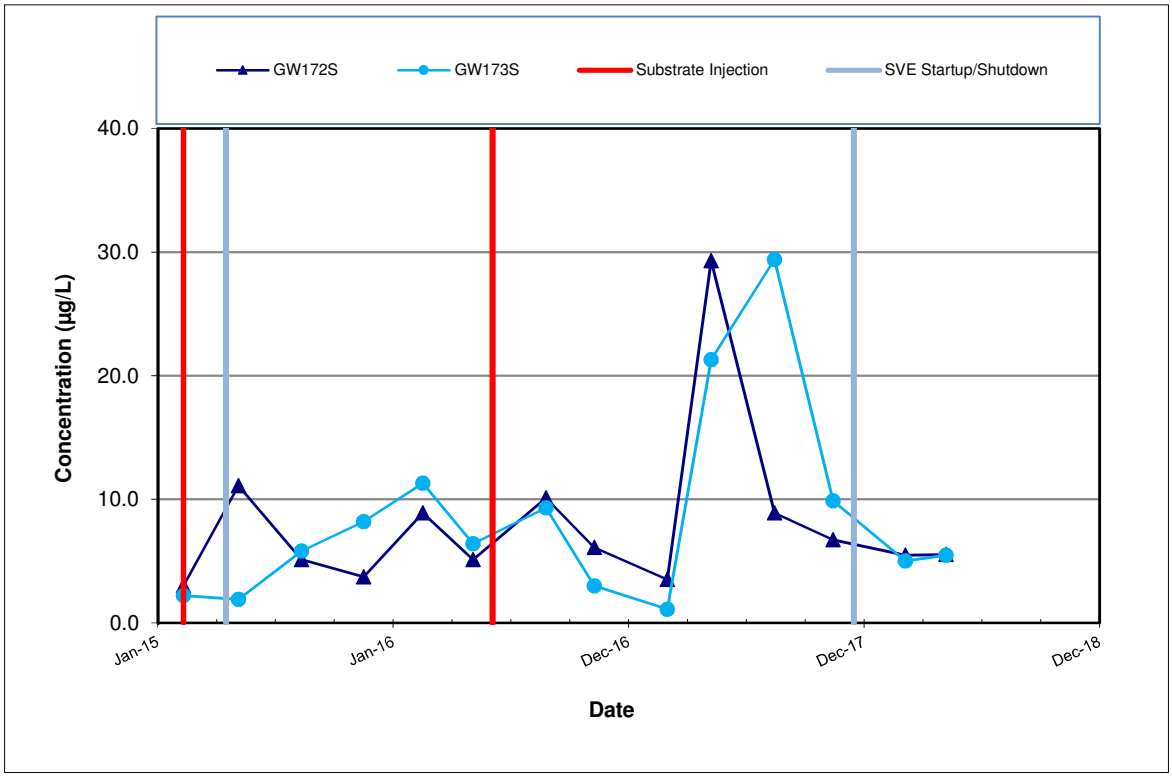


TOTAL ARSENIC IN SOURCE AREA WELLS



TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

Note: non-detected values shown at one-half the reporting limit

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC IN SELECT SOURCE AREA AND DOWNGRADIENT PLUME AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 4

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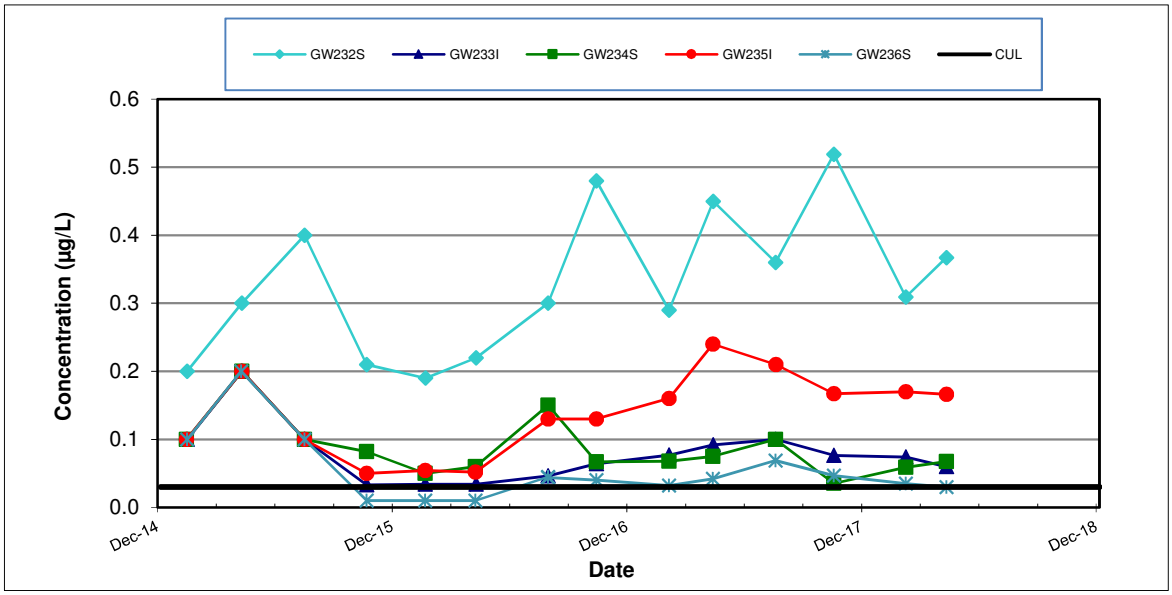
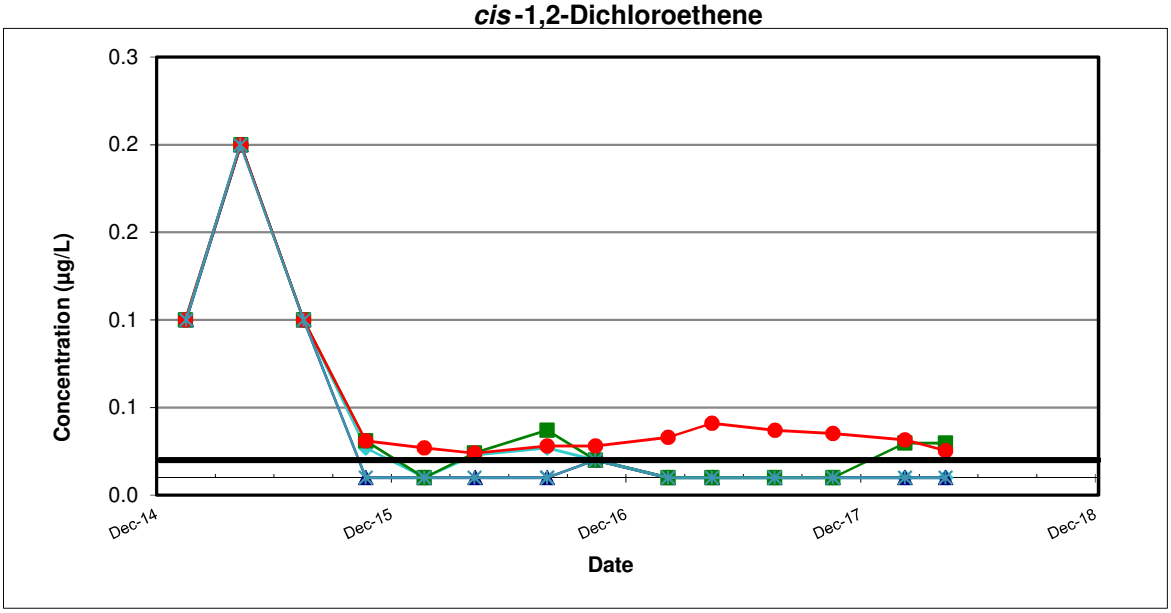
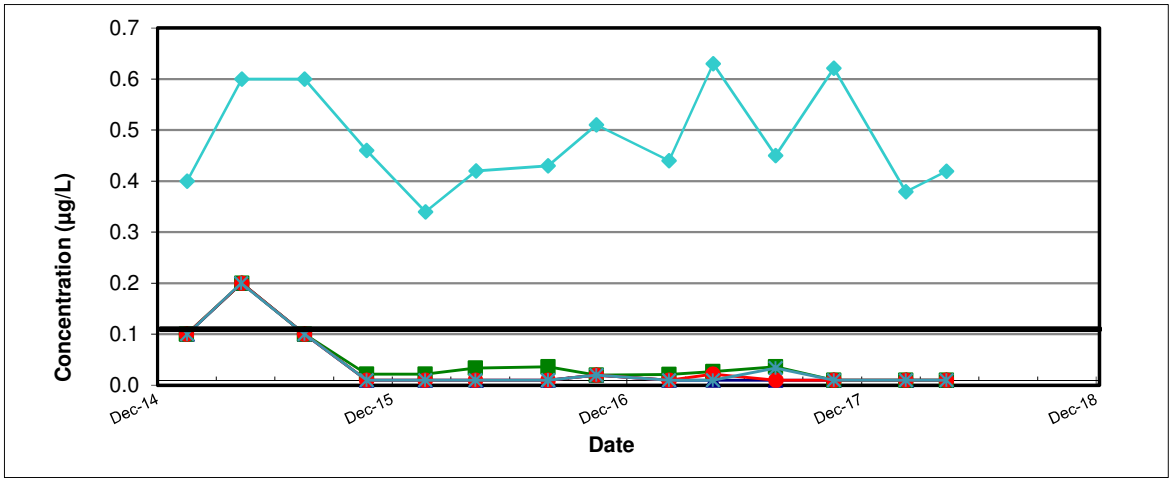


***cis*-1,2-Dichloroethene**



Trichloroethene



Vinyl Chloride

wood.

SWMU-172 AND SWMU-174 TREND PLOTS FOR *CIS*-1,2-DCE, TRICHLOROETHENE, AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 5

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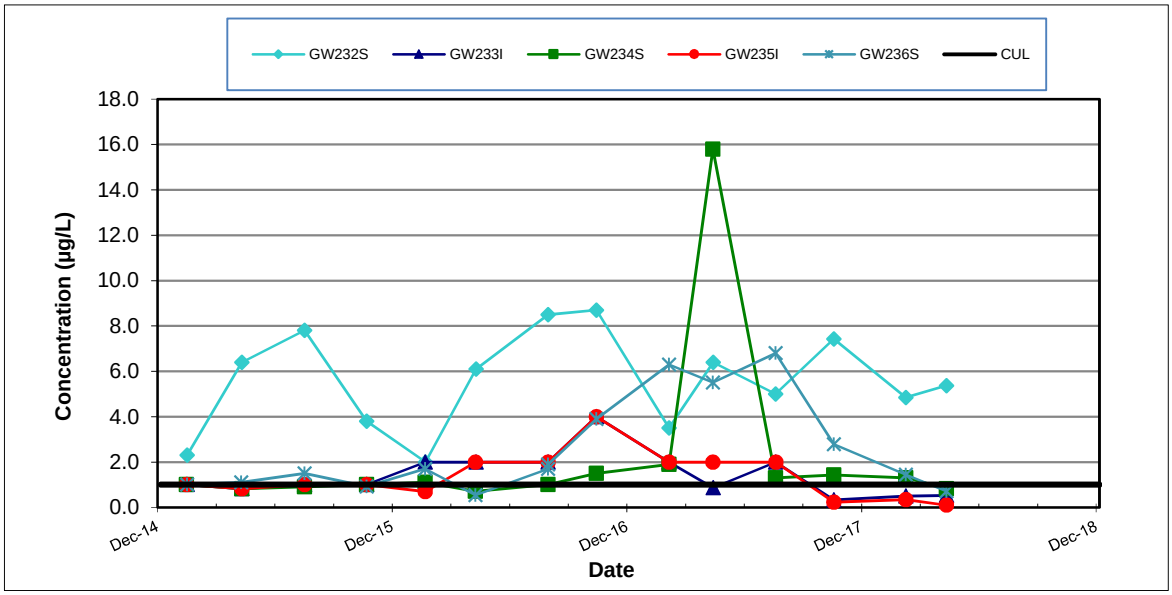
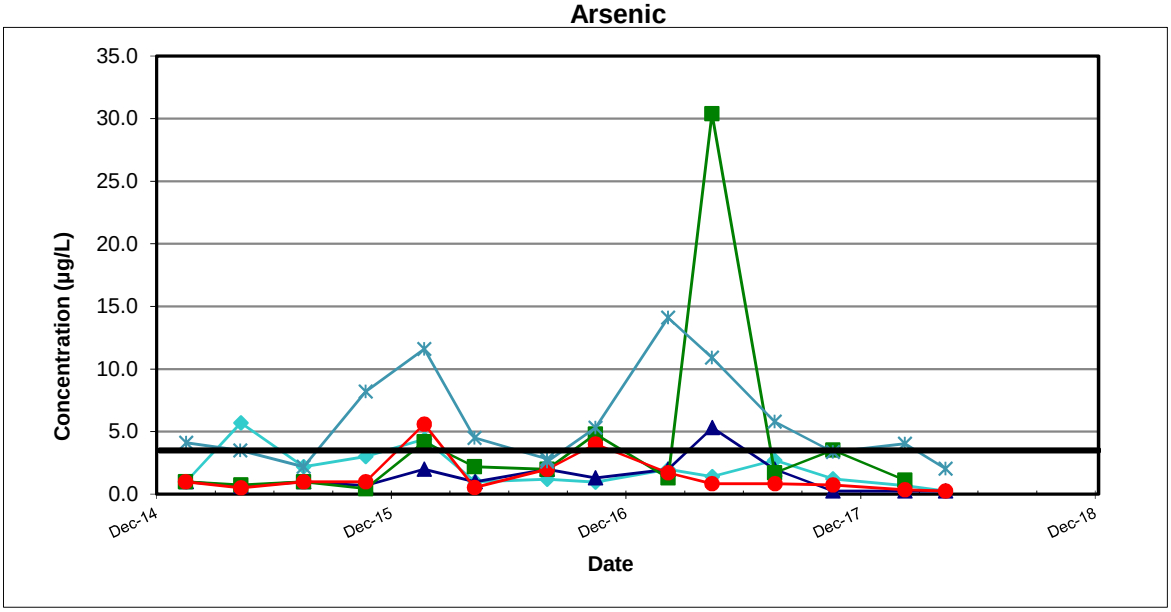
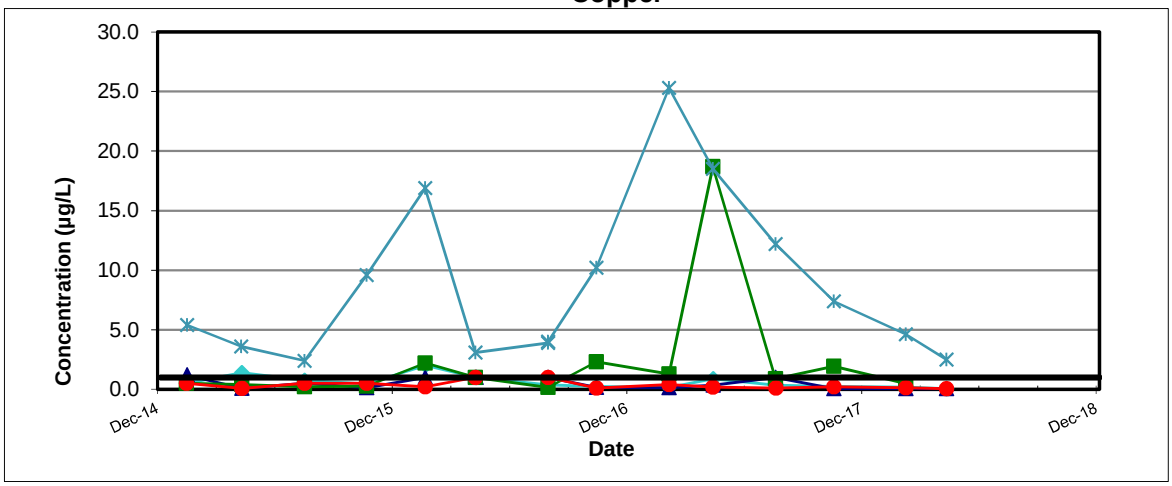


Arsenic



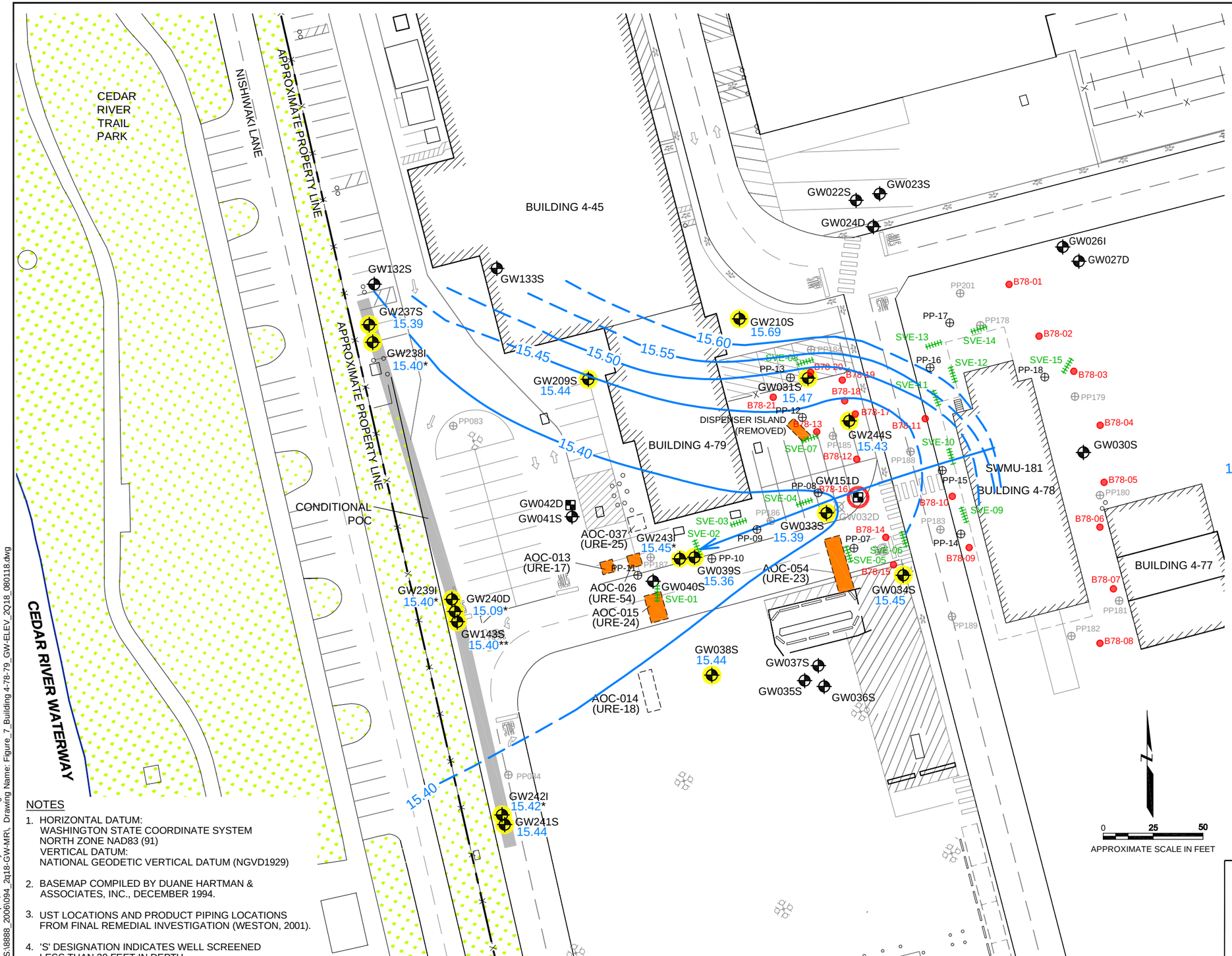
Copper



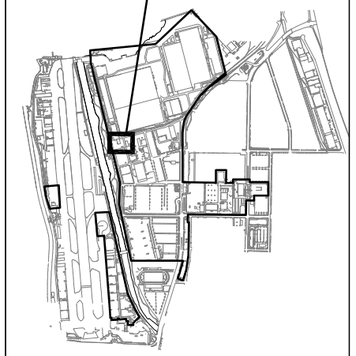
Lead

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 6



4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW031S 14.39 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

* WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.

** WATER LEVEL IS ANOMALOUS, NOT USED FOR CONTOURING.

14.30 — GROUNWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

GW042D — EXTRACTION WELL

GW032D — ABANDONED MONITORING WELL

SVE-15 — HORIZONTAL SVE WELL

B78-12 — BIOREMEDIATION INJECTION WELL

EXTRACTION WELL CONVERTED TO INJECTION WELL

PP083 — PUSH-PROBE SAMPLE LOCATION

PP-10 — PUSH-PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018

FENCE

APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS

REMOVED UST (WESTON, 2001)

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. UST LOCATIONS AND PRODUCT PIPING LOCATIONS FROM FINAL REMEDIAL INVESTIGATION (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED BETWEEN 20 AND 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.

BOEING

wood.

BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 7, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 7

Plot Date: 08/14/18 - 12:49pm, Plotted by: mike.stenberg
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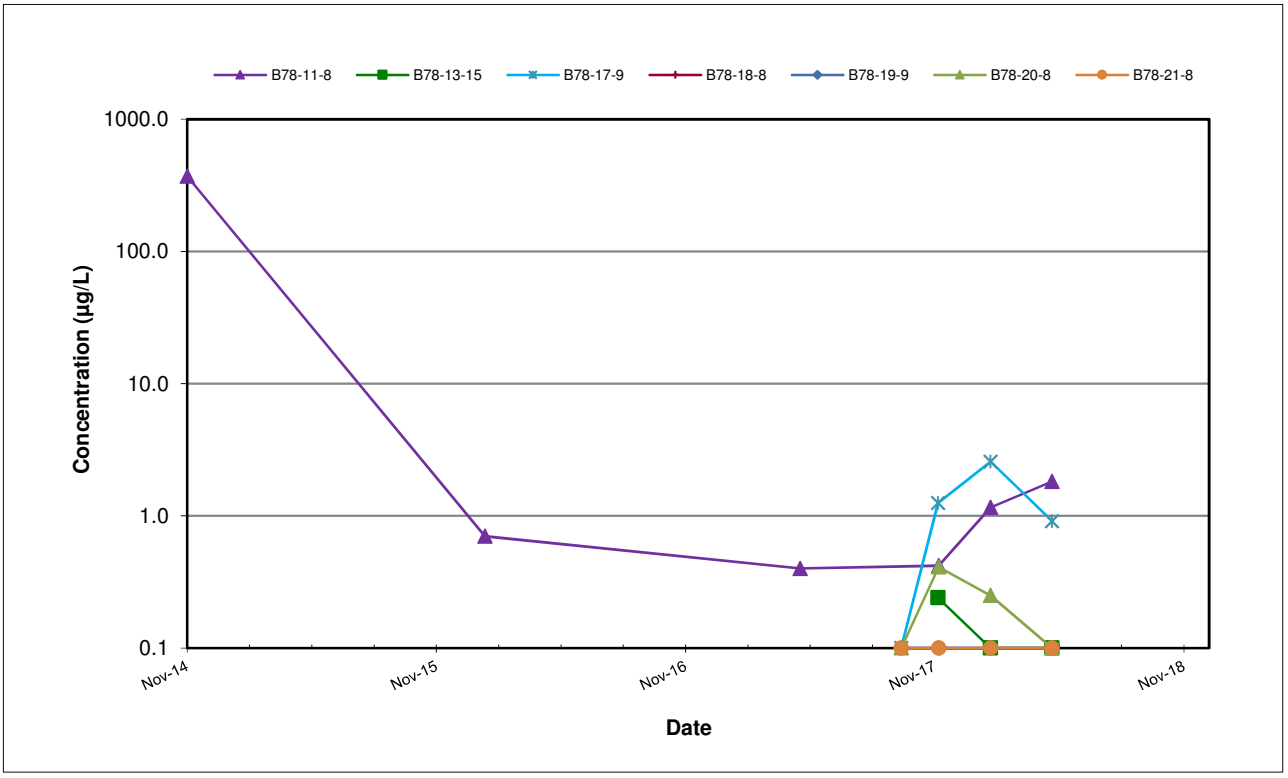

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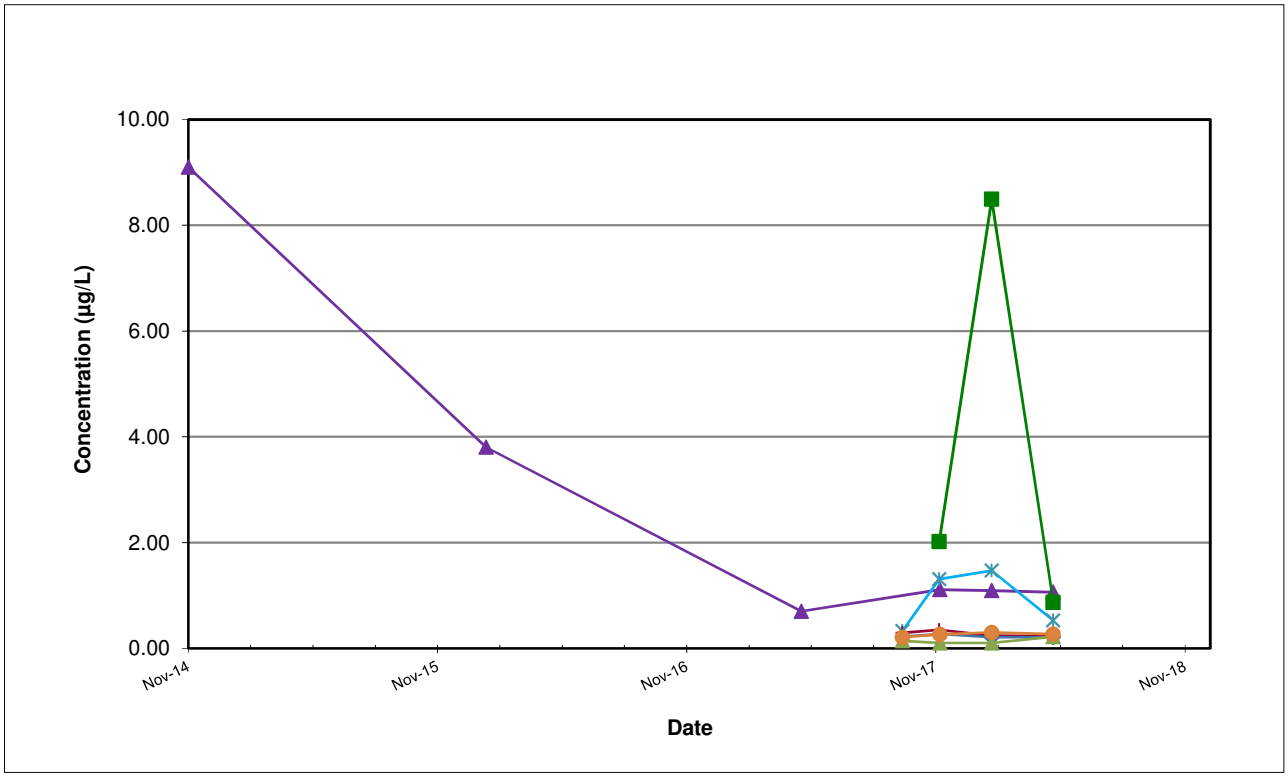


non-detected values shown at one-half the reporting limit

Vinyl Chloride

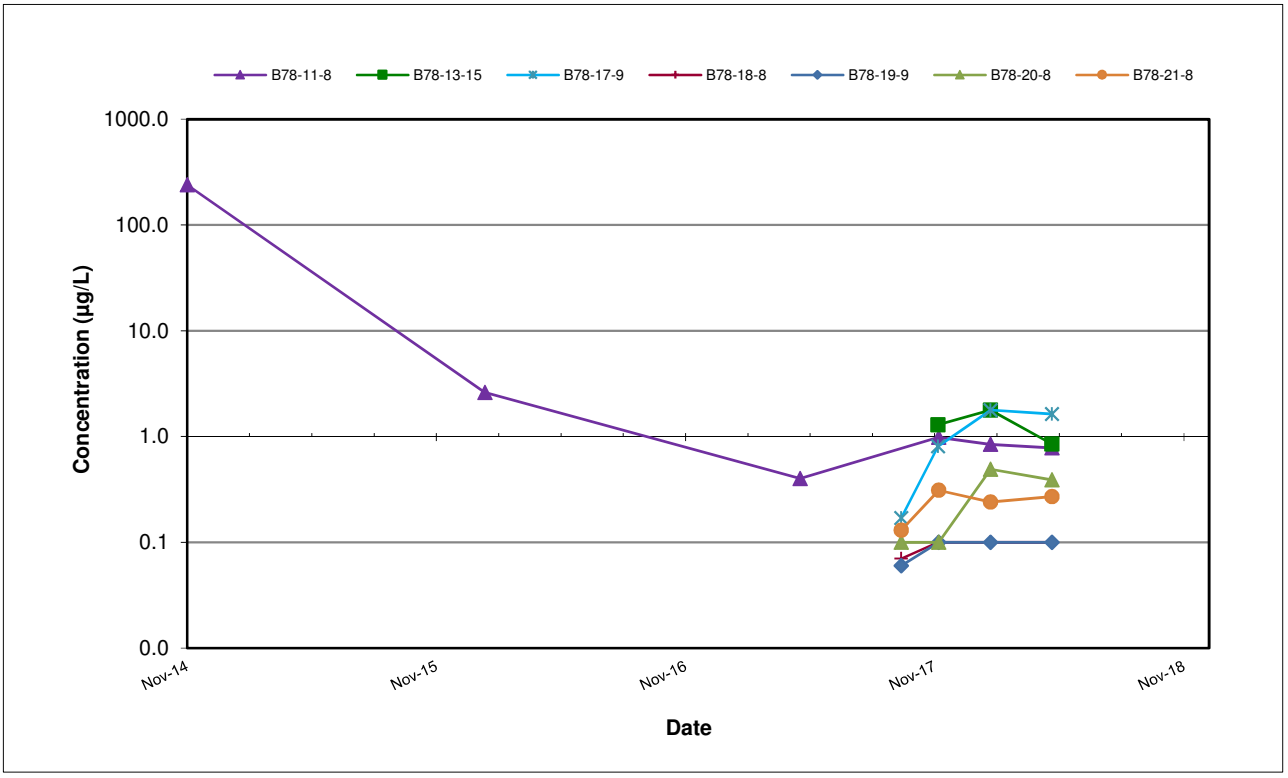
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

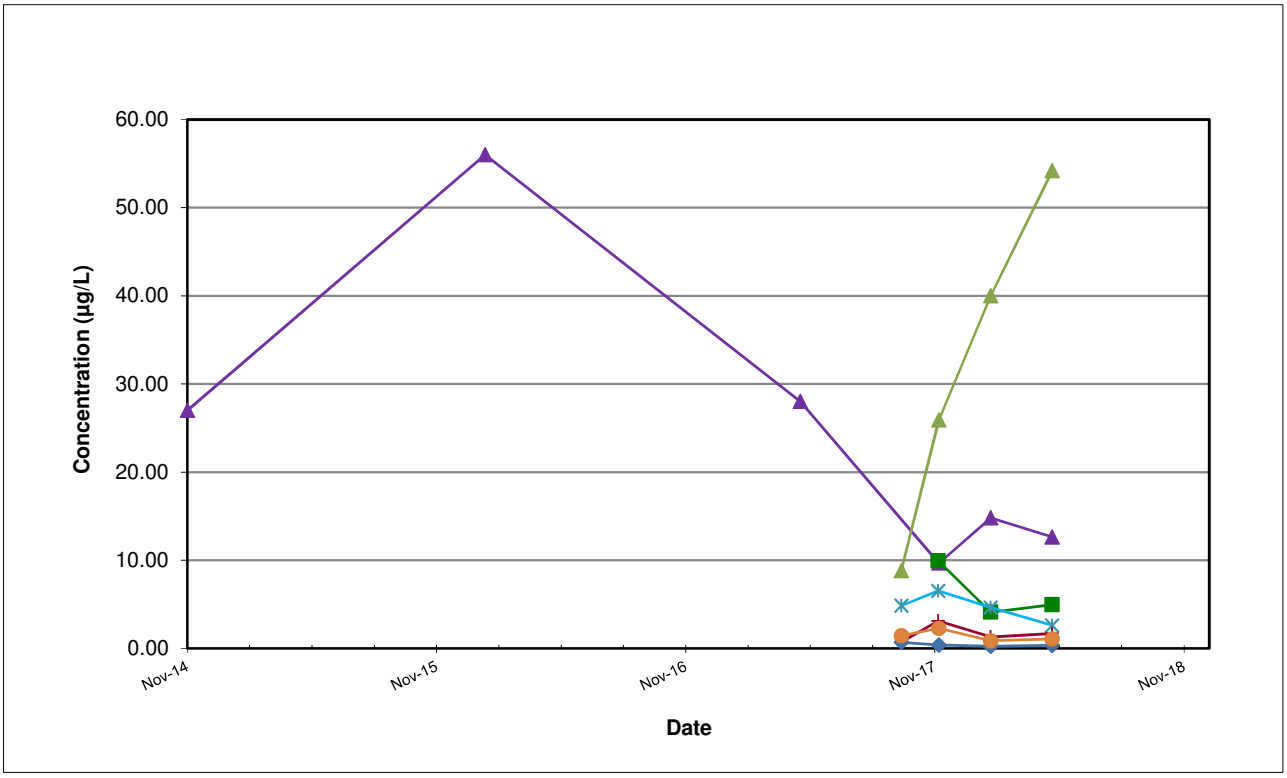
BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR
TRICHLOROETHENE AND VINYL CHLORIDE IN INJECTION WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 8



cis-1,2-Dichloroethene



non-detected values shown at one-half the reporting limit

Benzene

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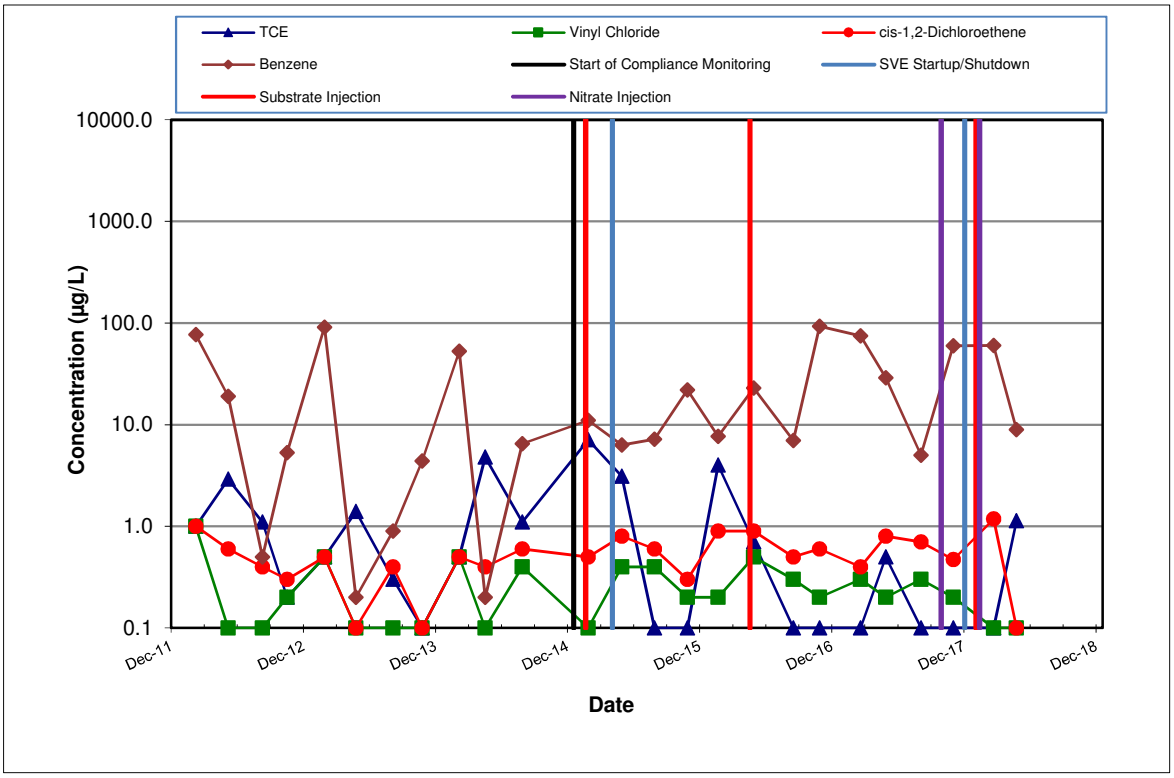
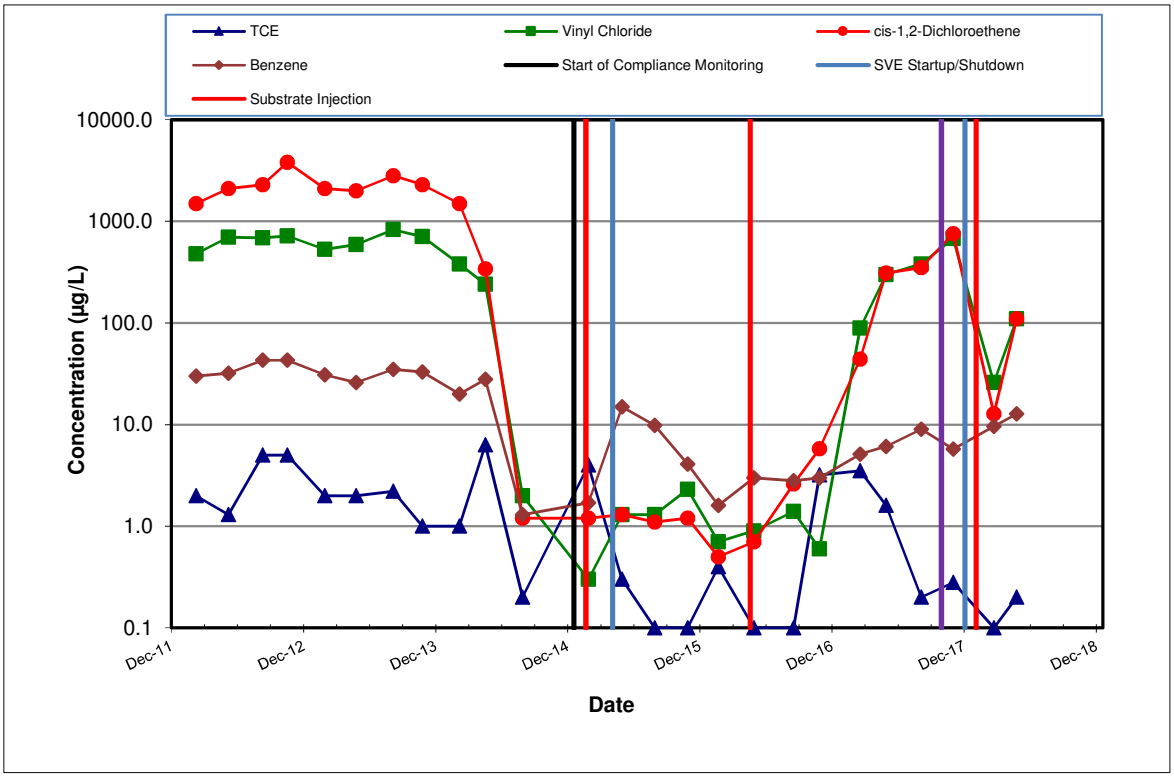
wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR cis-1,2-DICHLOROETHENE AND BENZENE IN INJECTION WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 9



SOURCE AREA WELL GW031S

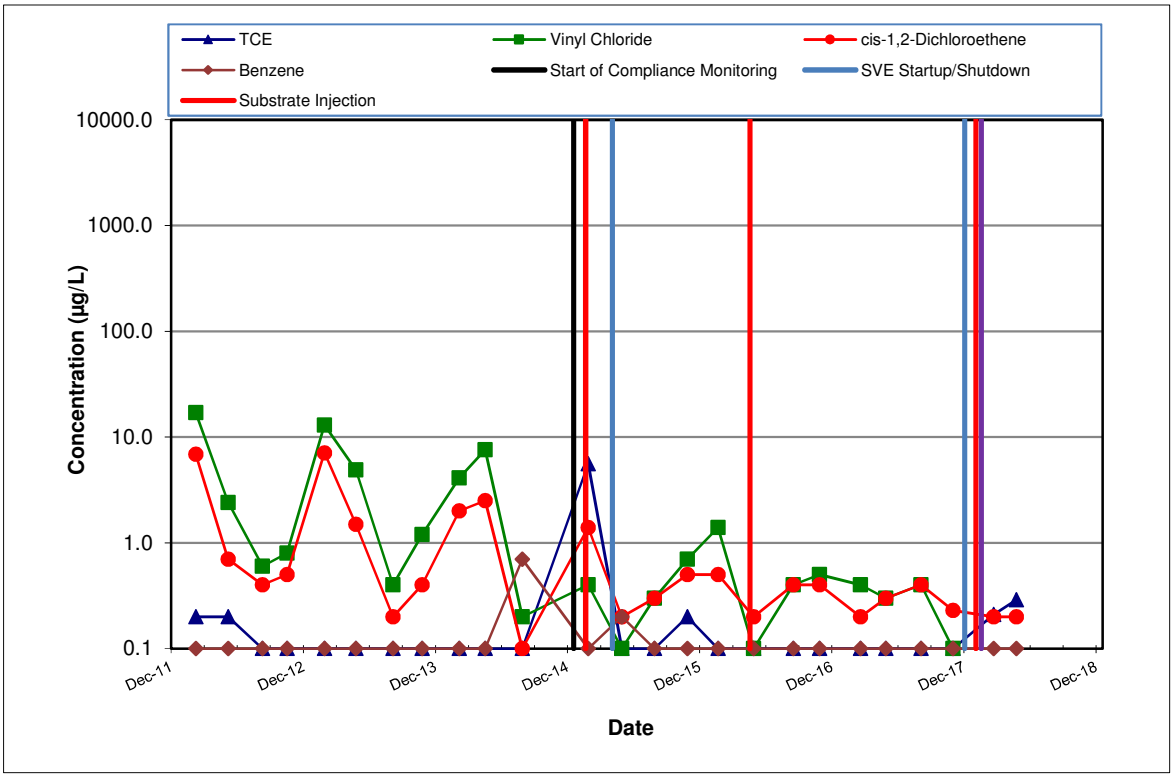


Note: non-detected values shown at one-half the reporting limit

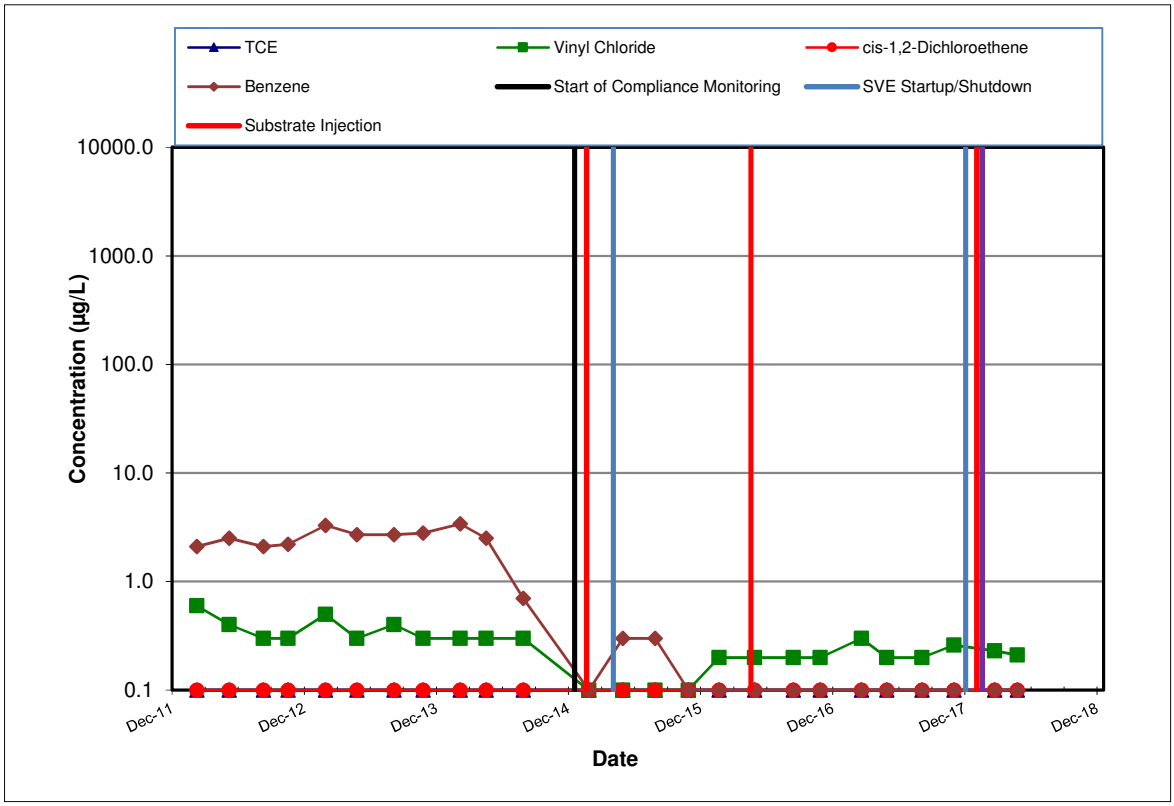
SOURCE AREA WELL GW033S

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW031S AND GW033S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 10

\\sea2-fs1\projectF$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls



SOURCE AREA WELL GW034S

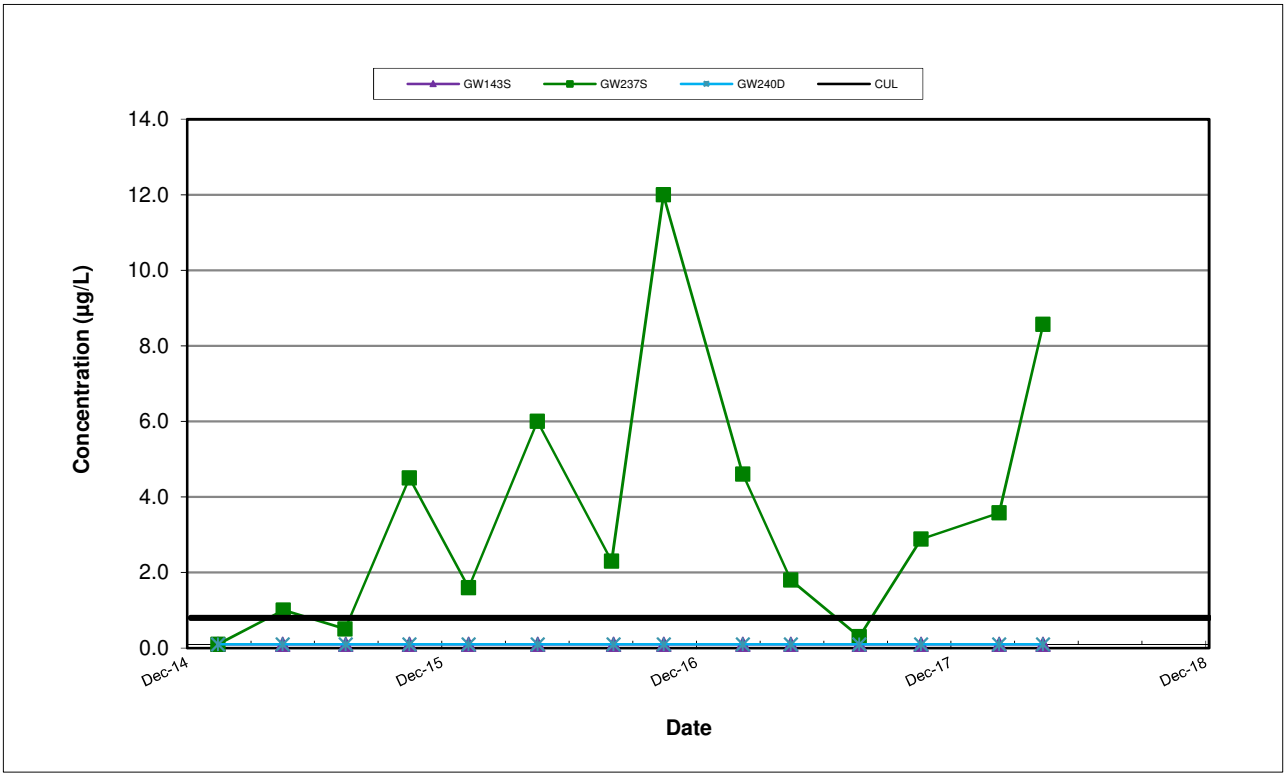


Note: non-detected values shown at one-half the reporting limit

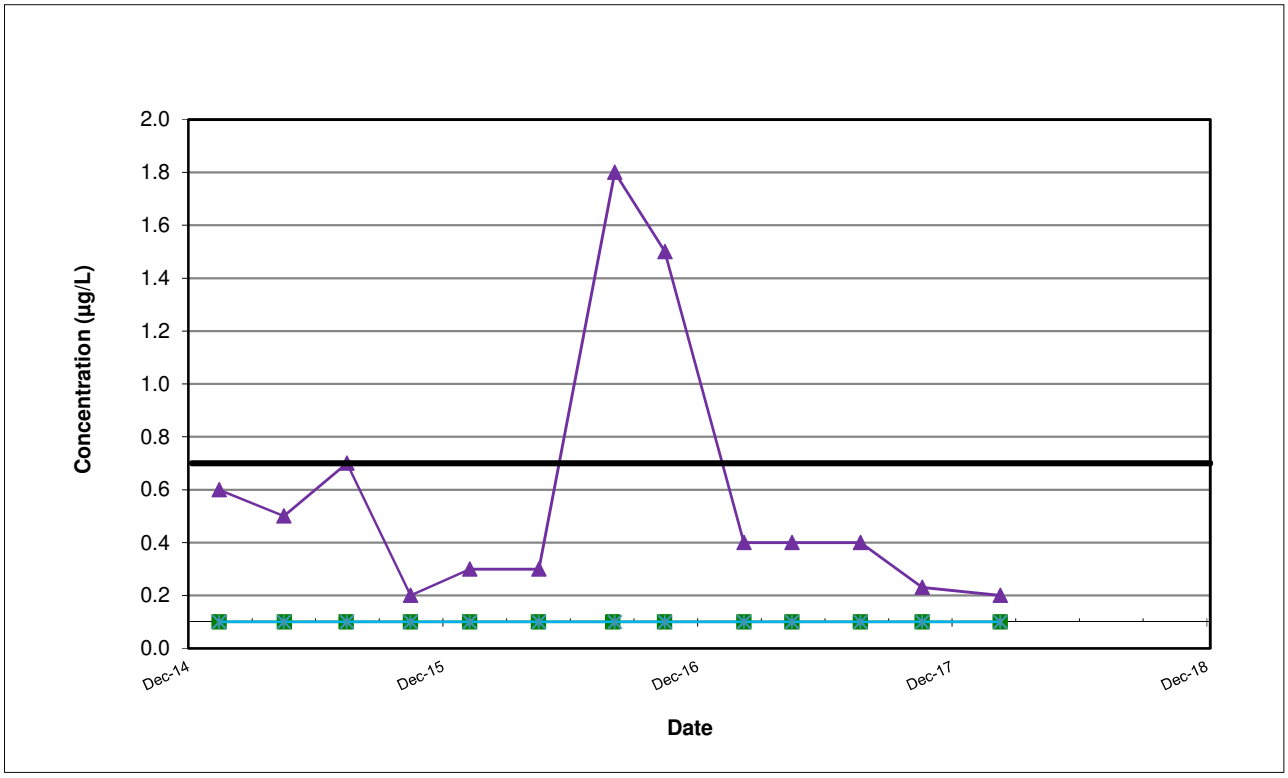
DOWNGRADIENT PLUME AREA WELL GW209S

wood.	BLDG 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELL GW034S AND DOWNGRADIENT PLUME AREA WELL GW209S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 11

\\sea2-fs1\projectF$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls



Benzene



non-detected values shown at one-half the reporting limit

cis-1,2-Dichloroethene

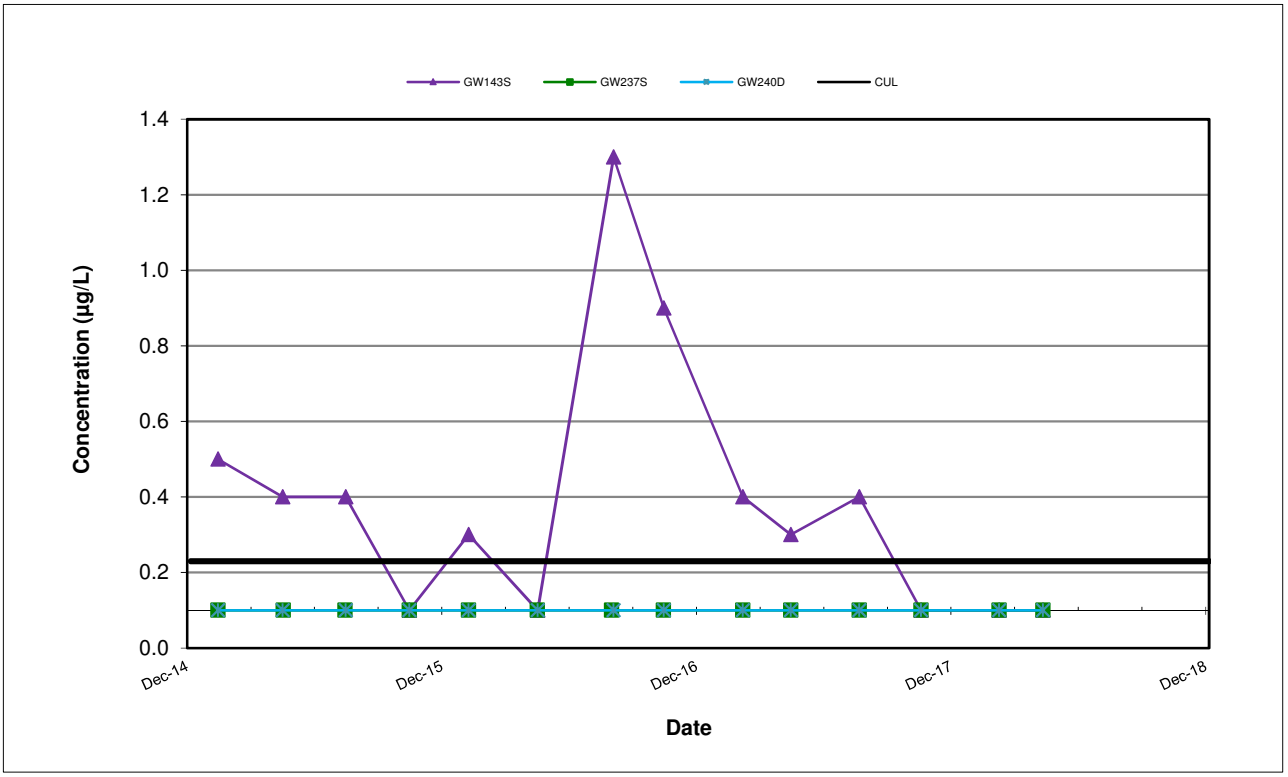
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

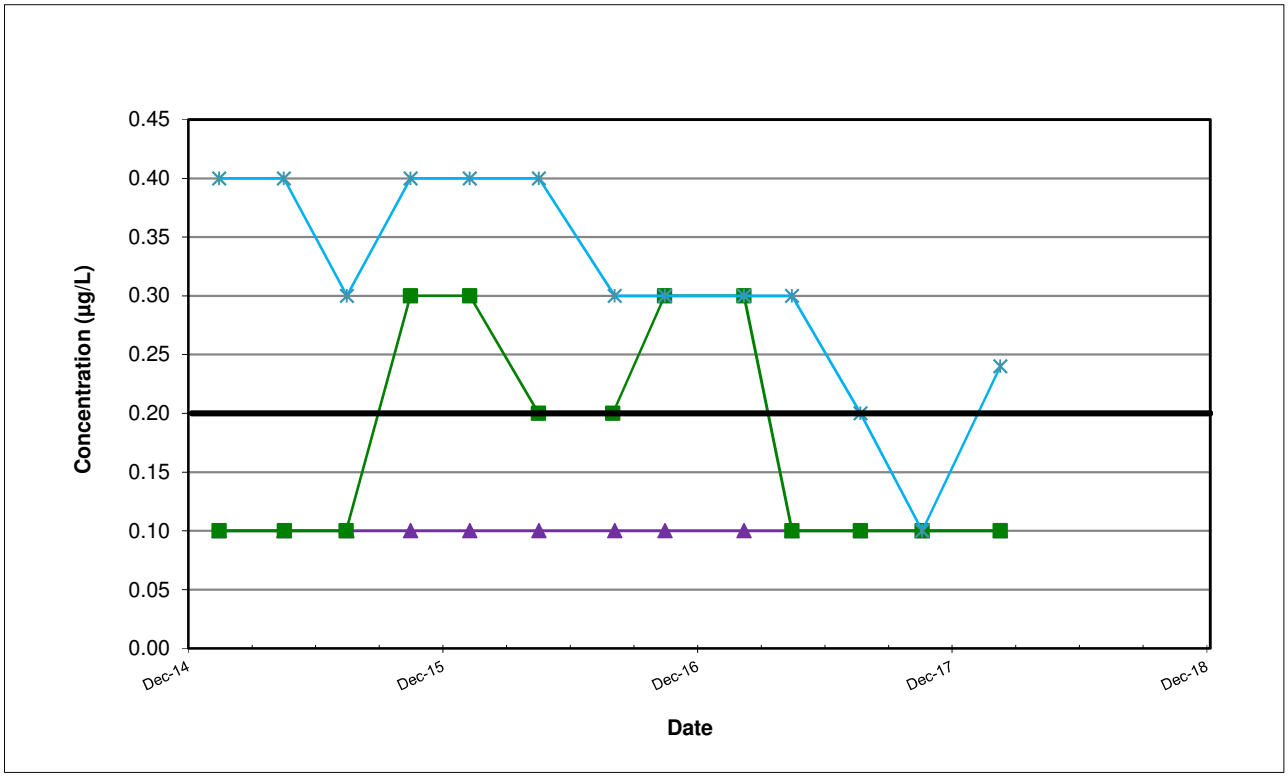
BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR BENZENE AND cis-1,2-DICHLOROETHENE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 12



Trichloroethene



non-detected values shown at one-half the reporting limit

Vinyl Chloride

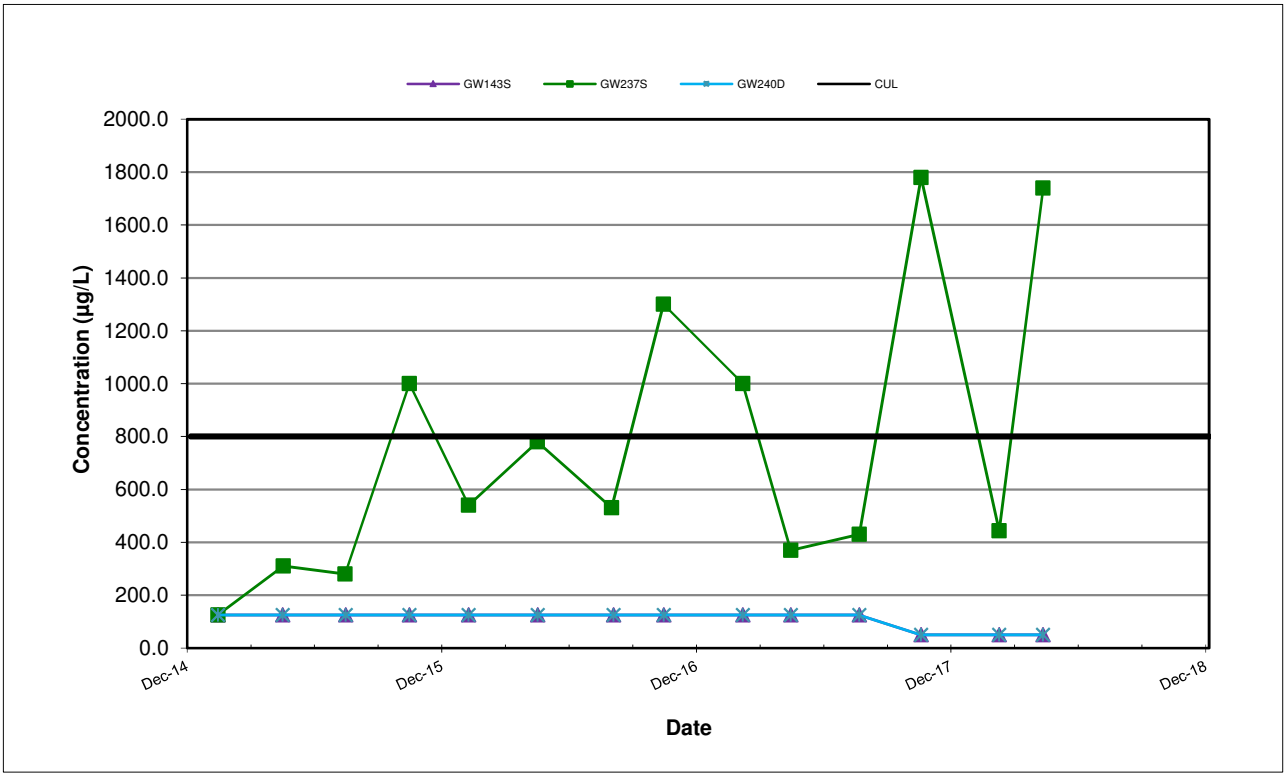
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR
TRICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 13

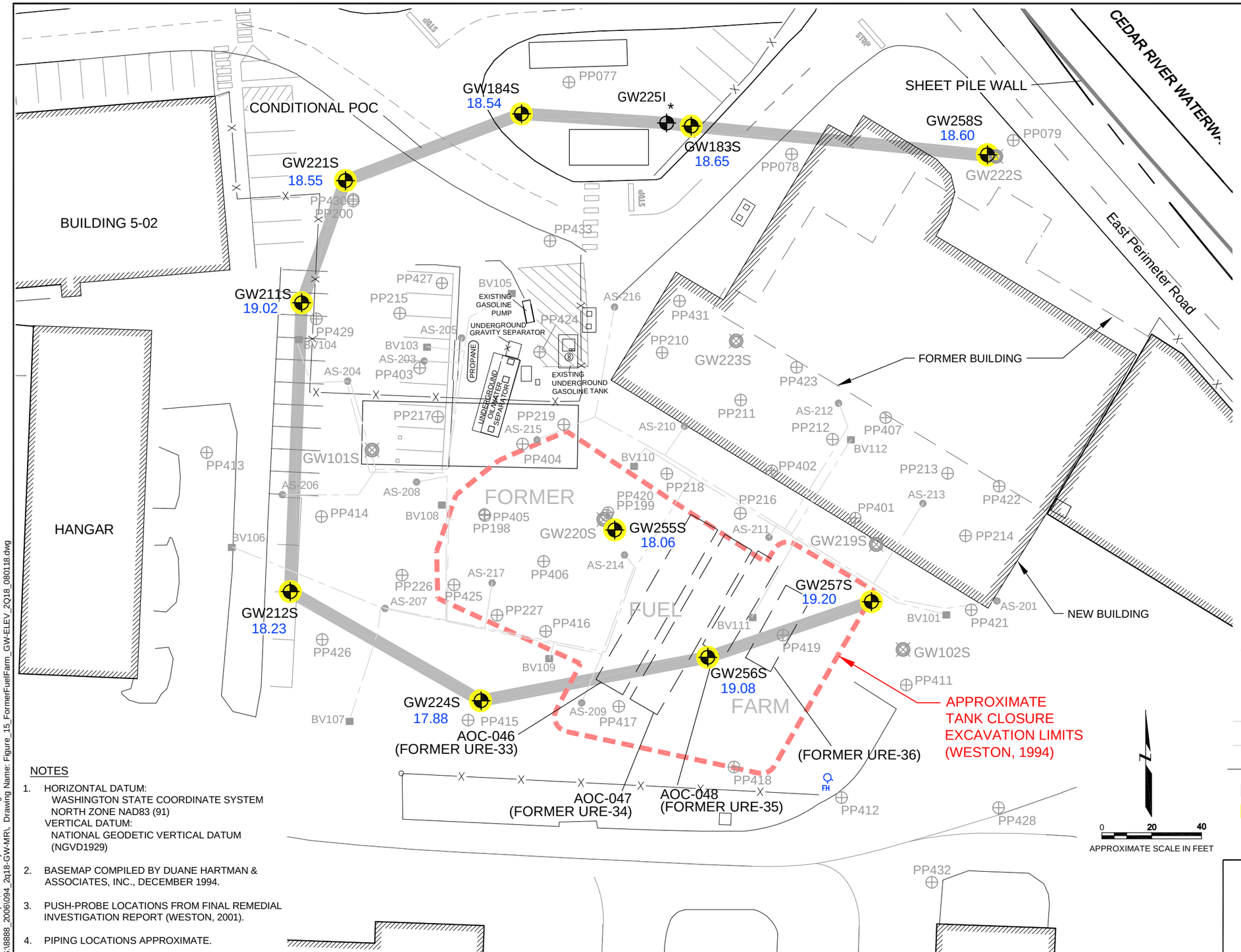


TPH as Gasoline

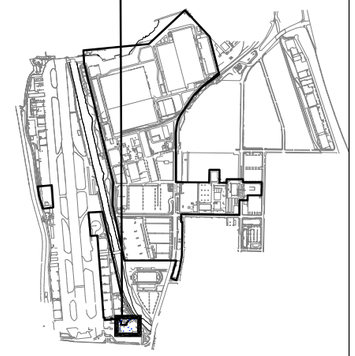
non-detected values shown at one-half the reporting limit

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TPH AS GASOLINE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 14

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls



FORMER FUEL FARM AOC GROUP
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW184S — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- PP042 — PUSH PROBE LOCATION
- GW222S — ABANDONED GROUNDWATER MONITORING WELL
- AS-204 — FORMER UNDERGROUND AIR SPARGING WELL
- BV112 — FORMER UNDERGROUND BIOVENTING WELL
- FORMER UNDERGROUND BIOVENTING LINE
- FORMER UNDERGROUND AIR SPARGING LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

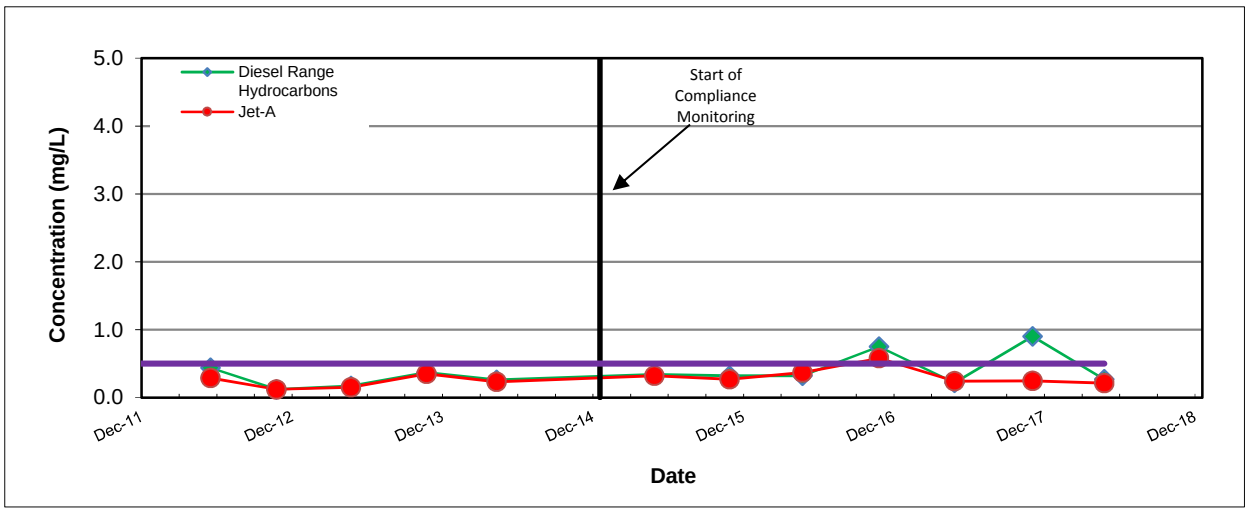
NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM
   (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH-PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. PIPING LOCATIONS APPROXIMATE.
5. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.

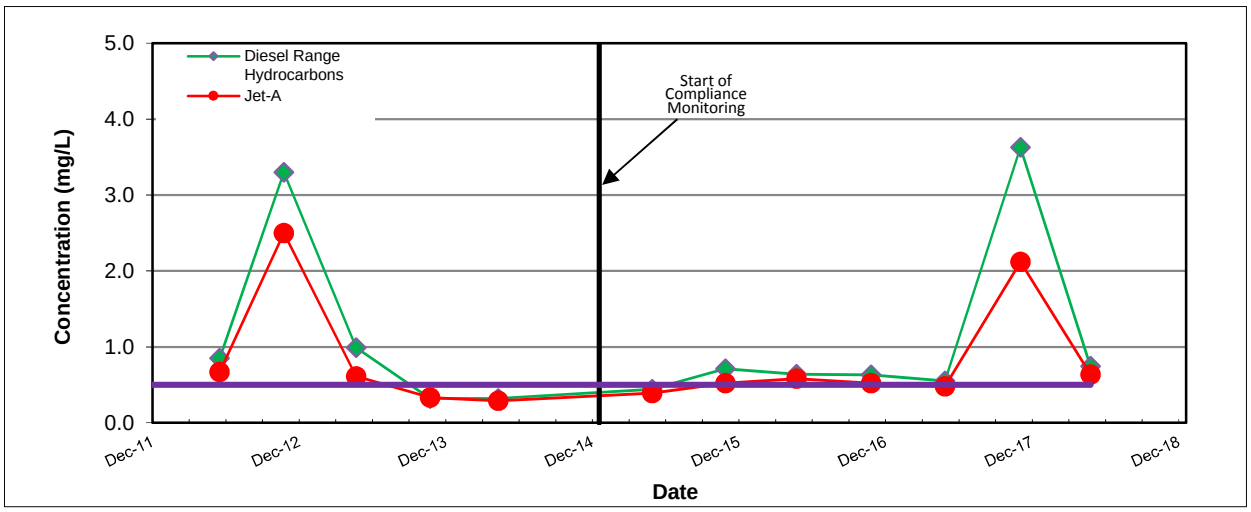
FORMER FUEL FARM AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 7, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 15

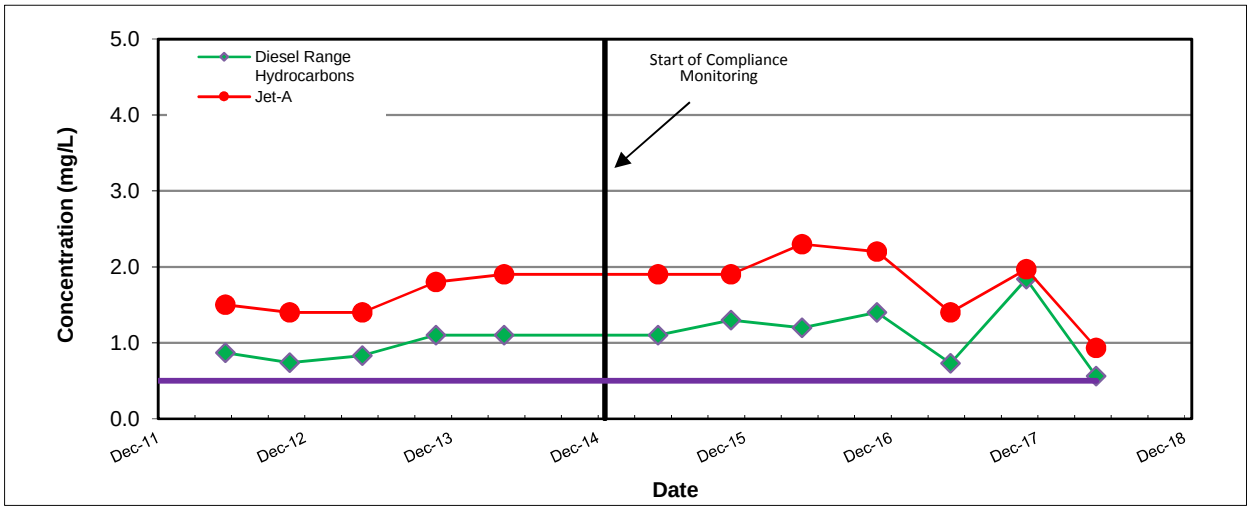
Plot Date: 08/14/18 - 12:47pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\094_2q18-GW-MR\, Drawing Name: Figure_15_FormerFuelFarm_GW-ELEV_2Q18_080118.dwg



CPOC WELL GW211S



CPOC WELL GW221S

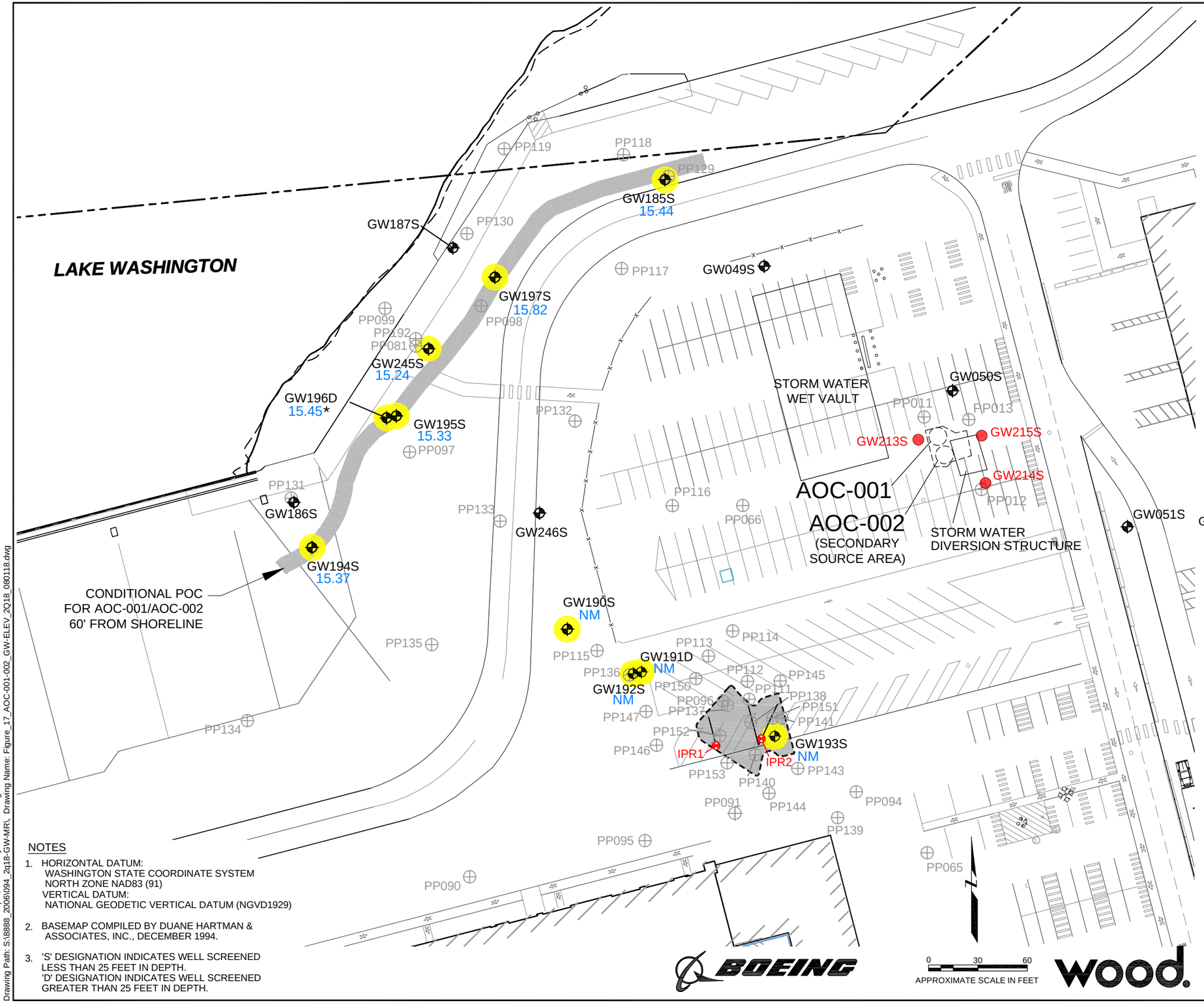


Note: non-detected values shown at one-half the reporting limit

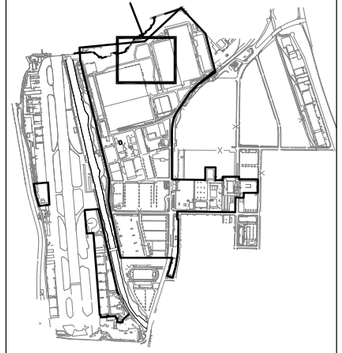
CPOC WELL GW224S

wood.	FORMER FUEL FARM AOC GROUP TREND PLOTS FOR CPOC AREA WELLS GW211S, GW221S, AND GW224S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 16

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Fig 10 FFF CPOC trends.xls



AOC-001 AND AOC-002
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW195S 13.78 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- NM — NOT MEASURED
- * — WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW227S — ABANDONED MONITORING WELL
- GW215S — EXISTING ELECTRON DONOR INJECTION WELL
- IPR1 — EXISTING INJECTION PIPE RISER
- PP011 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- APPROXIMATE LIMIT OF NOVEMBER 2005 SOURCE AREA EXCAVATION
- AOC-001, AOC-002 CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.

AOC-001 AND AOC-002
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MAY 8, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 17

Plot Date: 08/14/18 - 1:45pm Plotted by: mike.stenberg
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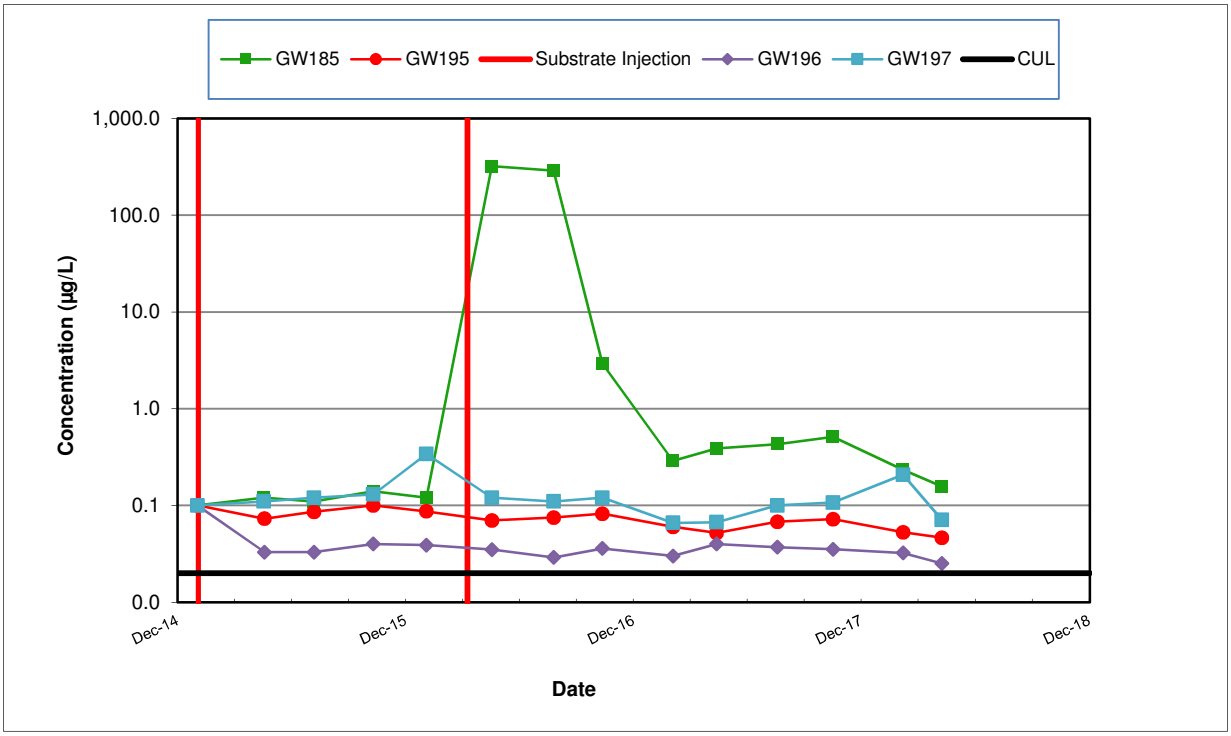
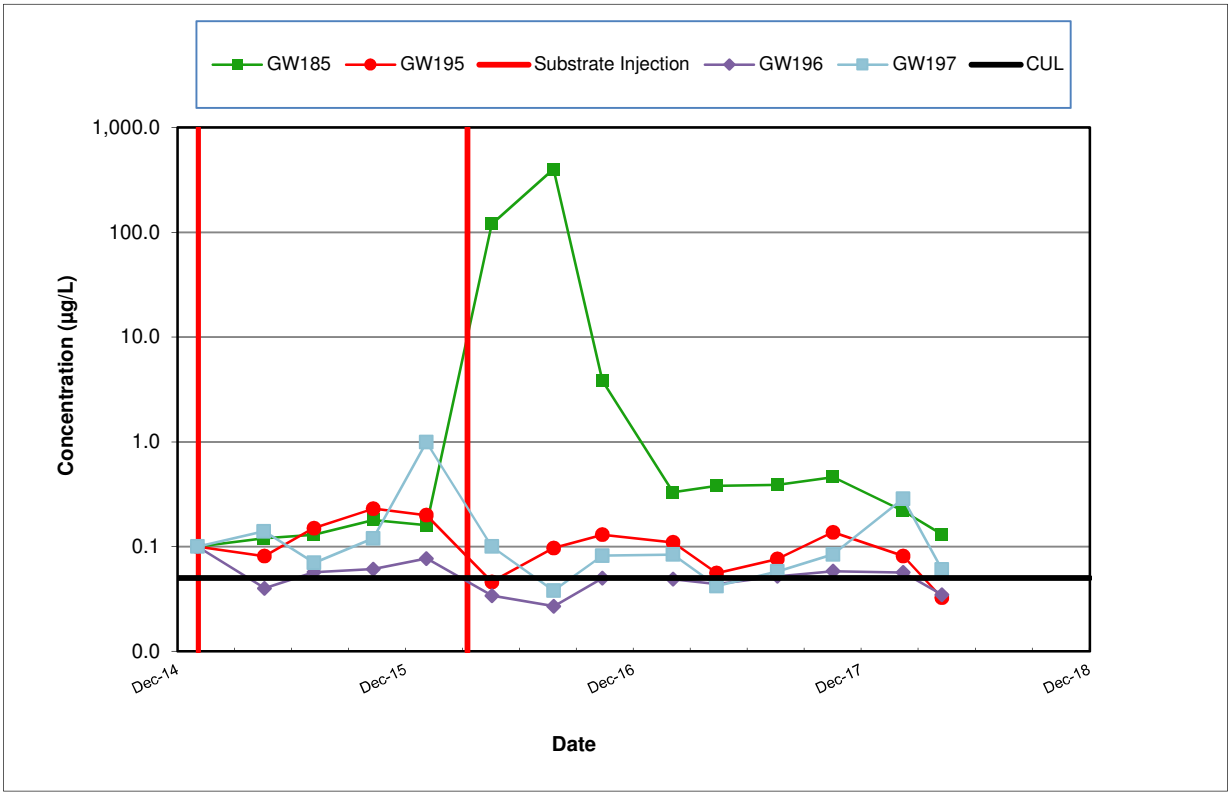


cis-1,2-Dichloroethene

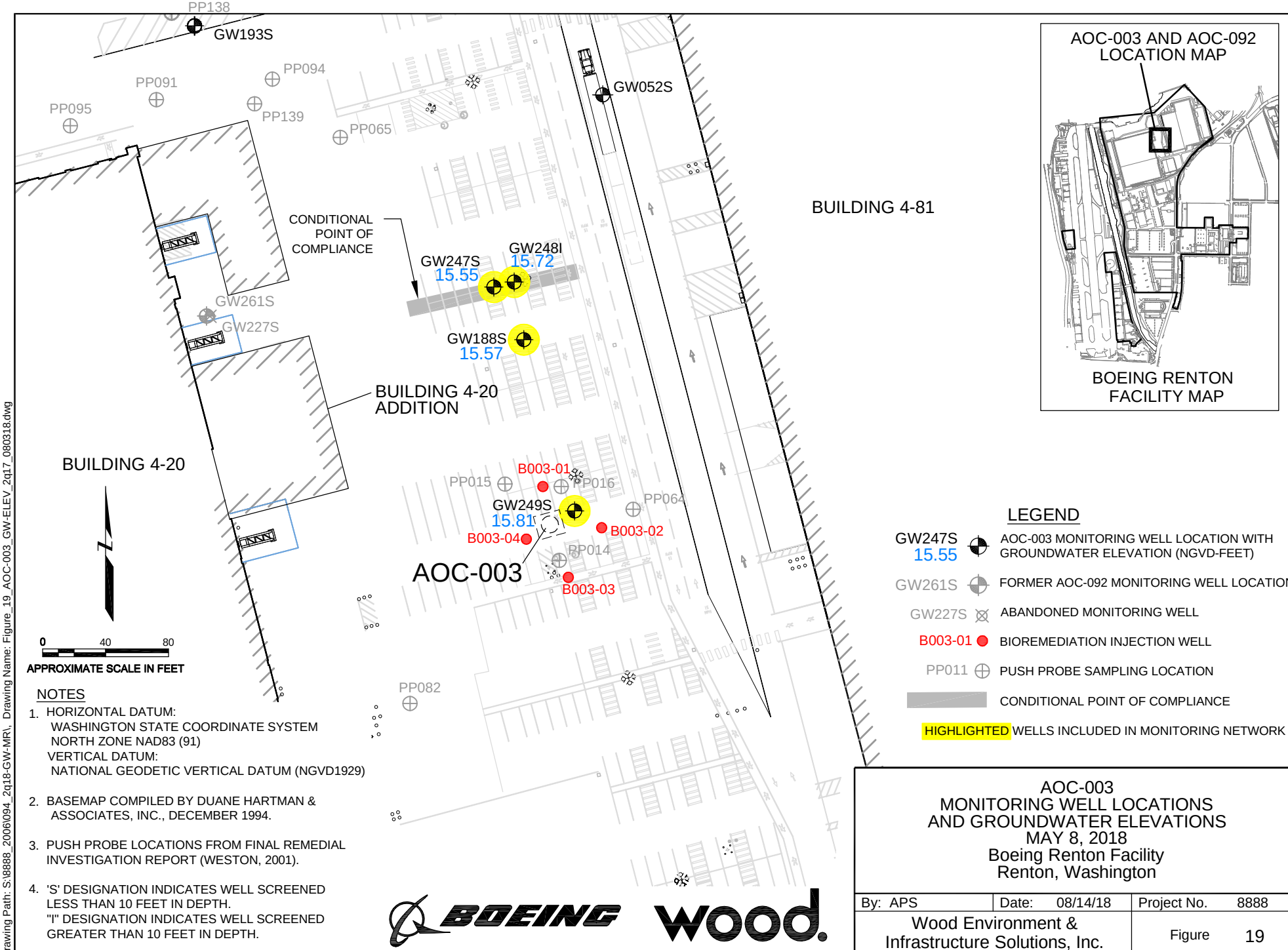


Vinyl Chloride

Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR *cis*-1,2-DICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 18

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 12, 13, and 14_AOC 1-2 Trend Plots.xls



AOC-003 AND AOC-092 LOCATION MAP

BOEING RENTON FACILITY MAP

LEGEND

- GW247S 15.55 — AOC-003 MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GW261S — FORMER AOC-092 MONITORING WELL LOCATION
- GW227S — ABANDONED MONITORING WELL
- B003-01 — BIOREMEDIATION INJECTION WELL
- PP011 — PUSH PROBE SAMPLING LOCATION
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.
   "I" DESIGNATION INDICATES WELL SCREENED GREATER THAN 10 FEET IN DEPTH.

AOC-003 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 8, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 19

LAKE WASHINGTON

LAKE WASHINGTON

GW001S
15.43

GW004S
15.41

GW005S
NM

GW218S
15.39

GW251S
15.26

GW216S
15.55

GW006S

GW217S
15.51

GW007S

15.40

15.45

15.50

CEDAR RIVER
TRAIL PARK

BUILDING
4-41

CONDITIONAL
POC

PILINGS

CEDAR RIVER COMMERCIAL WATERWAY

PARK DRIVE

AOC-035
(FORMER URE-08)

AOC-034
(FORMER URE-07)

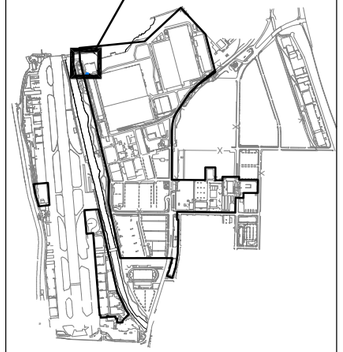
(FORMER URE-07)

DOOR 5
DOOR 6
DOOR 7
DOOR 8
DOOR 8A

PP032
PP161
PP160
PP163
PP162
PP035
PP164
PP033
PP034

STOP

AOC-034 and AOC-035
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW218S 14.35 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- NM — NOT MEASURED
- 14.30 — GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL: 0.10 FOOT) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- LIMITS OF PREVIOUS EXCAVATION
- FORMER UST LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- PP162 — 12/14/2006 PUSH-PROBE SOIL AND GROUNDWATER SAMPLE LOCATION
- PP032 — HISTORICAL PUSH-PROBE SAMPLE LOCATION

N

0 25 50
APPROXIMATE SCALE IN FEET

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 24 FEET IN DEPTH.

AOC-034 AND AOC-035 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 8, 2018 Boeing Renton Facility Renton, Washington

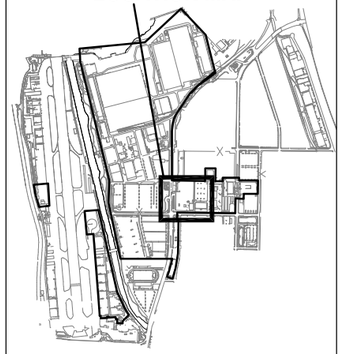
By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 20

BOEING

wood.

Plot Date: 08/14/18 - 1:08pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_20060094_2q18-GW-MR\, Drawing Name: Figure_20_AOC-034-035_GW-ELEV_2Q18_080118.dwg

FORMER BUILDING 10-71 LOCATION MAP



BOEING RENTON FACILITY MAP

FORMER BUILDING 10-71 (DEMOLISHED)

MULTI-LEVEL PARKING GARAGE

10-71-MW4 21.23

10-71-MW3 NM

10-71-MW2 21.96

10-71-MW1 23.38

BUILDING 10-20

FORMER BUILDING 10-72

LOGAN AVE N

N 6TH ST

PAVED PARKING

LEGEND

10-71-MW4 21.23	MONITORING WELL LOCATION GROUNDWATER ELEVATION (NGVD-FT)
NM	NOT MEASURED
	GENERAL DIRECTION OF GROUNDWATER FLOW
10-71-MW2	ELECTRON DONOR INJECTION WELL AND MONITORING WELL LOCATION
	APPROXIMATE PROPERTY LINE
— x —	FENCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.

0 40 80
APPROXIMATE SCALE IN FEET

BOEING

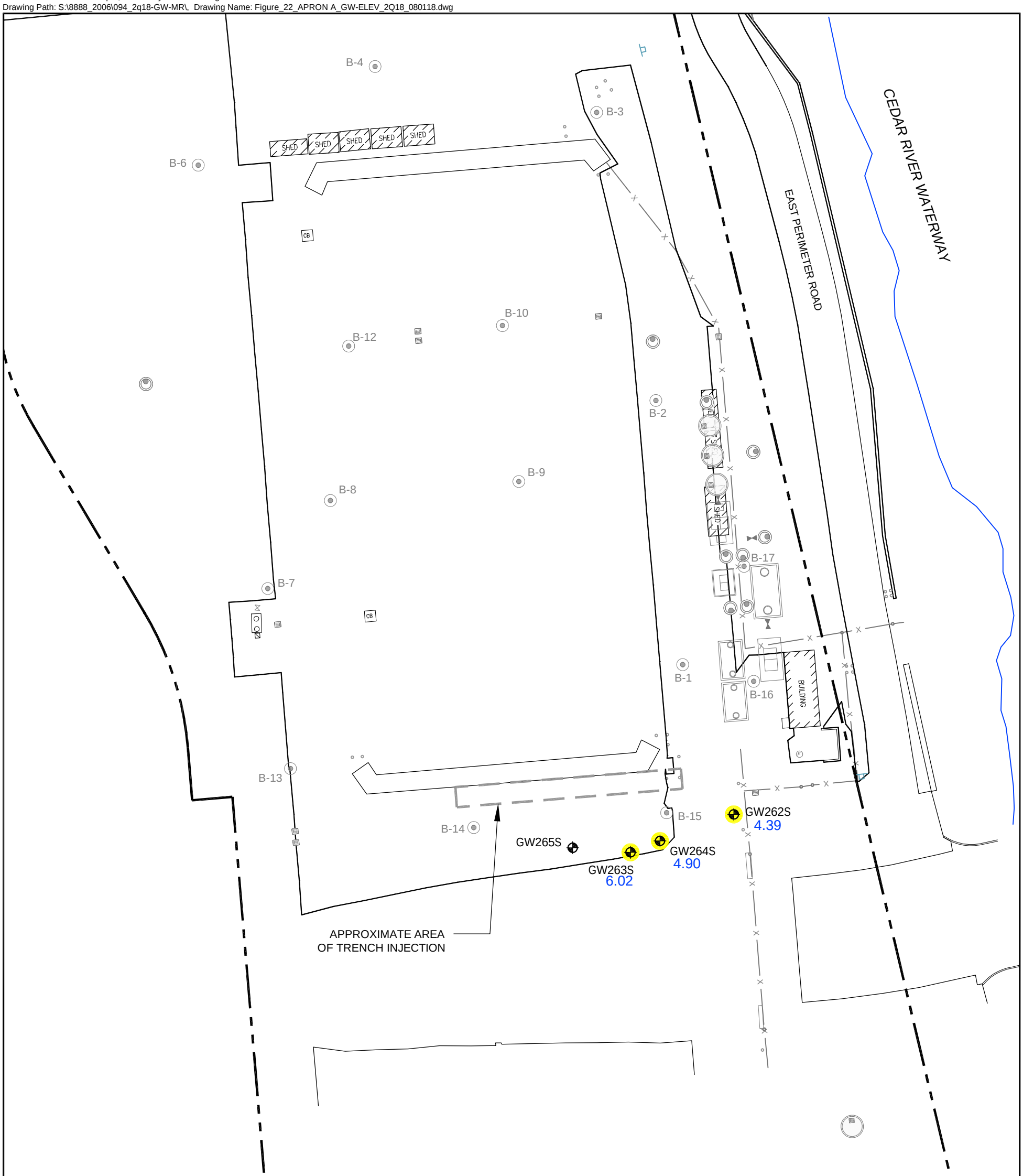
wood.

LOT 20 / FORMER BUILDING 10-71 PARCEL MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MAY 8, 2018 Boeing Renton Facility Renton, Washington

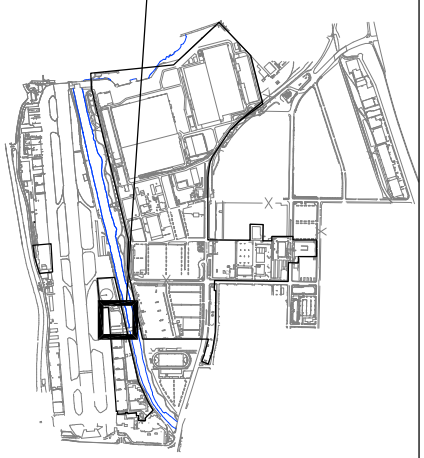
By: APS	Date: 08/14/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 21

Plot Date: 08/14/18 - 12:36pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_20066094_2q18-GW-MR_Drawing Name: Figure_21_FormerBldg10-71_GW-ELEV_2Q18_080118.dwg

Plot Date: 08/14/18 - 12:59pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\094_2q18-GW-MR\, Drawing Name: Figure_22_APRON A_GW-ELEV_2Q18_080118.dwg



APRON A
LOCATION MAP



BOEING RENTON
FACILITY MAP

N

0 20 40
APPROXIMATE SCALE IN FEET

LEGEND

GW264S 4.90	MONITORING WELL LOCATION WITH DEPTH TO GROUNDWATER (BGS IN FEET)
B-1	SOIL SAMPLE LOCATION
	APPROXIMATE PROPERTY LINE
x	FENCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

APRON A
MONITORING WELL LOCATIONS AND DEPTH TO GROUNDWATER
MAY 7, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 08/14/18	Project No. 16096
Wood Environment & Infrastructure Solutions, Inc.		Figure 22

Tables

TABLE 1: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN IN SOIL[1, 2]

JUNE 20, 2018

Boeing Renton Facility, Renton, Washington

	Cleanup Level[3]	Push Probe ID												
		PP01			PP02		PP03		PP04		PP05		PP06	
		2 feet bgs	8.5 feet bgs	Field Dup. 8.5 feet bgs	2 feet bgs	8.5 feet bgs	2 feet bgs	8.5 feet bgs	2 feet bgs	8.5 feet bgs	2 feet bgs	8.5 feet bgs	2 feet bgs	8.5 feet bgs
Volatile Organic Compounds (µg/kg)														
1,1-Dichloroethene	1	1.02 U	1.24 U	1.19 U	1.29 U	1.47 U	1.18 UJ	1.36 U	1.12 U	1.20 U	1.00 U	1.11 U	1.14 U	1.33 U
Benzene	9	1.02 U	1.24 U	1.19 U	1.29 U	1.47 U	1.18 U	1.36 U	1.12 U	1.20 U	1.00 U	1.11 U	1.14 U	1.33 U
cis-1,2-Dichloroethene	3	1.02 U	1.24 U	1.19 U	1.29 U	1.47 U	**35.1**	1.36 U	1.12 U	1.20 U	1.65	1.11 U	1.14 U	1.33 U
Methylene chloride	24	2.04 U	3.85	4.35	6.21	4.92	4.55	17.0	2.25 U	9.76	2.96	2.23 U	2.29 U	2.65 U
Tetrachloroethene	10	**22.9**	**20.1**	**14.3**	**49.8**	**32.5**	**1,070 J**	**27.7**	**18.3**	**12.0**	**57.4**	5.90	**11.6**	**38.8**
Trichloroethene	6	1.02 U	1.32	1.19 U	3.57	1.87	**51.2**	2.57	2.47	1.20 U	3.23	1.11 U	**6.91**	**7.31**
Vinyl Chloride	4	1.02 U	1.24 U	1.19 U	1.29 U	1.47 U	1.18 U	1.36 U	1.12 U	1.20 U	1.00 U	1.11 U	1.14 U	1.33 U
Total Metals (mg/kg)														
Copper	36	**72.7**	17.8	16.3	24.8	24.0	23.8	21.2	**37.4**	25.7	25.3	18.5	**36.9**	21.8
Thallium	0.34	0.23 U	0.23 U	0.22 U	0.21 U	0.23 U	0.24 U	0.21 U	0.23 U	0.20 U	0.20 U	0.04 J	0.22 U	0.23 U
Zinc	39.8	**276**	**108**	**88.1**	**49.5**	**211**	**47.7**	35.3	38.6	37.3	**52.6**	**46.6**	38.3	**43.4**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
   UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations

µg/kg = micrograms per kilogram
bgs = below ground surface
field dup. = field duplicate
mg/kg = milligrams per kilogram

TABLE 2: SWMU-172 and SWMU-174 GROUP GROUNDWATER ELEVATION DATA
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW081S	5 to 20[3]	25.91	7.92	17.99
GW152S	5 to 20[3]	26.98	8.55	18.43
GW153S	5 to 20[3]	27.47	8.82	18.65
GW172S	8 to 18[3]	26.44	8.68	17.76
GW173S	8 to 18[3]	26.51	8.70	17.81
GW226S	5 to 20[3]	26.86	8.38	18.48
GW232S	4 to 14	24.45	6.92	17.53
GW233I	15 to 25	24.35	6.43	17.92
GW234S	3 to 13	24.95	7.24	17.71
GW235I	15 to 25	24.90	6.72	18.18
GW236S	5 to 15	24.36	6.46	17.90

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Screen intervals are approximate and based on database listings of the screen interval depths for these wells.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 3: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1, 2]

MAY 7, 2018

Boeing Renton Facility, Renton, Washington

	Well ID[3]											
	Source Area			Downgradient Plume Area				CPOC Area				
	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Specific Conductivity (µS/cm)	185	185	228	193	252	364	221	436	181	249	165	312
Dissolved Oxygen (mg/L)	0.61	0.61	0.83	0.36	0.32	0.49	0.37	1.16	0.56	6.93	2.47	0.65
Oxidation/Reduction Potential (mV)	38.7	38.7	40.9	59.3	14.7	45.7	28.4	110.1	61.6	232.5	220.4	24.9
pH (standard units)	6.24	6.24	6.35	6.38	6.48	6.39	6.59	5.93	6.28	6.08	6.45	6.39
Temperature (degrees C)	15.00	15.00	15.30	14.90	16.70	13.50	15.40	13.80	14.20	13.35	14.96	17.30
Total Organic Carbon (mg/L)	2.04	2.23	7.81	4.65	3.38	5.21	7.00	7.81	4.32	1.03	0.55	2.43

Notes

1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
3. S = shallow well; I = intermediate well.

Abbreviations

µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 4: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level[4]	Well ID[3]											
		Source Area			Downgradient Plume Area				CPOC Area				
		GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Volatile Organic Compounds (µg/L)													
cis -1,2-Dichloroethene	0.03	**0.348**	**0.330**	**0.0649**	**0.0311**	**0.641**	0.020 U	**0.0401**	**0.367**	**0.0598**	**0.0672**	**0.166**	**0.0297**
Tetrachloroethene	0.02	**1.390**	**1.380**	0.020 U	0.020 U	0.020 U	**0.0610**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.226**	**0.228**	0.020 U	0.020 U	0.020 U	**0.0344**	0.020 U	0.020 U	0.020 U	0.020 U	**0.0253**	0.020 U
Vinyl Chloride	0.11	0.0972	0.0892	**0.313**	0.020 U	**1.240**	0.0460	0.0260	**0.419**	0.020 U	0.020 U	0.020 U	0.020 U
Total Metals (µg/L)													
Arsenic	1.0	**2.99 J**	**2.08 J**	**3.51**	**1.63**	**5.52**	**5.47**	**3.27**	**5.36**	0.532	0.820	0.200 U	**1.80**
Copper	3.5	2.86	2.41	1.01	0.534	0.989	3.48	1.05	0.500 U	0.500 U	na	0.500 U	2.05
Lead	1.0	**1.52 J**	0.992 J	0.207	0.100 U	0.772	0.314	0.129	0.100 U	0.100 U	na	0.100 U	**2.49**
Dissolved Metals (µg/L)													
Arsenic	NA	NA	NA	NA	NA	NA	1.80	NA	5.07	NA	NA	NA	0.704

Notes
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate
NA = not analyzed

TABLE 5: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN IN SOIL [1, 2]
JUNE 20, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level[3]	Push Probe ID											
		PP07		PP08		PP09		PP10		PP11		PP12	
		1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs
Volatile Organic Compounds (µg/kg)													
1,1-Dichloroethene	NA	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	1.28 U
Benzene	19000	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	2.67	1.42 U	1.24 U	1.28 U
Carbon Disulfide	11000	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	1.40
cis-1,2-Dichloroethene	200	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	1.28 U
Tetrachloroethene	160	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	1.28 U
Trichloroethene	100	0.94 U	1.21 U	1.16 U	11.9	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	2.68
Vinyl Chloride	100	0.94 U	1.21 U	1.16 U	1.21 U	1.08 U	1.31 U	1.36 U	1.22 U	1.10 U	1.42 U	1.24 U	1.28 U
Total Petroleum Hydrocarbons (mg/kg)													
GRO (C7-C12)	30	5.78 U	6.84 U	7.29 U	6.88 U	5.67 U	7.58 U	8.88 U	8.12 U	6.85 U	9.18 U	6.79 U	9.10 U

	Cleanup Level[3]	Push Probe ID											
		PP13			PP14		PP15		PP16		PP17		PP
		1 foot bgs	4.5 feet bgs	Field Dup. 1 foot bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs	3 feet bgs	1 foot bgs
Volatile Organic Compounds (µg/kg)													
1,1-Dichloroethene	NA	1.02 U	1.97 U	1.97 U	1.18 U	1.28 U	1.27 U	1.54 U	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
Benzene	19000	1.02 U	30.0	23.1	1.18 U	1.28 U	1.27 U	1.54 U	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
Carbon Disulfide	11000	1.02 U	1.97 U	1.97 U	1.18 U	1.28 U	1.27 U	1.54 U	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
cis-1,2-Dichloroethene	200	1.02 U	1.97 U	1.97 U	1.18 U	1.28 U	1.97	6.31	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
Tetrachloroethene	160	1.02 U	1.97 U	1.97 U	1.18 U	1.28 U	1.27 U	1.60	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
Trichloroethene	100	1.02 U	1.97 U	1.97 U	1.54	2.40	22.6	28.3	19.0	12.1	26.2	23.1	15.7
Vinyl Chloride	100	1.02 U	1.97 U	1.97 U	1.18 U	1.28 U	1.27 U	1.54 U	1.36 U	1.34 U	1.24 U	1.29 U	1.56 U
Total Petroleum Hydrocarbons (mg/kg)													
GRO (C7-C12)	30	6.21 U	**147**	**131**	7.47 U	7.49 U	6.74 U	9.33 U	6.52 U	9.48 U	6.54 U	6.89 U	9.58 U

Notes
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/kg = micrograms per kilogram
bgs = below ground surface
GRO = gasoline range organics
mg/kg = milligrams per kilogram
NA = not applicable

TABLE 6: BUILDING 4-78/79 SWMU/AOC GROUP
GROUNDWATER ELEVATION DATA
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW031S	5 to 25	19.44	3.97	15.47
GW033S	5 to 25	19.49	4.10	15.39
GW034S	5 to 25	19.65	4.20	15.45
GW038S	5 to 25	19.68	4.24	15.44
GW039S	3.5 to 13.5	19.30	3.94	15.36
GW143S	10 to 15	19.81	4.41	15.40
GW209S	3.5 to 13.3	19.37	3.93	15.44
GW210S	3.5 to 13.3	19.19	3.50	15.69
GW237S	5 to 15	18.85	3.46	15.39
GW238I	5 to 20	18.94	3.54	15.40
GW239I	15 to 20	19.69	4.29	15.40
GW240D	22 to 27	19.81	4.72	15.09
GW241S	4 to 14	20.28	4.84	15.44
GW242I	15 to 20	20.44	5.02	15.42
GW243I	5 to 20	19.49	4.04	15.45
GW244S	5 to 15	19.53	4.10	15.43

Notes
1. S = shallow well; I = intermediate well; D = deep well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 7: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]									
	Source Area							Downgradient Plume Area		
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S	GW038S	GW209S	GW210S
Specific Conductivity (µS/cm)	250	250	329	295	162	371	408	336	366	228
Dissolved Oxygen (mg/L)	0.95	0.95	0.72	0.69	0.43	0.90	0.85	0.59	0.14	0.45
Oxidation/Reduction Potential (mV)	-8.3	-8.3	-12.6	-23.7	34.2	3.7	6.0	141.7	36.3	5.2
pH (standard units)	6.12	6.12	6.22	6.27	6.23	6.28	6.16	6.35	6.26	6.36
Temperature (degrees C)	18.50	18.50	18.40	17.30	18.10	18.20	17.4	15.53	16.90	19.40
Total Organic Carbon (mg/L)	6.54	6.43	24.38	8.84	6.41	9.74	15.09	9.13	11.47	9.98

	Well ID[2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Specific Conductivity (µS/cm)	107	129	395	293	449	392	391
Dissolved Oxygen (mg/L)	1.94	10.28	0.43	0.5	2.67	0.13	1.09
Oxidation/Reduction Potential (mV)	45.1	187.8	19.5	7.3	127.1	129.8	139.8
pH (standard units)	6.24	6.61	6.31	6.31	6.38	6.17	6.23
Temperature (degrees C)	16.20	22.86	18.40	17.60	15.79	14.96	16.06
Total Organic Carbon (mg/L)	9.22	8.04	12.81	10.18	5.64	NA	NA

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well; D = deep well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed

TABLE 8: BUILDING 4-78/79 SWMU/AOC GROUP
CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level[4]	Well ID[3]						
		Source Area						
		GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Volatile Organic Compounds (µg/L)								
Benzene	0.80	**8.95**	**11.0**	**12.8**	0.20 U	0.20 U	**1.66**	**3.63**
cis -1,2-Dichloroethene	0.70	0.20 UJ	0.66 J	**40.7**	0.20 U	0.20 U	0.20 U	**1.80**
Trichloroethene	0.23	**1.13**	0.99	0.40 U	**0.29**	0.20 U	0.20 U	**0.92**
Vinyl Chloride	0.20	0.20 U	0.20 U	**110**	**0.24**	0.20 U	0.20 U	**1.06**
Total Petroleum Hydrocarbons (µg/L)								
GRO (C7-C12)	800	**917**	**830**	239	100 U	100 U	132	100 U

	Cleanup Level[4]	Well ID[3]		
		Downgradient Plume Area		
		GW038S	GW209S	GW210S
Volatile Organic Compounds (µg/L)				
Benzene	0.80	0.20 U	0.20 U	0.20 U
cis -1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	**0.21**	0.20 U
Total Petroleum Hydrocarbons (µg/L)				
GRO (C7-C12)	800	100 U	100 U	100 U

	Cleanup Level[4]	Well ID[3]						
		CPOC Area						
		GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Volatile Organic Compounds (µg/L)								
Benzene	0.80	0.20 U	**8.57**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis -1,2-Dichloroethene	0.70	0.33	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	**0.23**	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
GRO (C7-C12)	800	100 U	**1,740**	100 U	100 U	100 U	100 U	100 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
   UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate
GRO = gasoline range organics
NA = not analyzed

TABLE 9: FORMER FUEL FARM GROUNDWATER ELEVATION DATA
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW183S	5.5 to 15	26.58	7.93	18.65
GW184S	5.6 to 15	27.14	8.60	18.54
GW211S	4.8 to 14.7	27.77	8.75	19.02
GW212S	4.9 to 14.8	28.06	9.83	18.23
GW221S	5 to 15	27.93	9.38	18.55
GW224S	5 to 15	27.98	10.10	17.88
GW255S	6 to 16	27.49	9.43	18.06
GW256S	7 to 16	27.22	8.14	19.08
GW257S	8 to 16	27.87	8.67	19.20
GW258S	9 to 16	25.51	6.91	18.60

Notes
1. S = shallow well, I = intermediate well
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 10: FORMER FUEL FARM CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]											
	Source Area	CPOC Area										
	GW255S	GW183S	GW184S	GW211S	GW212S	GW221S	GW224S	GW224S (field dup.)	GW255S	GW256S	GW257S	GW258S
Specific Conductivity (µS/cm)	189	127	131	260	240	213	190	190	189	148	158	325
Dissolved Oxygen (mg/L)	0.63	0.19	0.64	0.63	1.59	1.11	1.99	1.99	0.63	0.97	2.6	0.72
Oxidation/Reduction Potential (mV)	28.0	47.4	45.8	-13.1	72.9	49.2	43.3	43.3	28.0	29.8	53.6	39.1
pH (standard units)	6.15	6.28	6.32	6.37	5.59	6.12	6.11	6.11	6.15	6.29	6.11	6.29
Temperature (degrees C)	17.00	15.20	15.90	13.90	14.30	17.60	15.40	15.40	17.00	15.80	18.00	16.10

Notes
1. Primary geochemical indicators are measured in the field.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 11: FORMER FUEL FARM CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

MAY 7, 2018

Boeing Renton Facility, Renton, Washington

	Cleanup Level[4]	Well ID[3]										
		Source Area	CPOC Area									
		GW255S	GW183S	GW184S	GW211S	GW212S	GW221S	GW224S	GW224S (field dup.)	GW256S	GW257S	GW258S
Total Petroleum Hydrocarbons (mg/L)												
DRO (C12-C24)	0.5	0.100 U	0.100 U	0.100 U	0.272	0.100 U	**0.746**	**0.560**	**0.664**	0.100 U	0.100 U	0.100 U
Jet A	0.5	0.100 U	0.100 U	0.100 U	0.214	0.100 U	**0.635**	**0.933**	**1.17**	0.100 U	0.100 U	0.100 U

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations

CPOC = conditional point of compliance
DRO = diesel range organics
field dup. = field duplicate
mg/L = milligrams per liter

TABLE 12: AOC-001 AND AOC-002 GROUNDWATER ELEVATION DATA
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW185S	4.5 to 14.5	16.27	0.83	15.44
GW190S	3.0 to 13.0	17.30	NM	NM
GW191D	26.5 to 36.0	17.53	NM	NM
GW192S	5.0 to 9.5	17.54	NM	NM
GW193S	3.0 to 12.8	18.67	NM	NM
GW194S	7.3 to 12.0	16.79	1.42	15.37
GW195S	7.3 to 12.0	16.34	1.01	15.33
GW196D	26.8 to 36.8	16.46	1.01	15.45
GW197S	7.8 to 12.5	16.52	0.70	15.82
GW245S	3.0 to 13.0	16.08	0.84	15.24

Notes
1. S = shallow well; D = deep well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 13: AOC-001 AND AOC-002 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	CPOC Area						
	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D[4]	GW197S	GW245S[5]
Specific Conductivity (µS/cm)	765	765	586	520	385	779	534
Dissolved Oxygen (mg/L)	0.76	0.76	1.88	1.18	0.89	0.29	0.27
Oxidation/Reduction Potential (mV)	-5.2	-5.2	-25.4	-11.7	4.5	-129.7	-70.7
pH (standard units)	6.43	6.43	6.29	6.31	6.31	7.11	6.80
Temperature (degrees C)	16.70	16.70	14.90	14.30	15.30	15.20	14.80
Total Organic Carbon (mg/L)	20.15	20.29	11.06	18.49	9.16	12.77	12.18

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; D = deep well.
3. GW191D is installed in a cluster with GW192S, and is screened below a silt layer at 26.5 to 36 feet in depth.
4. GW196D is installed in a cluster with GW195S, and is screened below a silt layer at 26.8 to 36.8 feet in depth.
5. GW245S is both the source area and CPOC well for AOC-093.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 14: AOC-001 AND AOC-002 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

MAY 8, 2018

Boeing Renton Facility, Renton, Washington

	Cleanup Level[4]	CPOC Area[3]						
		GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D[5]	GW197S	GW245S
Volatile Organic Compounds (µg/L)								
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzene	0.8	0.21	0.20 U	0.20 U	0.20 U	0.20 U	0.29	0.20 U
cis -1,2-Dichloroethene	0.02	**0.157**	**0.164**	0.020 U	**0.0464**	**0.0252**	**0.0711**	**0.0517**
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.05	**0.131**	**0.130**	0.020 U	0.0326	0.0348	**0.0606**	0.0278

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
5. GW196D is installed in a cluster with GW195S, and is screened below a silt layer at 26.8 to 36.8 feet in depth

Abbreviations

µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = duplicate field

TABLE 15: AOC-003 GROUNDWATER ELEVATION DATA
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S[3]	3.5 to 13.5	18.78	3.21	15.57
GW247S	4 to 14	18.91	3.36	15.55
GW248I	10 to 20	18.78	3.06	15.72
GW249S	4 to 14	18.85	3.04	15.81

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Depth to water measurement not collected at GW188S during the second quarter 2017.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 16: AOC-003 CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Specific Conductivity (µS/cm)	463	449	377	432
Dissolved Oxygen (mg/L)	1.16	1.28	0.67	1.53
Oxidation/Reduction Potential (mV)	34.0	10.7	7.8	-25.1
pH (standard units)	6.23	6.30	6.33	6.33
Temperature (degrees C)	14.4	15.2	13.50	14.60
Total Organic Carbon (mg/L)	16.47	10.89	10.98	14.15

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 17: AOC-003 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

MAY 8, 2018

Boeing Renton Facility, Renton, Washington

	Cleanup Level[4]	Well ID[3]			
		Source Area	Downgradient Plume Area	CPOC Area	
		GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (µg/L)					
cis -1,2-Dichloroethene	0.78	0.0757	0.0531	0.0949	0.020 U
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.16	0.0211	0.020 U	0.0257	0.020 U
Vinyl Chloride	0.24	**0.428**	**0.505**	**0.460**	**0.573**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations

µg/L = micrograms per liter
CPOC = conditional point of compliance

TABLE 18: AOC-034 AND AOC-035 GROUNDWATER ELEVATION DATA
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW001S	2 to 12	18.28	2.85	15.43
GW004S	2 to 12	16.66	1.25	15.41
GW005S[3]	2 to 12	18.20	NM	NM
GW216S	4.4 to 14.2	18.90	3.35	15.55
GW217S	3.5 to 13.4	19.20	3.69	15.51
GW218S	3.6 to 13.5	18.01	2.62	15.39
GW251S	4 to 14	17.98	2.72	15.26

Notes
1. S = shallow well
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Access to this well was blocked due to construction.

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 19: AOC-034 AND AOC-035 CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW217S	GW216S	GW218S	GW251S
Specific Conductivity (µS/cm)	250	340	133	117
Dissolved Oxygen (mg/L)	0.13	0.04	0.14	0.25
Oxidation/Reduction Potential (mV)	21.1	25.1	24.8	14.5
pH (standard units)	6.47	6.61	6.87	6.93
Temperature (degrees C)	20.20	17.50	15.80	17.70

Notes
1. Primary geochemical indicators are measured in the field.
2. S = shallow well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 20: AOC-034 AND AOC-035
CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level[3]	Well ID[2]			
		Source Area	Cross-Gradient Plume Area	CPOC Area	
		GW217S	GW216S	GW218S	GW251S
Volatile Organic Compounds (µg/L)					
cis -1,2-Dichloroethene	0.65	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.29	0.2 U	0.2 U	0.2 U	0.2 U

Notes
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
2. S = shallow well
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance

TABLE 21: LOT 20/FORMER BUILDING 10-71 PARCEL
GROUNDWATER ELEVATION DATA
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

Well ID	Screen Interval Depth (feet bgs)	TOC Elevation (feet) [1]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet) [1]
10-71-MW-1	7 to 17	30.07	6.69	23.38
10-71-MW-2	7 to 17	29.88	7.92	21.96
10-71-MW-4	6 to 16	28.97	7.74	21.23

Notes
1. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 22: LOT 20/FORMER BUILDING 10-71 PARCEL CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	Well ID		
	10-71-MW1	10-71-MW2	10-71-MW4
Specific Conductivity (µS/cm)	174	184	228
Dissolved Oxygen (mg/L)	0.58	0.63	0.80
Oxidation/Reduction Potential (mV)	79.2	104.5	227.8
pH (standard units)	6.09	5.87	5.98
Temperature (degrees C)	14.00	13.90	14.00

Notes
1. Primary geochemical indicators are measured in the field.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 23: LOT 20/FORMER BUILDING 10-71 PARCEL
CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
MAY 8, 2018
Boeing Renton Facility, Renton, Washington

	Well ID		
	10-71-MW1	**10-71-MW2**	**10-71-MW4**
Volatile Organic Compounds (µg/L)			
cis-1,2-Dichloroethene	0.20 U	0.20 U	0.20 U
Toluene	0.20 U	0.20 U	0.20 U
Trichloroethene	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20 U	0.24	0.20 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. No cleanup standards have been established for the Building 10-71 Parcel.

Abbreviations
µg/L = micrograms per liter

TABLE 24: APRON A GROUNDWATER ELEVATION DATA
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

Well ID	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[1]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[1]
GW262S	8 to 18	NA	4.93	NA
GW263S	8 to 18	NA	6.02	NA
GW264S	8 to 18	NA	4.90	NA

Notes
1. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
NA = not available
TOC = top of casing

TABLE 25: APRON A CONCENTRATIONS OF
PRIMARY GEOCHEMICAL INDICATORS [1]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]		
	GW262S	GW262S (field dup.)	GW264S
Specific Conductivity (µS/cm)	428	428	697
Dissolved Oxygen (mg/L)	2.66	2.66	3.49
Oxidation/Reduction Potential (mV)	-66.7	-66.7	-58.4
pH (standard units)	6.09	6.09	6.19
Temperature (degrees C)	13.70	13.70	14.30
Total Organic Carbon (mg/L)	33.87	33.07	37.38

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well.

Abbreviations
µS/cm = microsiemens per centimeter
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 26: APRON A CONCENTRATIONS
OF CONSTITUENTS OF CONCERN[1]
MAY 7, 2018
Boeing Renton Facility, Renton, Washington

	Well ID[2]		
	GW262S	GW262S (field dup.)	GW264S
Volatile Organic Compounds (µg/L)			
cis- 1,2-Dichloroethene	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.25	0.24	1.63

Notes
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
2. S = shallow well.

Abbreviations
µg/L = micrograms per liter

Appendix A

TABLE A-1: GROUNDWATER COMPLIANCE MONITORING SCHEDULE

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Monitoring Frequency[1]		Groundwater Monitoring Wells[2]				Additional Water Level Monitoring Wells[3]	Constituents of Concern[4]	Analyses[5]
	Quarterly	Semiannual	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells			
SWMU-168		X (1,3)	NA	GW228S[7]	NA	GW229S, GW230I, and GW231S		VC	SW8260C SIM
SWMU-172/SWMU-174	X		NA	GW152S and GW153S	GW081S, GW172S, GW173S, and GW226S	GW232S, GW233I, GW234S, GW235I, and GW236S		*cis* -1,2-DCE, PCE, TCE, VC	SW8260C SIM[6]
								Arsenic, copper, and lead	EPA 6020A
Building 4-78/79 SWMU/AOC Group	X		NA	GW031S, GW033S, GW034S, GW039S, GW243I, and GW244S	GW038S, GW209S, and GW210S	GW143S, GW237S, GW238I, GW239I, GW240D, GW241S, and GW242I		VC, TCE, *cis* -1,2-DCE, benzene	SW8260C[6]
								TPH-gasoline	NWTPH-Gx
Former Fuel Farm SWMU/AOC Group		X (2,4)	NA	GW255S, GW256S, and GW257S	NA	GW183S, GW184S, GW211S,GW212S, GW221S,		TPH-jet fuel, TPH-diesel	NWTPH-Dx
AOC-001/AOC-002	X (CPOC wells)	X (1,3) (all other wells)	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S		Benzene	SW8260C[6]
								TCE, *cis* -1,2-DCE, 1,1-dichloroethene, VC	SW8260C SIM[6]
AOC-003	X (CPOC wells)	X (1,3) (all other wells)	NA	GW249S	GW188S	GW247S and GW248I		PCE, TCE	SW8260C SIM[6]
								cis -1,2-DCE, VC	
AOC-004		X (1,3)	NA	GW250S	NA	GW174S		Lead	EPA 6020A
AOC-034/AOC-035		X (2,4)	GW216S	GW217S	NA	GW218S and GW251S	GW001S, GW004S, and GW005S	VC, *cis* -1,2-DCE	SW8260C[6]
AOC-060		X (1,3)	GW012S and GW014S	GW009S	GW147S	GW149S, GW150S, GW252S, GW253I, and GW254S	GW010S and GW011D	VC	SW8260C SIM[6]
								TCE, *cis* -1,2-DCE	
AOC-090		X (1,3)	NA	GW189S	GW175I and GW176S	GW163I, GW165I, GW177I, GW178S, GW179I, GW180S, GW207S, and GW208S		1,1,2-Trichloroethane, acetone, benzene, toluene, carbon tetrachloride, chloroform, *cis* -1,2-DCE,	SW8260C[6]
								1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE	SW8260C SIM[6]
								TPH-gasoline	NWPTH-Gx
								TPH-diesel, TPH-motor oil	NWTPH-Dx
Building 4-70 Area		X (1,3)	NA	NA	NA	GW259S and GW260S		TCE, *cis* -1,2-DCE, VC	SW8260C[6]
Lot 20/Former Building 10-71		X (2,4)	NA	10-71-MW1, 10-71-MW2, and 10-71-MW4	NA	NA		Toluene, cis-1,2-DCE, TCE, VC	SW8260C[6]
Apron A		X (2,4)	NA	GW262S and GW264S	NA	NA		*cis* -1,2-DCE and VC	SW8260C[6]

Notes:

1. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. For sites with semiannual monitoring frequency, specific quarters when monitoring will be conducted is indicated by 1 for quarter 1, 2 for quarter 2, etc.
2. Groundwater monitoring wells are also monitored for groundwater levels.
3. Additional wells are monitored for groundwater levels only.
4. In addition to COCs, primary geochemical indicators will be monitored during each regular monitoring event. Geochemical indicators are listed in Table A-2.
5. Details of analytical methods are specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
6. SIM methods will be used if the cleanup level is lower than the reporting limit achieved by the conventional 8021, 8260 or 8270 method. If cleanup levels become higher or if the conventional 8021, 8260 or 8270 methods are updated and able to achieve reporting limits below the cleanup levels, then the conventional method rather than the SIM method will be used.
7. GW228S will not be monitored on a semiannual basis - only the CPOC wells will be monitored on a semiannual basis for SWMU-168.

Abbreviations:

AOC = area of concern
cis -1,2-DCE = *cis* -1,2 dichloroethene
COCs = constituents of concern
CPOC = conditional point of compliance
Cr = chromium
EDR = Engineering Design Report
EPA = Environmental Protection Agency
NA = not applicable
PCE = tetrachloroethene
SIM = selected ion monitoring
SWMU = solid waste management unit
TCE = trichloroethene
TPH = total petroleum hydrocarbons
trans -1,2-DCE = *trans* -1,2 dichloroethene
VC = vinyl chloride
VOCs = volatile organic compounds

TABLE A-2: MONITORED NATURAL ATTENUATION/MONITORED ATTENUATION SCHEDULE

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Groundwater Monitoring Wells				Primary Geochemical Parameters[2]		
					Indicators	Monitoring Frequency[3]	
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells		Quarterly	Semiannual
SWMU-168	NA	GW228S[4]	NA	GW229S, GW230I, and GW231S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
SWMU-172/SWMU-174	NA	GW152S and GW153S	GW081S, GW172S, GW173S, and GW226S	GW232S, GW233I, GW234S, GW235I, and GW236S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X	
Building 4-78/79 SWMU/AOC Group	NA	GW031S, GW033S, GW034S, GW039S, GW243I, and GW244S	GW038S, GW209S, and GW210S	GW143S, GW237S, GW238I, GW239I, GW240D, GW241S, and GW242I	Dissolved oxygen, pH, ORP, temperature, specific conductance in all wells, TOC in all wells except GW241S and GW242I	X	
Former Fuel Farm SWMU/AOC Group	NA	GW255S, GW256S, and GW257S	NA	GW183S, GW184S, GW211S,GW212S, GW221S, GW224S, and GW258S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
AOC-001/AOC-002	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-003	NA	GW249S	GW188S	GW247S and GW248I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-004	NA	GW250S	NA	GW174S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
AOC-034/AOC-035	GW216S	GW217S	NA	GW218S and GW251S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
AOC-060	GW012S and GW014S	GW009S	GW147S	GW149S, GW150S, GW252S, GW253I, and GW254S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (1,3)
AOC-090	NA	GW189S	GW175I and GW176S	GW163I, GW165I, GW177I, GW178S, GW179I, GW180S, GW207S, and GW208S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC [5]		X (1,3)
Building 4-70 Area	NA	NA	NA	GW259S and GW260S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (1,3)
Apron A	NA	GW262S and GW264S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (2,4)

Notes:

1. In addition to COCs listed in Table A-1, primary geochemical indicators will be monitored during each regular monitoring event.
2. All primary geochemical indicators except TOC are monitored in the field during sampling. TOC is analyzed in the laboratory following methods specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
   The primary geochemical indicators differ slightly depending on whether the site is a fuel-related site or a solvent-related site.
   At a fuel related site, TOC is not necessary; at a solvent-related site, TOC is a measure of how much electron donor remains present.
3. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. For sites with semiannual monitoring frequency, specific quarters when monitoring will be conducted is indicated by 1 for quarter 1, 2 for quarter 2, etc.
4. Primary geochemical parameters will not be collected at GW228S - only at CPOC wells that are sampled semiannually.
5. TOC will only be analyzed in the groundwater from the source area well (GW189S).

Abbreviations:

AOC = area of concern
COCs = constituents of concern
CPOC = conditional point of compliance
EDR = Engineering Design Report
NA = not applicable
ORP = oxidation reduction potential
SWMU = solid waste management unit
TOC = total organic carbon

Appendix B

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 816
Sample Number: RGW081S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 7.92 | Time: 751 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 754 | End Purge: Date/Time: 5/ 7 /2018 @ 815 | Gallons Purged: 1
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
757	14.9	179.4	1.35	6.35	75.1	LOW	7.92	<0.25	
800	14.9	186.2	0.75	6.31	73.1			0.25	
803	14.9	189.6	0.52	6.33	69.9		7.92		
806	14.9	191.2	0.44	6.35	67.2			0.5	
809	14.8	192.1	0.40	6.36	64.9				
812	14.9	192.4	0.37	6.38	62.4				
814	14.9	192.6	0.36	6.38	59.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.9	192.7	0.36	6.38	59.1				
2	14.9	192.6	0.37	6.38	58.7				
3	14.9	192.6	0.37	6.39	58.4				
4	14.9	192.7	0.37	6.38	58.2				
Average:	14.9	192.7	0.37	6.38	58.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1026
Sample Number: RGW152S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 8.55 | Time: 946 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1002 | End Purge: Date/Time: 5/ 7 /2018 @ 1023 | Gallons Purged: 0.75
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1005	14.8	228.8	1.17	6.25	55.7	MED	8.55	<0.25	
1008	14.9	229.4	0.59	6.25	50.3			0.25	
1011	15.0	225.1	0.52	6.25	48.1		8.55		
1014	15.0	214.9	0.50	6.25	44.4			0.5	
1017	15.0	204.4	0.53	6.25	41.5				
1020	15.0	195.6	0.57	6.25	40.0			0.75	
1022	15.0	185.3	0.61	6.24	38.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT GRAY COLOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.0	185.7	0.63	6.24	38.4				
2	15.0	184.3	0.63	6.23	38.3				
3	15.0	182.8	0.64	6.24	37.9				
4	15.0	181.2	0.65	6.24	37.5				
Average:	15.0	183.5	0.64	6.24	38.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate Location (DUP1)
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 956
Sample Number: RGW153S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 8.82 | Time: 912 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 933 | End Purge: Date/Time: 5/ 7 /2018 @ 954 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
936	15.2	179.7	3.41	6.17	51.9	LOW	8.84	<0.25	
939	15.2	182.4	3.24	6.14	53.5			<0.25	
942	15.2	208.2	1.96	6.17	54.1		8.84	<0.25	
945	15.2	218.6	1.53	6.23	51.5			0.25	
948	15.2	224.9	1.01	6.31	46.4				
951	15.3	227.0	0.93	6.33	43.1				
953	15.3	227.9	0.83	6.35	40.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.3	227.9	0.88	6.36	40.4				
2	15.3	227.9	0.85	6.36	40.1				
3	15.3	228.0	0.83	6.37	39.7				
4	15.3	228.0	0.82	6.37	39.7				
Average:	15.3	228.0	0.85	6.37	40.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1121
Sample Number: RGW172S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 8.68 | Time: 1047 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1056 | End Purge: Date/Time: 5/ 7 /2018 @ 1117 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1059	17.3	257.4	0.23	6.12	54.8	LOW	8.72	<0.25	
1102	17.1	276.8	0.19	6.18	50.9		8.72	<0.25	
1105	16.8	272.9	0.18	6.38	36.3			<0.25	
1108	16.7	265.9	0.22	6.44	28.5		8.72	0.25	
1111	16.7	261.8	0.25	6.46	24.8				
1114	16.6	254.5	0.31	6.47	17.6				
1116	16.7	252.3	0.32	6.48	14.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	252.3	0.32	6.48	14.4				
2	16.7	251.9	0.33	6.48	14.1				
3	16.7	251.8	0.33	6.48	13.8				
4	16.7	251.6	0.33	6.48	13.5				
Average:	16.7	251.9	0.33	6.48	14.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 846
Sample Number: RGW173S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 8.7 | Time: 759 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 823 | End Purge: Date/Time: 5/ 7 /2018 @ 844 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
826	13.5	287.3	1.32	6.03	77.6	LOW-MED	8.73	<0.25	
829	13.5	323.6	0.84	6.11	72.0			<0.25	
832	13.5	339.7	0.71	6.18	66.9		8.73	0.25	
835	13.5	355.0	0.61	6.25	62.3				
838	13.5	358.6	0.54	6.32	54.5				
841	13.5	361.4	0.50	6.36	49.8			0.5	
843	13.5	364.1	0.49	6.39	45.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY TURBID, LIGHT BROWN/ORANGE COLOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.5	364.3	0.48	6.39	45.2				
2	13.5	365.6	0.50	6.39	44.6				
3	13.5	365.8	0.51	6.40	43.9				
4	13.5	366.2	0.52	6.42	40.5				
Average:	13.5	365.5	0.50	6.40	43.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments: MSMSD Location

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 931
Sample Number: RGW226S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.38 Time: 903 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 907 End Purge: Date/Time: 5/ 7 /2018 @ 928 Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
910	15.3	262.3	0.50	6.42	51.0	LOW	8.38	<0.25	
913	15.3	249.7	0.37	6.51	42.5			<0.25	
916	15.3	242.8	0.35	6.51	39.2		8.38	0.25	
919	15.3	232.2	0.37	6.51	34.7				
922	15.3	226.9	0.36	6.50	32.6				
925	15.3	223.7	0.36	6.50	30.5			0.5	
927	15.4	220.6	0.37	6.59	28.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.4	220.7	0.37	6.49	28.1				
2	15.4	220.1	0.37	6.49	27.8				
3	15.4	219.4	0.38	6.49	27.4				
4	15.4	218.9	0.38	6.49	27.3				
Average:	15.4	219.8	0.38	6.49	27.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 706
Sample Number: RGW232S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.92 Time: 630 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 640 End Purge: Date/Time: 5/ 7 /2018 @ 701 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
643	14.2	380.1	0.51	6.01	105.6	LOW	7.01	<0.25	TURN CPM DOWN
646	14.0	386.1	0.64	5.90	138.0		7.15	<0.25	AT LOWEST SETTING
649	14.0	410.2	0.63	5.86	133.9		7.35		TURN OFF
652	14.0	422.1	0.77	5.88	126.8		7.35		TURN ON
655	13.9	428.4	0.97	5.91	119.1				
658	13.9	431.6	1.06	5.92	113.9		7.41		
700	13.8	435.5	1.16	5.93	110.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.8	435.8	1.16	5.93	109.3				
2	13.8	435.9	1.16	5.93	108.4				
3	13.8	436.8	1.20	5.94	107.3				
4	13.8	437.1	1.23	5.94	106.6				
Average:	13.8	436.4	1.19	5.94	107.9	#DIV/0!	8.17		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: VERY LONG RECAHRGE RATE. PURGING AT SLOWEST RATE.

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 736
Sample Number: RGW233I- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 6.43 | Time: 702 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 713 | End Purge: Date/Time: 5/ 7 /2018 @ 734 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
716	14.1	179.0	1.00	6.36	68.5	LOW	6.43	<0.25	
719	14.1	178.7	0.87	6.32	68.4			<0.25	
722	14.1	179.1	0.80	6.29	67.2		6.43	0.25	
725	14.2	179.8	0.75	6.28	65.7				
728	14.2	180.5	0.67	6.27	64.8				
731	14.2	181.1	0.58	6.28	62.3			0.5	
733	14.2	181.4	0.56	6.28	61.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.2	181.5	0.55	6.28	61.3				
2	14.2	181.4	0.54	6.28	61.1				
3	14.2	181.4	0.54	6.28	60.9				
4	14.2	181.7	0.55	6.28	60.6				
Average:	14.2	181.5	0.55	6.28	61.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@ 1243

Sample Number: RGW234S 180507 | Weather: cloudy 65F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP, PURGED STORMWATER

DTW Before Purging (ft) 7.24 Time: 1213 Flow through cell 0.3 GAL GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 07 /2018 @1215 End Purge: Date/Time: 5/ 07/2018 @1234 Gallons Purged: 2.1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1216	13.44	266	1.62	6.29	224.3		7.28	0.3	CLEAR/COLORLESS/ NO/NS
1219	13.50	252	9.32	6.20	229.3		7.24	0.6	SAME
1222	13.45	251	9.85	5.63	268.7		7.26	0.9	SAME
1225	13.39	249	9.83	5.75	255.3		7.26	1.2	SAME
1228	13.61	250	8.13	5.90	244.4		7.26	1.5	SAME
1231	13.52	249	6.11	6.04	236.6		7.25	1.8	SAME
1234	13.35	249	6.93	6.08	232.5		7.26	2.1	SAME

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER PUMP

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.37	248	7.73	6.11	230.3		7.27		
2	13.38	249	7.39	6.11	229.9		7.27		
3	13.37	249	6.90	6.12	229.3		7.27		
4	13.37	248	6.71	6.12	228.5		7.27		
Average:	13.37	249	7.18	6.12	229.5	#DIV/0!	7.27		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 07 /2018@ 1143
Sample Number:	RGW235I- 180507	Weather:	overcast // 65 F
Landau Representative:	GJN		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: Well cap

DTW Before Purging (ft) 6.72 Time: 1102 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 07 /2018 11:16 End Purge: Date/Time: 5/ 07 /2018 @ 1137 Gallons Purged: 2.1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1117	14.44	176	2.93	6.50	209.0		6.78	0.3	CLEAR/SOME ORGANICS
1122	14.58	169	2.27	6.27	228.9		6.78	0.6	
1125	14.64	167	1.35	6.10	236.3		6.79	0.9	
1128	14.74	166	1.27	6.31	225.6		6.8	1.2	
1131	14.76	165	1.56	6.41	222.6		6.8	1.5	
1134	14.82	165	2.32	6.43	221.9		6.8	1.8	
1137	14.96	165	2.47	6.45	220.4		6.79	2.1	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type Dedicated bladder pump

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.97	164	2.45	6.47	216.1		6.8		
2	14.97	164	2.51	6.47	215.8		6.8		
3	114.90	164	2.55	6.47	215.6		6.8		
4	14.88	164	2.57	6.47	215.5		6.8		
Average:	39.93	164	2.52	6.47	215.8	#DIV/0!	6.80		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments: PH didn't stabilize so purged for 20 mins

Signature: Greg Nostrand Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1156
Sample Number: RGW236S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.46 Time: 1130 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1133 End Purge: Date/Time: 5/ 7 /2018 @ 1154 Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1136	16.2	299.1	2.11	6.22	50.3	MED	6.51	<0.25	
1139	16.7	306.2	1.31	6.26	45.7		6.51	<0.25	
1142	16.9	310.2	0.96	6.25	41.7			0.25	
1145	17.1	312.1	0.72	6.35	35.8		6.51	<0.50	
1148	17.2	312.3	0.67	6.37	31.6				
1151	17.2	312.1	0.65	6.40	27.4				
1153	17.3	312.3	0.65	6.39	24.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY TURBID, ORANGE/BROWN COLOR, NO./NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.3	312.4	0.64	6.39	24.0				
2	17.3	312.6	0.64	6.40	23.5				
3	17.3	312.5	0.64	6.40	23.3				
4	17.3	312.5	0.64	6.41	23.0				
Average:	17.3	312.5	0.64	6.40	23.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 700
Sample Number: RGWDUP1-180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ End Purge: Date/Time: 5/ 7 /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW152S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT GRAY COLOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.0	184.5	0.62	6.23	38.5				
2	15.0	184.3	0.62	6.23	38.2				
3	15.0	182.9	0.63	6.24	37.8				
4	15.0	180.0	0.65	6.24	37.7				
Average:	15.0	182.9	0.63	6.24	38.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW152S
Comments:

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 1530
Sample Number:	RGW031S- 180507	Weather:	70S SUNNY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 3.97 Time: 1455 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ /2018 @ 1500 End Purge: Date/Time: 5/ 7 /2018 @ 1520 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1503	19.6	276.4	0.68	6.12	10.9	LOW	3.97		
1506	19.2	267.1	0.96	6.12	6.6		3.97		
1509	19.3	266.3	0.9	6.1	6		3.97		
1512	18.5	253.3	0.88	6.12	-2.5				
1515	18.5	251	0.89	6.12	-5.2				
1518	18.5	249.7	0.95	6.12	-8.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.5	249.3	0.98	6.12	-9.4				
2	18.4	248.3	0.98	6.12	-9.7				
3	18.5	247.6	1	6.13	-10.3				
4	18.4	247.5	1	6.12	-10.5				
Average:	18.5	248.2	0.99	6.12	-10.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP2)

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1630
Sample Number: RGW033S- 180507 | Weather: 70S SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.1 Time: 1559 Flow through cell vol. GW Meter No.(s HREON1
Begin Purge: Date/Time: 5/ /2018 @ 1600 End Purge: Date/Time: 5/ 7 /2018 @ 1610 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1603	18.3	327	0.67	6.21	-7	LOW	4.1		
1606	18.3	328.1	0.7	6.22	-9.9	LOW	4.1		
1609	18.4	329	0.72	6.22	-12.6		4.1		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.5	329.9	0.73	6.22	-15.2				
2	18.5	330.7	0.73	6.22	-17.8				
3	18.6	331.1	0.73	6.22	-18.6				
4	18.7	331.6	0.74	6.22	-19				
Average:	18.6	330.8	0.73	6.22	-17.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1700
Sample Number: RGW034S- 180507 | Weather: 70S SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.2 Time: 1629 Flow through cell vol. GW Meter No.(s HREON1
Begin Purge: Date/Time: 5/ /2018 @ 1630 End Purge: Date/Time: 5/ 7 /2018 @ 1640 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1633	17.7	298.7	0.67	6.25	-13.3	LOW	4.2		
1636	17.5	297.6	0.69	6.26	-16.6		4.2		
1639	17.3	295	0.69	6.27	-23.7		4.2		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.2	294.6	0.71	6.26	-24.6				
2	17.2	294.5	0.72	6.26	-25.9				
3	17.3	293.9	0.74	6.26	-26.9				
4	17.4	294	0.7	6.26	-28				
Average:	17.3	294.3	0.72	6.26	-26.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@ 1733

Sample Number: RGW038S- 180507 | Weather: SUNNY 70F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/LOCK

DTW Before Purging (ft): 4.24 Time: 1712 Flow through cell v: 0.3 GW Meter No.(s): 2

Begin Purge: Date/Time: 5/ 07 /2018 @ 1714 End Purge: Date/Time: 5/ 07/2018 @ 1726 Gallons Purged: 1.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell vol.**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1714	14.58	317	0.75	6.34	169.7		4.3	0.3	
1717	14.00	316	0.21	6.30	161.9		4.29	0.6	
1720	15.56	327	0.70	6.34	148.1		4.28	0.9	
1723	15.55	330	0.70	6.34	146.6		4.28	1.2	
1726	15.53	336	0.59	6.35	141.7		4.28	1.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.55	336	0.58	6.35	140.1		4.28		
2	15.53	336	0.56	6.35	139.5		4.28		
3	15.52	336	0.55	6.35	138.8		4.28		
4	15.51	336	0.53	6.35	137.7		4.28		
Average:	15.53	336	0.56	6.35	139.0	#DIV/0!	4.28		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1626
Sample Number: RGW039S- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.94 | Time: 1600 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1603 | End Purge: Date/Time: 5/ 7 /2018 @ 1622 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1606	17.9	165.6	0.63	6.31	36.3	LOW	3.94	<0.25	
1609	17.9	161.7	0.57	6.29	35.9				
1612	18.1	161.7	0.51	6.25	35.1		3.94	0.25	
1615	18.0	161.8	0.44	6.23	34.6				
1618	18.1	161.8	0.45	6.23	34.4				
1621	18.1	162.1	0.43	6.23	34.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.1	162.1	0.43	6.23	34.2				
2	18.1	162.1	0.43	6.23	34.2				
3	18.1	162.1	0.43	6.23	34.2				
4	18.1	162.1	0.43	6.23	34.2				
Average:	18.1	162.1	0.43	6.23	34.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1526
Sample Number: RGW143S- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.41 Time: 1432 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1503 End Purge: Date/Time: 5/ 7 /2018 @ 1513 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1506	16.0	106.3	1.95	6.25	40.1	MED	4.41	<0.25	
1509	16.2	106.8	1.93	6.22	43.0			<0.25	
1512	16.2	107.2	1.94	6.24	45.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, GRAY, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.4	107.3	1.94	6.24	46.8				
2	16.4	107.5	1.95	6.24	46.4				
3	16.4	107.3	1.95	6.24	47.4				
4	16.4	107.4	1.95	6.24	46.9				
Average:	16.4	107.4	1.95	6.24	46.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments: PUMP NOT WORKING. TROUBLESHOOTED ~25 MIN TO GET SAMPLE.

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1556
Sample Number: RGW209S- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.93 | Time: 1532 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1534 | End Purge: Date/Time: 5/ 7 /2018 @ 1544 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1537	16.9	364.7	0.12	6.24	46.5	LOW	3.93	<0.25	
1540	16.9	365.4	0.14	6.26	41.2			<0.25	
1543	16.9	365.5	0.14	6.26	36.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.9	365.3	0.14	6.26	35.6				
2	16.9	365.4	0.14	6.27	35.2				
3	16.9	365.4	0.15	6.27	34.5				
4	16.9	365.6	0.15	6.27	34.0				
Average:	16.9	365.4	0.15	6.27	34.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1500
Sample Number: RGW210S- 180507 | Weather: 70S SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.5 Time: 1425 Flow through cell vol. GW Meter No.(s HREON1
Begin Purge: Date/Time: 5/ /2018 @ 1430 End Purge: Date/Time: 5/ 7 /2018 @ 1444 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1433	20.3	276.3	0.5	6.25	37.7	HIGH	3.6		
1436	21.7	272.1	0.44	6.39	14.1		3.65		
1439	19.2	230.4	0.45	6.34	9.3		3.65		
1442	19.4	227.8	0.45	6.36	5.2		3.65		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): BROWN SLIGHTLY TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.4	224	0.48	6.37	3.7				
2	19.1	222.7	0.48	6.37	2.9				
3	19.1	222.2	0.5	6.35	3				
4	18.8	214.9	0.49	6.36	2.1				
Average:	19.1	221.0	0.49	6.36	2.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@ 1417

Sample Number: RGW237S- 180507 | Weather: PARTLY SUNNY 65 F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe:

DTW Before Purging (ft): 3.46 Time: 1350 Flow through cell v: 0.3 GW Meter No.(s): 2

Begin Purge: Date/Time: 5/ 07 /2018 @ 1353 End Purge: Date/Time: 5/ 07 /2018 @ 1414 Gallons Purged: 2.4

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell vol.**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1353	16.05	130	13.11	6.50	192.5		3.47	0.3	
1356	16.50	130	12.65	6.51	197.6		3.47	0.6	
1359	17.62	129	122.60	6.53	201.7		3.49	0.9	
1402	19.19	128	116.70	10.75	198.1		3.5	1.2	
1405	20.73	129	10.50	6.57	194.3		3.48	1.5	
1411	21.95	129	10.40	6.59	189.5		3.49	2.1	
1414	22.86	129	10.28	6.61	187.8		3.49	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN/ LOW/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	22.99	129	10.24	6.25	187.0		3.49		
2	23.12	129	10.26	6.61	186.1		3.49		
3	23.19	129	10.25	6.61	185.0		3.49		
4	23.31	129	10.18	6.61	183.7		3.49		
Average:	23.15	129	10.23	6.52	185.5	#DIV/0!	3.49		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1411
Sample Number: RGW238I- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.54 Time: 1345 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1348 End Purge: Date/Time: 5/ 7 /2018 @ 1409 Gallons Purged: 0.75
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1351	16.5	389.0	0.09	6.25	78.5	LOW	3.54	<0.25	
1354	16.3	384.1	0.13	6.26	67.2		3.54	0.25	
1357	16.2	382.2	0.19	6.26	61.1				
1400	17.2	386.9	0.22	6.29	39.6		3.54	0.5	
1403	17.6	389.0	0.26	6.30	34.4				
1406	18.0	391.7	0.33	6.30	26.5				
1408	18.4	394.7	0.43	6.31	19.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, SLIGHT YELLOW TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.4	394.9	0.45	6.31	18.9				
2	18.5	395.1	0.46	6.31	18.4				
3	18.5	395.1	0.46	6.31	17.9				
4	18.6	395.6	0.47	6.32	17.0				
Average:	18.5	395.2	0.46	6.31	18.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1446
Sample Number: RGW239I- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.29 Time: 1401 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1424 End Purge: Date/Time: 5/ 7 /2018 @ 1445 Gallons Purged: 1
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1427	17.8	293.9	0.26	6.31	19.8	LOW	4.29	<0.25	
1430	17.8	293.7	0.30	6.30	17.6			0.25	
1433	17.7	293.7	0.31	6.31	16.7		4.29		
1436	17.6	293.4	0.37	6.31	13.2			0.5	
1439	17.6	293.0	0.42	6.31	11.1				
1442	17.6	292.9	0.45	6.31	9.4			0.75	
1444	17.6	293.0	0.50	6.31	7.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.6	292.9	0.53	6.31	5.7				
2	17.6	292.9	0.54	6.31	5.3				
3	17.6	293.0	0.55	6.31	5.1				
4	17.6	292.9	0.55	6.31	4.7				
Average:	17.6	292.9	0.54	6.31	5.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: MSMSD Location

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@ 1511
Sample Number: RGW240D- 180507 | Weather: SUNNY 70 F
Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LOCK
DTW Before Purging (ft): 4.72 Time: 1445 Flow through cell vol. GW Meter No.(s): 2
Begin Purge: Date/Time: 5/ 07/2018 @1448 End Purge: Date/Time: 5/ 07 /2018 @ 1508 Gallons Purged: 2.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell vol.**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1448	17.50	448	8.62	7.28	118.4		4.72	0.3	
1451	17.49	457	10.40	7.18	120.5		4.61	0.6	
1454	17.00	452	11.45	6.87	123.5	LOW	4.58	0.9	
1457	16.67	449	11.35	6.49	123.3		5.42	1.2	AIR BUBBLE
1500	16.16	447	4.80	6.40	136.6		5.64	1.5	
1503	15.93	450	2.65	6.40	135.9		5.71	1.8	
1508	15.79	449	2.67	6.38	127.1		5.79	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR,LOW,NO,NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.77	449	2.88	6.37	126.7		6.89		
2	15.77	449	2.90	6.36	126.5				
3	15.78	449	29.00	6.35	126.4				
4	15.76	449	30.00	6.34	126.1				
Average:	15.77	449	16.20	6.36	126.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:
Signature: GREG NOSTRAND Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@1643
Sample Number: RGW-241S- 180507 | Weather: SUNNY 70F
Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe:
DTW Before Purging (ft): 4.84 Time: 1629 Flow through cell vol. GW Meter No.(s): 2
Begin Purge: Date/Time: 5/ 07/2018 @1628 End Purge: Date/Time: 5/ 07/2018 @1640 Gallons Purged: 1.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell vol.**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1628	14.91	391	0.21	6.20	158.8		4.89	0.3	
1631	14.94	391	0.19	6.10	157.4		4.9	0.6	
1634	15.02	392	0.16	6.10	153.1		4.89	0.9	
1637	14.97	392	0.13	6.16	139.0		4.89	1.2	
1640	14.96	392	0.13	6.17	129.8		4.89	1.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.99	392	0.12	6.17	127.4		4.9		
2	14.99	392	0.12	6.17	126.2		4.9		
3	14.95	392	0.14	6.17	124.1		4.9		
4	14.94	392	0.14	6.17	121.6		4.9		
Average:	14.97	392	0.13	6.17	124.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:
Signature: GREG NOSTRAND Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 07 /2018@ 1607

Sample Number: RGW-242I- 180507 | Weather: SUNNY 70F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LOCK

DTW Before Purging (ft): 5.02 Time: 1544 Flow through cell vol. GW Meter No.(s): 2

Begin Purge: Date/Time: 5/ 07 /2018 @ 1545 End Purge: Date/Time: 5/ 07 /2018 @ 1605 Gallons Purged: 2.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell vol.**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1545	14.88	383	1.42	6.19	183.0	LOW	5.02	0.3	
1548	15.08	388	0.94	6.21	173.3	LOW	5.02	0.6	
1551	15.94	389	0.76	6.10	174.7	LOW	5.02	0.9	
1554	16.50	391	0.51	6.18	165.4	LOW	5.02	1.2	
1600	16.51	392	1.21	6.23	147.8	LOW	5.03	1.8	
1603	16.20	391	1.08	6.23	143.7	LOW	5.02	2.1	
1605	16.06	391	1.09	6.23	139.8	LOW	5.02	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.06	391	0.97	6.23	135.3		5.02		
2	16.07	391	1.00	6.23	134.5		5.02		
3	16.08	391	1.01	6.23	133.6		5.02		
4	16.10	391	1.02	6.23	132.8		5.02		
Average:	16.08	391	1.00	6.23	134.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 05/0718

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1651
Sample Number: RGW-243I- 180507 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.04 Time: 1613 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1627 End Purge: Date/Time: 5/ 7 /2018 @ 1648 Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1630	18.3	369.1	0.49	6.28	20.0	LOW	4.04		
1633	18.2	369.2	0.53	6.28	17.8			<0.25	
1636	18.1	369.2	0.60	6.28	15.5		4.04	0.25	
1639	18.2	369.6	0.72	6.28	10.6				
1642	18.2	370.0	0.78	6.28	8.2				
1645	18.2	370.6	0.86	6.28	5.4				
1647	18.2	370.5	0.90	6.28	3.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.2	370.4	0.91	6.29	3.4				
2	18.2	370.3	0.92	6.29	3.1				
3	18.2	370.1	0.93	6.29	2.9				
4	18.1	370.1	0.93	6.28	2.7				
Average:	18.2	370.2	0.92	6.29	3.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1600
Sample Number: RGW-244S 180507 | Weather: 70S SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.1 Time: 1529 Flow through cell vol. GW Meter No.(s HREON1
Begin Purge: Date/Time: 5/ /2018 @ 1530 End Purge: Date/Time: 5/ 7 /2018 @ 1542 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1533	16.7	403.7	0.83	6.16	10.6	LOW	4.1		
1536	16.8	404.1	0.83	6.16	8.2		4.1		
1539	17.4	407.7	0.85	6.16	6		4.1		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.4	409.4	0.85	6.17	4.5				
2	17.9	412.1	0.85	6.17	3.3				
3	18	414	0.86	6.17	2				
4	18	415.7	0.86	6.17	1				
Average:	17.8	412.8	0.86	6.17	2.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@
Sample Number: RGWDUP2 180507 | Weather: 70S SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HREON1
Begin Purge: Date/Time: 5/ /2018 @ End Purge: Date/Time: 5/ 7 /2018 @ Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW031S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.5	249.1	0.98	6.12	-9.6				
2	18.4	248	0.99	6.12	-9.9				
3	18.4	247.6	1	6.12	-10.3				
4	18.4	247.3	1	6.12	-10.7				
Average:	18.4	248.0	0.99	6.12	-10.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW031S
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1256
Sample Number: RGW183S- 180507 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft) 7.93 | Time: 1227 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 7 /2018 @ 1231 | End Purge: Date/Time: 5/ 7 /2018 @ 1247 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1234	15.5	134.3	0.42	6.44	51.6	LOW	7.96	<0.25	
1237	15.4	130.6	0.22	6.23	55.7			<0.25	
1240	15.3	128.5	0.20	6.27	51.1		7.96	0.25	
1243	15.2	127.1	0.18	6.28	48.7				
1246	15.2	126.7	0.19	6.28	47.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.2	126.5	0.18	6.28	47.0				
2	15.2	126.5	0.18	6.28	46.9				
3	15.2	126.4	0.18	6.29	46.7				
4	15.2	126.4	0.17	6.28	46.5				
Average:	15.2	126.5	0.18	6.28	46.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 1340
Sample Number:	RGW184S- 180507	Weather:	60S PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft): 8.6 Time: 1300 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ 7 /2018 @ 1310 End Purge: Date/Time: 5/ 7 /2018 @ 1337 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1313	15.6	135.7	0.92	6.27	60	LOW	8.64		
1316	16	134.4	0.79	6.37	50.4		8.64		
1319	15.9	132.9	0.7	6.38	47.8		8.64		
1322	15.9	131.8	0.62	6.33	46.1				
1335	15.9	131.4	0.64	6.32	45.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY GRAY AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.9	131.3	0.66	6.3	45.9				
2	16	131.4	0.64	6.31	45.4				
3	16	131.4	0.64	6.32	45.1				
4	16	131.4	0.65	6.31	45.3				
Average:	16.0	131.4	0.65	6.31	45.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 900
Sample Number: RGW211S- 180507 | Weather: 60s PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.75 Time: 829 Flow through cell vol. GW Meter No.(s HERON1
Begin Purge: Date/Time: 5/ 7 /2018 @ 830 End Purge: Date/Time: 5/ 7 /2018 @ 848 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
833	13.8	171.1	1.76	6.45	20.1	HIGH	8.8		
836	13.6	259.7	0.96	6.17	21.7		8.85		
839	13.8	291.3	0.71	6.29	0.6	MED	8.85		
842	13.9	282.1	0.66	6.33	-3.6		8.85		
845	13.9	260.1	0.63	6.37	-13.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): ORANGE VERY TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.9	255.3	0.71	6.37	-15				
2	13.8	253.3	0.69	6.37	-16				
3	13.8	250.3	0.62	6.36	-16.9				
4	13.8	248.3	0.62	6.37	-17.7				
Average:	13.8	251.8	0.66	6.37	-16.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 945
Sample Number:	RGW212S- 180507	Weather:	60s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 9.83 Time: 912 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ 7 /2018 @ 915 End Purge: Date/Time: 5/ 7 /2018 @ 938 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
918	13.5	222	1.09	5.61	66.7	MED	9.95		
921	13.7	230.4	0.99	5.59	68.8		9.95		
924	13.9	234.6	1.1	5.59	69.5		9.95		
927	14	237.2	1.19	5.6	69.9				
930	14.1	238.6	1.41	5.6	71.6				
933	14.2	238.9	1.5	5.59	72.3				
936	14.3	239.5	1.59	5.59	72.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): ORANGE TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.4	239.7	1.63	5.59	73.1				
2	14.3	239.8	1.64	5.59	73.2				
3	14.4	239.9	1.71	5.59	73.3				
4	14.4	240.1	1.71	5.59	73.4				
Average:	14.4	239.9	1.67	5.59	73.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1410
Sample Number: RGW221S- 180507 | Weather: 60S PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.38 Time: 1330 Flow through cell vol. GW Meter No.(s HERON1
Begin Purge: Date/Time: 5/ 7 /2018 @ 1340 End Purge: Date/Time: 5/ 7 /2018 @ 1340 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1343	16.6	209	1.18	6.08	82.8	LOW	9.38		
1346	17	210.8	1.18	6.1	56.5		9.38		
1349	17.6	213.2	1.11	6.12	49.2		9.38		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.7	213.9	1.06	6.12	47.7				
2	17.6	214.6	1.06	6.12	47				
3	17.8	215	1.07	6.12	46.2				
4	17.8	215.3	1.08	6.12	45.4				
Average:	17.7	214.7	1.07	6.12	46.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 1020
Sample Number:	RGW224S- 180507	Weather:	60s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 10.1 Time: 930 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ 7 /2018 @ 950 End Purge: Date/Time: 5/ 7 /2018 @ 1005 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
953	15.5	199.4	2.8	6.07	58.3	MED	10.1		
956	15.2	192.1	2.24	6.09	51.1		10.1		
959	15.3	191	2.14	6.1	47.6		10.1		
1002	15.4	190.3	1.99	6.11	43.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY ORANGE AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.5	189.5	2	6.11	42.4				
2	15.5	189.1	1.92	6.11	41.8				
3	15.5	188.8	1.9	6.11	41.3				
4	15.5	188	1.9	6.12	40.7				
Average:	15.5	188.9	1.93	6.11	41.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP3)

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1130
Sample Number: RGW255S- 180507 | Weather: 60S PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.43 Time: 1055 Flow through cell vol. GW Meter No.(s HERON1
Begin Purge: Date/Time: 5/ 7 /2018 @ 1100 End Purge: Date/Time: 5/ 7 /2018 @ 1114 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1103	16.5	187.6	0.65	6.01	46.3	LOW	9.43		
1106	16.7	187.9	0.61	6.07	39.1		9.43		
1109	16.9	188.7	0.63	6.14	30.9		9.43		
1112	17	188.7	0.63	6.15	28				
1115									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17	188.7	0.67	6.16	26.6				
2	17.1	188.8	0.74	6.16	26				
3	17	188.7	0.67	6.16	25.6				
4	17.1	188.7	0.72	6.16	25.4				
Average:	17.1	188.7	0.70	6.16	25.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 1045
Sample Number:	RGW256S- 180507	Weather:	60s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 8.14 Time: 1009 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ 7 /2018 @ 1015 End Purge: Date/Time: 5/ 7 /2018 @ 1039 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1018	16.1	150.7	3.17	6.29	40	LOW	8.16		
1021	15.8	154.4	2.22	6.23	41.1		8.16		
1024	15.6	154	1.34	6.24	38.2		8.16		
1027	15.6	153.3	1.29	6.25	35				
1030	15.6	150.8	1.07	6.28	32.6				
1033	15.7	150.5	1.03	6.29	32				
1036	15.8	148	0.97	6.29	29.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.8	148.3	0.98	6.3	29.2				
2	15.8	148.4	0.94	6.29	29.2				
3	15.9	147.7	0.96	6.3	28.8				
4	15.9	147.8	0.94	6.3	28.5				
Average:	15.9	148.1	0.96	6.30	28.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1200
Sample Number: RGW257S- 180507 | Weather: 60S PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.67 Time: 1120 Flow through cell vol. GW Meter No.(s HERON1
Begin Purge: Date/Time: 5/ 7 /2018 @ 1130 End Purge: Date/Time: 5/ 7 /2018 @ 1153 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1133	16.7	163.2	3.75	6.14	47.2	LOW	8.67		
1136	17	161	3.61	6.13	49.6		8.67		
1139	17.3	159.9	3.33	6.12	51.2		8.67		
1142	17.5	159.4	2.97	6.11	52				
1145	17.6	159.3	2.84	6.12	52.4				
1148	17.9	158.4	2.67	6.11	53.3				
1151	18	158.1	2.6	6.11	53.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18	158	2.52	6.11	53.9				
2	18.1	158	2.44	6.11	53.8				
3	18.1	157.8	2.48	6.11	53.9				
4	18.1	157.8	2.42	6.11	54.1				
Average:	18.1	157.9	2.47	6.11	53.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1245
Sample Number: RGW258S- 180507 | Weather: 60S PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.91 Time: 1210 Flow through cell vol. GW Meter No.(s HERON1
Begin Purge: Date/Time: 5/ 7 /2018 @ 1215 End Purge: Date/Time: 5/ 7 /2018 @ 1234 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1218	17.2	227.4	2.21	6.16	78.5	LOW	6.91		
1221	17.3	246.6	1.83	6.13	77		6.91		
1224	16.6	306.1	0.88	6.23	66		6.91		
1227	16.2	317.9	0.81	6.27	58.3				
1230	16.1	324.6	0.78	6.28	41.3				
1233	16.1	324.5	0.72	6.29	39.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.1	324.2	0.71	6.3	37.7				
2	16.1	324.2	0.67	6.3	36.4				
3	16.1	324	0.67	6.31	35.7				
4	16	323.6	0.69	6.3	34.5				
Average:	16.1	324.0	0.69	6.30	36.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: MSMSD Location

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 1030

Sample Number: DUP3- 180507 | Weather: 60s PC

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 5/ 7 /2018 @ End Purge: Date/Time: 5/ 7 /2018 @ Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY ORANGE AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.5	189.3	1.98	6.11	42.6				
2	15.5	189	1.92	6.11	41.9				
3	15.5	188.2	1.9	6.12	41.3				
4	15.5	188	1.87	6.12	40.3				
Average:	15.5	188.6	1.92	6.12	41.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW224S

Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1051
Sample Number: RGW185S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 0.83 | Time: 1024 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1028 | End Purge: Date/Time: 5/ 8 /2018 @ 1049 | Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1031	16.1	734	0.14	6.36	57.8	LOW	0.83	<0.25	
1034	16.2	749	0.19	6.39	41.7				
1037	16.4	759	0.40	6.42	16.4		0.83	0.25	
1040	16.5	761	0.49	6.42	9.7		0.83		
1043	16.7	763	0.54	6.43	6.4				
1046	16.7	765	0.67	6.43	-0.9			0.5	
1048	16.7	765	0.76	6.43	-5.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	765	0.77	6.44	-5.7				
2	16.7	765	0.78	6.44	-6.0				
3	16.7	764	0.79	6.44	-6.4				
4	16.7	765	0.80	6.44	-6.8				
Average:	16.7	765	0.79	6.44	-6.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP4)
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1000
Sample Number: RGWDUP4 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ End Purge: Date/Time: 5/ 8 /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW185S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	765	0.77	6.44	-5.7				
2	16.7	765	0.78	6.44	-6.1				
3	16.7	764	0.79	6.44	-6.4				
4	16.7	765	0.80	6.44	-7.2				
Average:	16.7	765	0.79	6.44	-6.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW194S
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1211
Sample Number: RGW195S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 1.01 Time: 1117 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1149 End Purge: Date/Time: 5/ 8 /2018 @ 1210 Gallons Purged: 1
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1152	14.4	739	0.40	6.17	37.4	LOW	1.01	<0.25	
1155	14.4	684	0.64	6.21	19.9		1.05	0.25	
1158	14.3	609	0.86	6.28	5.3				
1201	14.3	588	0.92	6.29	1.7		1.05	0.5	
1204	14.3	549	1.04	6.30	-4.3				
1207	14.3	533	1.11	6.30	-7.9				
1209	14.3	520	1.18	6.31	-11.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.3	520	1.18	6.31	-12.1				
2	14.3	518	1.19	6.31	-12.2				
3	14.3	518	1.19	6.31	-12.4				
4	14.3	517	1.20	6.31	-12.6				
Average:	14.3	518	1.19	6.31	-12.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1131
Sample Number: RGW196D- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 1.01 Time: 1104 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1107 End Purge: Date/Time: 5/ 8 /2018 @ 1128 Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1110	15.2	381.8	0.38	6.42	29.7	LOW	1.05	<0.25	
1113	15.2	384.9	0.46	6.34	26.7		1.05	0.25	
1116	15.2	385.7	0.51	6.33	24.2				
1119	15.2	386.3	0.61	6.31	19.3		1.05	0.5	
1122	15.2	386.0	0.70	6.31	14.7				
1125	15.2	385.7	0.75	6.31	12.4			75	
1127	15.3	384.6	0.89	6.31	4.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.3	384.8	0.90	6.31	4.3				
2	15.3	384.8	0.91	6.31	4.2				
3	15.3	384.8	0.91	6.31	3.6				
4	15.3	384.8	0.92	6.31	3.4				
Average:	15.3	384.8	0.91	6.31	3.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 946
Sample Number: RGW188S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.21 | Time: 917 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 921 | End Purge: Date/Time: 5/ 8 /2018 @ 940 | Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
924	15.4	452.6	0.81	6.17	36.2	LOW	3.25	<0.25	
927	15.1	451.6	1.00	6.22	29.7				
930	15.2	450.8	1.12	6.26	23.2		3.25	0.25	
933	15.0	448.6	1.22	6.28	18.3				
936	15.2	449.1	1.26	6.29	13.1				
939	15.2	449.0	1.28	6.30	10.7			0.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SUSPENDED PARTICLES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.1	448.8	1.29	6.30	10.4				
2	15.2	448.8	1.28	6.30	10.2				
3	15.1	448.8	1.29	6.30	9.9				
4	15.1	448.8	1.29	6.30	9.5				
Average:	15.1	448.8	1.29	6.30	10.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 911
Sample Number: RGW249S- 180508 | Weather: 50'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.04 | Time: 846 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 849 | End Purge: Date/Time: 5/ 8 /2018 @ 910 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
852	14.2	534.0	0.20	6.15	93.7	MED		<0.25	
855	14.2	504.0	0.44	6.22	69.3		3.07	0.25	
858	14.3	485.3	0.63	6.23	56.4				
901	14.3	479.6	0.76	6.23	50.0		3.09	0.5	
904	14.3	468.0	0.94	6.23	42.3				
907	14.4	463.8	1.09	6.23	36.4				
909	14.4	462.8	1.16	6.23	34.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.4	462.8	1.16	6.23	33.6				
2	14.4	462.4	1.17	6.23	33.3				
3	14.4	462.8	1.18	6.23	32.8				
4	14.4	462.2	1.18	6.23	32.4				
Average:	14.4	462.6	1.17	6.23	33.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 1233
Sample Number: RGW194S- 180508 | Weather: sunny 70f
Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LID
DTW Before Purging (ft) 1.42 Time: 1203 Flow through cell 0.3 GW Meter No.(s 2
Begin Purge: Date/Time: 5/ 08 /2018 @ 1206 End Purge: Date/Time: 05/08/18 @ 1227 Gallons Purged: 2.4
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1207	15.7	558.0	0.43	6.67	31.8		1.59	0.3	CLEAR/COLORLESS/ NO/NS
1210	15.2	671.0	0.29	6.37	32.2		1.6	0.6	
1213	15.0	687.0	0.38	6.33	29.5		1.6	0.9	
1216	14.6	671.0	0.65	6.30	16.3		1.6	1.2	
1219	14.6	656.0	0.91	6.30	4.7		1.6	1.5	
1222	14.8	629.0	1.25	6.29	-7.4		1.61	1.8	
1225	14.9	600.0	1.66	6.29	-20.0		1.62	2.1	
1227	14.9	586.0	1.88	6.29	-25.4		1.63	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☑ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): clear/colorless/no/ns

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.9	583.0	1.94	6.29	-27.1				
2	14.9	578.0	1.99	6.29	-28.0				
3	14.9	578.0	2.02	6.29	-28.8				
4	14.9	577.0	2.06	6.29	-29.5				
Average:	14.9	579.0	2.00	6.29	-28.4	#DIV/0!	1.62		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1211
Sample Number: RGW195S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 1.01 Time: 1117 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1149 End Purge: Date/Time: 5/ 8 /2018 @ 1210 Gallons Purged: 1
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1152	14.4	739	0.40	6.17	37.4	LOW	1.01	<0.25	
1155	14.4	684	0.64	6.21	19.9		1.05	0.25	
1158	14.3	609	0.86	6.28	5.3				
1201	14.3	588	0.92	6.29	1.7		1.05	0.5	
1204	14.3	549	1.04	6.30	-4.3				
1207	14.3	533	1.11	6.30	-7.9				
1209	14.3	520	1.18	6.31	-11.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.3	520	1.18	6.31	-12.1				
2	14.3	518	1.19	6.31	-12.2				
3	14.3	518	1.19	6.31	-12.4				
4	14.3	517	1.20	6.31	-12.6				
Average:	14.3	518	1.19	6.31	-12.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1131
Sample Number: RGW196D- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 1.01 Time: 1104 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1107 End Purge: Date/Time: 5/ 8 /2018 @ 1128 Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1110	15.2	381.8	0.38	6.42	29.7	LOW	1.05	<0.25	
1113	15.2	384.9	0.46	6.34	26.7		1.05	0.25	
1116	15.2	385.7	0.51	6.33	24.2				
1119	15.2	386.3	0.61	6.31	19.3		1.05	0.5	
1122	15.2	386.0	0.70	6.31	14.7				
1125	15.2	385.7	0.75	6.31	12.4			75	
1127	15.3	384.6	0.89	6.31	4.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.3	384.8	0.90	6.31	4.3				
2	15.3	384.8	0.91	6.31	4.2				
3	15.3	384.8	0.91	6.31	3.6				
4	15.3	384.8	0.92	6.31	3.4				
Average:	15.3	384.8	0.91	6.31	3.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 1047
Sample Number: RGW197S- 180508 | Weather: SUNNY 75F
Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/LOCK
DTW Before Purging (ft) 0.7 Time: 1023 Flow through cell 0.3 GW Meter No.(s 2
Begin Purge: Date/Time: 5/ 08 /2018 1025 End Purge: Date/Time: 5/ 08 /2018 @ 1045 Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1025	14.9	781	0.16	6.82	-7.6		0.7	0.3	
1028	14.9	790	0.12	6.96	-46.5		0.7	0.6	
1031	15.1	788	0.12	7.00	-67.9		0.72	0.9	
1034	15.0	783	0.16	7.04	-86.7		0.76	1.2	
1037	15.2	783	1.60	7.05	-96.4		0.74	1.5	
1040	15.1	778	2.40	7.10	-124.0		0.75	1.8	
1043	15.1	778	0.27	7.11	-128.4		0.75	2.1	
1045	15.2	779	0.29	7.11	-129.7		0.76	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.1	778	0.30	7.11	-130.7		0.76		
2	15.2	778	0.31	7.11	-131.5		0.76		
3	15.2	778	0.31	7.11	-132.2		0.76		
4	15.1	777	3.30	7.12	-133.3		0.76		
Average:	15.2	778	1.06	7.11	-131.9	#DIV/0!	0.76		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments: took water level with tape measure due to high water

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 1139

Sample Number: RGW245S- 180508 | Weather: SUNNY 75F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LOCK

DTW Before Purging (ft): 0.84 Time: 1113 Flow through cell: 0.3 GW Meter No.(s: 2

Begin Purge: Date/Time: 5/ 08 /2018 1115 End Purge: Date/Time: 5/ 08 /2018 @ 11: 1135 Gallons Purged: 2.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1115	15.5	523.0	0.47	7.30	-9.4		0.84	0.3	
1118	14.9	435.7	0.14	7.05	-9.9		0.84	0.6	
1121	14.9	444.3	0.13	6.94	-19.4		0.84	0.9	
1124	14.8	474.6	0.12	6.86	-35.0		0.84	1.2	
1127	14.8	490.3	0.13	6.84	-43.5		0.84	1.5	
1130	14.9	501.0	0.20	6.83	-55.1		0.84	1.8	
1133	14.8	514.0	0.22	6.82	-65.5		0.84	2.1	
1135	14.8	534.0	0.27	6.80	-70.7		0.84	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/SLIGHT ODOR/ NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.9	537.0	0.29	6.80	-72.4		0.84		
2	14.9	538.0	0.29	6.80	-73.5		0.84		
3	14.9	542.0	0.31	6.80	-74.6		0.84		
4	14.9	544.0	0.32	6.80	-75.7		0.84		
Average:	14.9	540.3	0.30	6.80	-74.1	#DIV/0!	0.84		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1000
Sample Number: RGWDUP4 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ End Purge: Date/Time: 5/ 8 /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW185S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	765	0.77	6.44	-5.7				
2	16.7	765	0.78	6.44	-6.1				
3	16.7	764	0.79	6.44	-6.4				
4	16.7	765	0.80	6.44	-7.2				
Average:	16.7	765	0.79	6.44	-6.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW194S
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 946
Sample Number: RGW188S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.21 | Time: 917 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 921 | End Purge: Date/Time: 5/ 8 /2018 @ 940 | Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
924	15.4	452.6	0.81	6.17	36.2	LOW	3.25	<0.25	
927	15.1	451.6	1.00	6.22	29.7				
930	15.2	450.8	1.12	6.26	23.2		3.25	0.25	
933	15.0	448.6	1.22	6.28	18.3				
936	15.2	449.1	1.26	6.29	13.1				
939	15.2	449.0	1.28	6.30	10.7			0.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SUSPENDED PARTICLES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.1	448.8	1.29	6.30	10.4				
2	15.2	448.8	1.28	6.30	10.2				
3	15.1	448.8	1.29	6.30	9.9				
4	15.1	448.8	1.29	6.30	9.5				
Average:	15.1	448.8	1.29	6.30	10.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08/2018@ 907

Sample Number: RGW247S- 180508 | Weather: CLEEAR 60F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LOCK

DTW Before Purging (ft) 3.36 Time: 845 Flow through cell 0.3 GW Meter No.(s 2

Begin Purge: Date/Time: 5/ /2018 @ 845 End Purge: Date/Time: 5/ 08 /2018 @ 906 Gallons Purged: 2.2

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
847	13.3	368.4	0.29	6.23	81.5		3.62	0.3	
850	13.4	370.9	0.22	6.19	72.9		3.57	0.6	
853	13.4	374.3	0.19	6.25	53.5		3.56	0.9	
856	13.4	374.8	0.23	6.26	46.9		3.56	1.2	
900	13.5	376.0	0.42	6.30	24.3		3.55	1.6	
903	13.5	376.1	0.52	6.32	16.6		3.54	1.9	
906	13.5	376.7	0.67	6.33	7.8		3.58	2.2	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.5	376.5	0.77	6.34	3.6		3.56		
2	13.5	376.9	0.80	6.34	2.4		3.56		
3	13.5	376.9	0.82	6.35	1.4		3.56		
4	13.5	376.8	0.85	6.35	0.5		3.56		
Average:	13.5	376.8	0.81	6.35	2.0	#DIV/0!	3.56		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 953

Sample Number: RGW248I- 180508 | Weather: SUNNY 65 F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL CAP W/ LOCK

DTW Before Purging (ft) 3.06 Time: 925 Flow through cell 0.3 GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 08 /2018 @0927 End Purge: Date/Time: 5/ 08 /2018 @ 947 Gallons Purged: 2.4

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
927	14.2	413.9	0.20	6.44	21.6		3.72	0.3	
930	14.3	425.2	0.34	6.34	18.3		3.32	0.6	
933	14.4	428.6	0.53	6.34	9.7		3.29	0.9	
936	14.5	430.3	0.77	6.34	-0.3		3.27	1.2	
939	14.3	429.7	1.05	6.32	-10.4		3.55	1.5	
942	14.5	430.8	1.23	6.33	-16.4		3.43	1.8	
945	14.5	431.7	1.47	6.33	-23.3		3.4	2.1	
947	14.6	431.9	1.53	6.33	-25.1		3.4	2.4	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.6	431.9	1.57	6.33	-26.2		3.4		
2	14.6	432.0	1.59	6.33	-26.8		3.4		
3	14.6	432.1	1.62	6.33	-27.4		3.4		
4	14.6	432.2	1.65	6.33	-28.1		3.4		
Average:	14.6	432.1	1.61	6.33	-27.1	#DIV/0!	3.40		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 911
Sample Number: RGW249S- 180508 | Weather: 50'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 3.04 | Time: 846 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 849 | End Purge: Date/Time: 5/ 8 /2018 @ 910 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
852	14.2	534.0	0.20	6.15	93.7	MED		<0.25	
855	14.2	504.0	0.44	6.22	69.3		3.07	0.25	
858	14.3	485.3	0.63	6.23	56.4				
901	14.3	479.6	0.76	6.23	50.0		3.09	0.5	
904	14.3	468.0	0.94	6.23	42.3				
907	14.4	463.8	1.09	6.23	36.4				
909	14.4	462.8	1.16	6.23	34.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.4	462.8	1.16	6.23	33.6				
2	14.4	462.4	1.17	6.23	33.3				
3	14.4	462.8	1.18	6.23	32.8				
4	14.4	462.2	1.18	6.23	32.4				
Average:	14.4	462.6	1.17	6.23	33.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@

Sample Number: RGW001S- 180508 | Weather: 60'S, SUNNY

Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:

DTW Before Purging (ft): 2.85 | Time: 1317 | Flow through cell vol. | GW Meter No.(s HERON 3

Begin Purge: Date/Time: 5/ 8 /2018 @ | End Purge: Date/Time: 5/ 8 /2018 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8021) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@

Sample Number: RGW004S- 180508 | Weather: 60'S, SUNNY

Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:

DTW Before Purging (ft) 1.25 | Time: 1320 | Flow through cell vol. | GW Meter No.(s HERON 3

Begin Purge: Date/Time: 5/ 8 /2018 @ | End Purge: Date/Time: 5/ 8 /2018 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8021) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@
Sample Number: RGW005S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ End Purge: Date/Time: 5/ 8 /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

Well covered with construction trailer

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: Construction trailer still over well.

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1351
Sample Number: RGW216S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.35 Time: 1327 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1330 End Purge: Date/Time: 5/ 8 /2018 @ 1343 Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1333	17.5	340.9	0.05	6.59	46.1	LOW	3.39	<0.25	
1336	17.6	340.9	0.04	6.60	32.1			0.25	
1339	17.5	340.5	0.04	6.60	29.6				
1342	17.5	339.7	0.04	6.61	25.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.5	339.6	0.05	6.61	25.0				
2	17.5	339.4	0.05	6.60	24.8				
3	17.5	339.4	0.05	6.60	24.8				
4	17.5	339.5	0.05	6.60	24.7				
Average:	17.5	339.5	0.05	6.60	24.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 1426
Sample Number: RGW217S- 180508 | Weather: 60'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.69 Time: 1400 Flow through cell vol. GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 1403 End Purge: Date/Time: 5/ 8 /2018 @ 1419 Gallons Purged: 0.75
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1406	18.4	194.7	0.42	6.50	38.8	LOW	3.69		
1409	19.1	231.7	0.19	6.45	37.7		3.69	0.25	
1412	19.9	250.5	0.14	6.45	31.1				
1415	20.0	251.5	0.13	6.45	26.5		3.69	0.5	
1418	20.2	249.6	0.13	6.47	21.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.3	249.2	0.13	6.47	21.0				
2	20.3	249.3	0.13	6.47	21.0				
3	20.3	248.9	0.13	6.47	20.4				
4	20.3	249.0	0.13	6.45	20.2				
Average:	20.3	249.1	0.13	6.47	20.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 1354

Sample Number: RGW218S- 180508 | Weather: SUNNY 75F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELL LOCK W/ CAP

DTW Before Purging (ft) 2.62 Time: 133011 Flow through cell 0.3 GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 08 /2018 @1333 End Purge: Date/Time: 5/ 08 /2018 @ 1348 Gallons Purged: 1.8

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1333	14.6	127.8	0.62	7.36	37.2		2.7	0.3	LIGHT BROWN/MED TURB/ NO/NS
1336	15.9	131.2	0.31	7.15	41.6		2.7	0.6	
1339	15.9	131.2	0.20	7.00	39.2		2.69	0.9	
1342	15.9	132.5	0.16	6.95	33.1		2.69	1.2	
1345	15.9	132.7	0.15	6.89	27.3		2.69	1.5	
1348	15.8	132.8	0.14	6.87	24.8		2.7	1.8	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): BROWN W/ TURBID MIXTURE/ HIGH TURB./NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.8	132.8	0.14	6.87	24.4				
2	15.7	132.8	0.14	6.87	23.7				
3	15.7	132.8	0.14	6.87	23.3				
4	15.7	132.7	0.14	6.86	22.8				
Average:	15.7	132.8	0.14	6.87	23.6	#DIV/0!	2.62		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☒ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08 /2018@ 1435

Sample Number: RGW251S- 180508 | Weather: SUNNY 75F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: WELLCAP W/ LOCK

DTW Before Purging (ft) 2.72 Time: 1412 Flow through cell 0.3 GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 08 /2018 1414 End Purge: Date/Time: 5/ 08 /2018 @ 1429 Gallons Purged: 1.8

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1414	15.0	129.9	1.10	7.05	34.1		2.74	0.3	
1417	16.6	127.3	0.61	6.82	38.4		2.74	0.6	
1420	17.3	124.7	0.46	6.80	33.4		2.74	0.9	
1423	17.9	120.0	0.30	6.92	22.9		2.75	1.2	
1426	18.0	118.9	0.28	6.94	18.0		2.74	1.5	
1429	17.7	116.5	0.25	6.93	14.5		2.74	1.8	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.7	116.1	0.25	6.92	14.0		2.74		
2	17.7	115.8	0.24	6.92	13.9				
3	17.7	115.6	0.24	6.92	13.7				
4	17.7	115.3	0.23	6.91	13.5				
Average:	17.7	115.7	0.24	6.92	13.8	#DIV/0!	2.74		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 816
Sample Number: 10-71-MW1 180508 | Weather: 50'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 6.69 | Time: 750 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 752 | End Purge: Date/Time: 5/ 8 /2018 @ 813 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
755	13.8	165.8	0.33	5.89	102.6	LOW	6.69	<0.25	
758	13.8	173.2	0.32	5.92	100.0		6.69		
801	13.9	174.0	0.40	6.01	91.9			0.25	
804	13.9	173.9	0.43	6.03	89.0		6.69		
807	13.9	173.9	0.47	6.05	85.8				
810	14.0	174.2	0.54	6.08	81.9			0.5	
812	14.0	174.3	0.58	6.09	79.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.0	174.3	0.59	6.09	78.9				
2	14.0	174.3	0.60	6.09	78.9				
3	14.0	174.3	0.60	6.09	78.8				
4	14.0	174.4	0.60	6.09	78.3				
Average:	14.0	174.3	0.60	6.09	78.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 8 /2018@ 746
Sample Number: 10-71-MW2 180508 | Weather: 50'S, SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft): 7.92 | Time: 719 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 5/ 8 /2018 @ 722 | End Purge: Date/Time: 5/ 8 /2018 @ 743 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
725	14.0	180.6	0.40	5.73	115.4	MED	5.95	<0.25	
728	14.0	183.9	0.32	5.67	117.4		5.95		
731	14.0	184.1	0.40	5.72	116.1			0.25	
734	14.0	184.2	0.38	5.77	113.2		5.95		
737	14.0	184.1	0.48	5.81	109.8	LOW			
740	14.0	184.1	0.55	5.84	107.4			0.5	
742	13.9	183.8	0.63	5.87	104.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.9	183.8	0.63	5.87	104.2				
2	13.9	183.8	0.64	5.87	104.1				
3	13.9	183.7	0.65	5.88	103.7				
4	13.9	183.7	0.66	5.88	103.5				
Average:	13.9	183.8	0.65	5.88	103.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 08/2018@ 749

Sample Number: 10-71-MW4 180508 | Weather: CLEAR 60 F

Landau Representative: GJN

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (**YES** or NO) Damaged (YES or **NO**) Describe: LARGE WELL MOUNT SITTING ON WELL

DTW Before Purging (ft) 7.74 Time: 735 Flow through cell 0.3 GW Meter No.(s 2

Begin Purge: Date/Time: 5/ 08/2018 @0736 End Purge: Date/Time: 5/ 08 /2018 @ 748 Gallons Purged: 1.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
736	14.0	231.2	0.62	5.88	134.0		7.8	0.3	
739	14.0	229.5	0.58	5.88	125.6		7.8	0.6	
742	14.0	228.9	0.53	5.91	116.2		7.79	0.9	
745	14.0	229.2	0.57	5.94	229.2		7.79	1.2	
748	14.0	227.9	0.80	5.98	227.8		7.8	1.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR/COLORLESS/NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.0	227.7	0.84	5.97	97.7		7.8		
2	14.0	227.7	0.84	5.98	96.3		7.8		
3	14.0	227.7	0.89	5.99	94.9		7.8		
4	14.0	227.7	0.92	5.99	93.7		7.8		
Average:	14.0	227.7	0.87	5.98	95.7	#DIV/0!	7.80		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: GREG NOSTRAND Date: 5/8/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 730
Sample Number:	RGW262S- 180507	Weather:	60s Cloudy
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 4.39 Time: 658 Flow through cell vol. GW Meter No.(s Heron1

Begin Purge: Date/Time: 5/ 7 /2018 @ 700 End Purge: Date/Time: 5/ 7 /2018 @ 723 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
703	13.4	434.1	0.9	5.72	4.7	LOW	6.25		
706	13.4	429.4	1.37	5.88	-35.1		6.3		
709	13.5	429.7	1.7	5.95	-49.6		6.6		
712	13.5	428.6	2.08	5.99	-56.8		6.65		
715	13.5	428.2	2.29	6.03	-61.2		6.7		
718	13.7	427.8	2.47	6.04	-63.4		6.7		
721	13.7	427.6	2.66	6.09	-66.7		6.7		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type PERI

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.7	427.6	2.68	6.09	-66.7				
2	13.7	427.5	2.69	6.1	-67				
3	13.7	427.5	2.74	6.11	-67.3				
4	13.7	427.5	2.74	6.12	-67.9				
Average:	13.7	427.5	2.71	6.11	-67.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP5)

Comments: VERY FAST DRAWDOWN. PUMPING AT LOWEST RATE OF PERI PUMP

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@

Sample Number: RGW263S- 180507 | Weather: 60s Cloudy

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:

DTW Before Purging (ft) 6.02 | Time: 758 | Flow through cell vol. | GW Meter No.(s Heron1

Begin Purge: Date/Time: 5/ 7 /2018 @ | End Purge: Date/Time: 5/ 7 /2018 @ | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

Water Level Only

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly May 2018 | Date/Time: 5/ 7 /2018@ 810
Sample Number: RGW264S- 180507 | Weather: 60s Cloudy
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.9 Time: 725 Flow through cell vol. GW Meter No.(s Heron1
Begin Purge: Date/Time: 5/ 7 /2018 @ 740 End Purge: Date/Time: 5/ 7 /2018 @ 803 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
743	14.1	690	1.15	6.11	-19.1	MED	5.48		
746	14.1	691	1.49	6.13	-28.4		5.5		
749	14	691	1.76	6.14	-34		5.5		
752	14.4	692	2.18	6.15	-40.5		5.5		
755	14	693	2.94	6.17	-49.9				
758	14.3	696	3.41	6.19	-56.8				
801	14.3	697	3.49	6.19	-58.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type PERI
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.3	697	3.53	6.19	-59.6				
2	14.3	697	3.55	6.19	-60.1				
3	14.3	697	3.6	6.18	-60.6				
4	14.2	697	3.6	6.19	-61.2				
Average:	14.3	697.0	3.57	6.19	-60.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: SRB Date: 5/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly May 2018	Date/Time:	5/ 7 /2018@ 700
Sample Number:	RGW262S- 180507	Weather:	60s Cloudy
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s Heron1

Begin Purge: Date/Time: 5/ 7 /2018 @ End Purge: Date/Time: 5/ 7 /2018 @ Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	

Duplicate to RGW262S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.7	427.5	2.69	6.1	-66.9				
2	13.7	427.5	2.73	6.11	-67.1				
3	13.7	427.5	2.73	6.12	-67.6				
4	13.7	427.6	2.75	6.12	-68.4				
Average:	13.7	427.5	2.73	6.11	-67.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW262S

Comments:

Signature: SRB Date: 5/7/2018

Appendix C

Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: July 1, 2018

Project: 0088880100.2018
c: Project File

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Group Number: 18E0134

This memo presents the summary data quality review of 11 primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on May 7, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310B;
- Total metals (arsenic, copper, and lead) by EPA Method 6020A; and
- Dissolved arsenic by EPA Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP1-180507	18E0134-01	all except dissolved arsenic
RGW232S-180507	18E0134-02 18E0134-03	all
RGW233I-180507	18E0134-04	all except dissolved arsenic
RGW081S-180507	18E0134-05	all except dissolved arsenic
RGW173S-180507	18E0134-06 18E0134-07	all
RGW226S-180507	18E0134-08	all except dissolved arsenic
RGW153S-180507	18E0134-09	all except dissolved arsenic
RGW152S-180507	18E0134-10	all except dissolved arsenic
RGW172S-180507	18E0134-11	all except dissolved arsenic
RGW235I-180507	18E0134-12	all except dissolved arsenic

Sample ID	Laboratory Sample ID	Requested Analyses
RGW236S-180507	18E0134-13 18E0134-14	all
RGW234S-180507	18E0134-15	all except dissolved arsenic
Trip Blank	18E0134-16	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on May 8, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW152S-180507/ RGWDUP1-180507	vinyl chloride	97.2	89.2	20	NC
	cis-1,2-dichloroethene	348	330	20	5
	trichloroethene	226	228	20	1
	tetrachloroethene	1,390	1,380	20	1

Abbreviations
ng/L = nanograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for total metals and TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS– Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits, except for total arsenic and lead. The results for the affected analytes in samples RGW152S-180507 and RGWDUP1-180507 are qualified as estimated and flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg /L)	Reporting Limit (µg /L)	RPD (%)
RGW152S-180507/ RGWDUP1-180507	TOC	2.23	2.04	0.50	NC
	total arsenic	2.99	2.08	0.200	36
	total copper	2.86	2.41	0.500	17
	total lead	1.52	0.992	0.100	42

Abbreviations
µg/L = micrograms per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18E0134 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDUP1-180507	total arsenic total lead	2.08 J 0.992 J	µg/L	field duplicate RPD
RGW232S-180507	none			
RGW233I-180507	none			
RGW081S-180507	none			
RGW173S-180507	none			
RGW226S-180507	none			
RGW153S-180507	none			
RGW152S-180507	total arsenic total lead	2.99 J 1.52 J	µg/L	field duplicate RPD
RGW172S-180507	none			
RGW235I-180507	none			
RGW236S-180507	none			
RGW234S-180507	none			
Trip Blank	none			

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: July 31, 2018

Project: 0088880100.2018
cc: Project File

Subject: Summary Data Quality Review
June 2018 Boeing Renton Soil Sampling
SWMU-172/174
ARI Group Number: 18F0363

This memo presents the summary data quality review of 13 primary soil samples and one soil field duplicate collected on June 20, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride, methylene chloride, 1,1-dichloroethene, cis-1,2-dichloroethene, benzene, trichloroethene, and tetrachloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C; and
- Total metals (copper, thallium, and zinc) by EPA Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
172-SB-PP01-2	18F0363-01	all
172-SB-PP01-2	18F0363-02	all
172-Dup01	18F0363-03	all
172-SB-PP02-2	18F0363-04	all
172-SB-PP02-8.5	18F0363-05	all
172-SB-PP03-2	18F0363-06	all
172-SB-PP03-8.5	18F0363-07	all
172-SB-PP04-2	18F0363-08	all
172-SB-PP04-8.5	18F0363-09	all
172-SB-PP06-2	18F0363-10	all
172-SB-PP06-8.5	18F0363-11	all
172-SB-PP05-2	18F0363-12	all

Sample ID	Laboratory Sample ID	Requested Analyses
172-SB-PP05-8.5	18F0363-13	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on June 20, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted that the samples times for 172-SB-PP05-2 and 172-SB-PP05-8.5 were switched on the sample labels. The laboratory logged the samples according to the times listed on the chain-of-custody and proceeded with analysis.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable

   A trip blank was not submitted with the samples as required by the EPA 5035 sample collection method. Sample results are not qualified.
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable except as noted

   VOCs by EPA 8260C: the recoveries for the following were below the control limits in the MS/MSD analysis performed with sample 172-SB-PP03-2: 1,1-dichloroethene at 26.2 and 29.2 percent, below the control limits of 67 to 132 percent; and tetrachloroethene at 62.1 and 74.9 percent, below the control limits of 76 to 120 percent. The low recoveries equate to a potential low bias in the sample; therefore, the 1,1-dichloroethene and tetrachloroethene results in sample 172-SB-PP03-2 are qualified as estimated with detections flagged with a "J" and non-detects flagged with a "UJ".
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 50 percent for concentrations greater than five times the

reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/kg)	Duplicate Result (µg/kg)	Reporting Limit (µg/kg)	RPD (%)
172-SB-PP01-8.5/172-Dup01	methylene chloride	3.85	4.35	1.24	NC
	tetrachloroethene	20.1	14.3	1.24	34

Notes
µg/kg = microgram per kilogram
NC = not calculated
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

   The laboratory reanalyzed samples 172-SB-PP01-2 and 172-SB-PP06-8.5 due to internal standard failures during the initial analyses. The internal standards were acceptable in the re-analyses; therefore, sample results are reporting from the reanalysis and are not qualified.

   The tetrachloroethene result in the initial analysis of sample 172-SB-PP03-2 was flagged with an "E" by the laboratory to indicate the concentration was greater than the calibration range of the instrument. The sample was diluted and reanalyzed. The tetrachloroethene result is reported from the reanalysis and the remaining results are reported from the initial analysis.

Inorganic analyses

Samples were analyzed for total metals. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable except as noted:
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 50 percent for concentrations greater than five times the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/kg)	Duplicate Result (mg/kg)	Reporting Limit (mg/kg)	RPD (%)
172-SB-PP01-8.5/172-Dup01	total copper	17.8	16.3	0.58	9
	total lead	108	88.1	4.7	20

Notes
mg/kg = milligrams per kilogram
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18F0363 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
172-SB-PP01-2	none			
172-SB-PP01-2	none			
172-Dup01	none			
172-SB-PP02-2	none			
172-SB-PP02-8.5	none			
172-SB-PP03-2	1,1-dichloroethene tetrachloroethene	1.18 UJ 1,070 J	µg/kg	MS/MSD recovery
172-SB-PP03-8.5	none			
172-SB-PP04-2	none			
172-SB-PP04-8.5	none			
172-SB-PP06-2	none			
172-SB-PP06-8.5	none			
172-SB-PP05-2	none			
172-SB-PP05-8.5	none			

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: July 2, 2018

Project: 0088880100.2018
c: Project File

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 18E0137

This memo presents the summary data quality review of 16 primary groundwater samples, one field duplicate groundwater sample, and one trip blank sample collected on May 7, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (limited suite: benzene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH-G; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B-00.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP2-180507	18E0137-01	all
RGW238I-180507	18E0137-02	all
RGW237S-180507	18E0137-03	all
RGW239I-180507	18E0137-04	all
RGW210S-180507	18E0137-05	all
RGW240D-180507	18E0137-06	all
RGW143S-180507	18E0137-07	all
RGW031S-180507	18E0137-08	all
RGW209S-180507	18E0137-09	all
RGW244S-180507	18E0137-10	all
RGW242I-180507	18E0137-11	all
RGW039S-180507	18E0137-12	all
RGW033S-180507	18E0137-13	all

Sample ID	Laboratory Sample ID	Requested Analyses
RGW241S-180507	17K0213-14	all
RGW243I-180507	18E0137-15	all
RGW034S-180507	18E0137-16	all
RGW038S-180507	18E0137-17	all
Trip Blank	18E0137-18	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on May 8, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. As shown in the table below, the difference between the primary and duplicate results for cis-1,2-dichloroethene exceeds the value of the reporting limit. The cis-1,2-dichloroethene results in samples RGW031S-080507 and RGWDUP2-180507 are qualified as estimated and flagged with a "J".

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW031S-180507/ RGWDUP2-180507	cis-1,2-dichloroethene	0.20 U	0.66	0.20	NC
	benzene	8.95	11.0	0.20	21
	trichloroethene	1.13	0.99	0.20	NC
	TPH-G	917	830	100	10

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS/LCSD – Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The RPDs are acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg /L)	Reporting Limit (mg /L)	RPD (%)
RGW031S-180507/ RGWDUP2-180507	TOC	6.54	6.43	0.50	2

Abbreviations
mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18E0137 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in

the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDUP2-180507	cis-1,2-dichloroethene	0.66 J	µg/L	field duplicate RPD
RGW238I-180507	none			
RGW237S-180507	none			
RGW239I-180507	none			
RGW210S-180507	none			
RGW240D-180507	none			
RGW143S-180507	none			
RGW031S-180507	cis-1,2-dichloroethene	0.20 UJ	µg/L	field duplicate RPD
RGW209S-180507	none			
RGW244S-180507	none			
RGW242I-180507	none			
RGW039S-180507	none			
RGW033S-180507	none			
RGW241S-180507	none			
RGW243I-180507	none			
RGW034S-180507	none			
RGW038S-180507	none			
Trip Blank	none			

Abbreviations
µg/L = micrograms per liter
RPD = relative percent difference

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: July 2, 2018

Project: 0088880100.2018
cc: Project File

Subject: Summary Data Quality Review
June 2018 Boeing Renton Soil Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 18F0358

This memo presents the summary data quality review of 24 primary soil samples, one field duplicate soil sample, and one trip blank sample collected on June 20, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride, 1,1-dichloroethene, carbon disulfide, cis-1,2-dichloroethene, benzene, trichloroethene, and tetrachloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C; and
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH-G.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
478-SB-PP07-1	18F0358-01	all
478-SB-PP07-3	18F0358-02	all
478-SB-PP08-1	18F0358-03	all
478-SB-PP08-3	18F0358-04	all
478-SB-PP09-1	18F0358-05	all
478-SB-PP09-3	18F0358-06	all
478-SB-PP10-1	18F0358-07	all
478-SB-PP10-3	18F0358-08	all
478-SB-PP11-1	18F0358-09	all
478-SB-PP11-3	18F0358-10	all
478-SB-PP12-1	18F0358-11	all
478-SB-PP12-3	18F0358-12	all

Sample ID	Laboratory Sample ID	Requested Analyses
478-SB-PP13-1	18F0358-13	all
478-SB-PP13-4.5	18F0358-14	all
478-Dup02	18F0358-15	all
478-SB-PP14-1	18F0358-16	all
478-SB-PP14-3	18F0358-17	all
478-SB-PP15-1	18F0358-18	all
478-SB-PP15-3	18F0358-19	all
478-SB-PP16-1	18F0358-20	all
478-SB-PP16-3	18F0358-21	all
478-SB-PP17-1.5	18F0358-22	all
478-SB-PP17-3	18F0358-23	all
478-SB-PP18-1	18F0358-24	all
478-SB-PP18-3	18F0358-25	all
Trip Blank	18F0358-26	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014).

ARI received the samples on June 20, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted several discrepancies between the sample information on the bottle labels compared to the chain-of-custody. The laboratory logged the samples according to the chain-of-custody and proceeded with analysis.

Organic analyses

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   VOCs by EPA 8260C: the recoveries for the following were below the control limits in the MS/MSD analysis performed with sample 478-SB-PP18-3: *cis*-1,2-dichloroethene at 71.7 and 72.6 percent, below the control limits of 80 to 125 percent; and trichloroethene at 74.4 percent in the MS, below the control limits of 80 to 120 percent (the MSD recovery was acceptable). The low recoveries equate to a potential low bias in the sample; therefore, the cis-1,2-dichloroethene result in sample 478-SB-PP18-3 was qualified as estimated and because the sample result was below detection flagged with a "UJ". The trichloroethene result is not qualified due to acceptable MSD recoveries.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 50 percent for concentrations greater than five times the reporting limit.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/kg)	Duplicate Result (µg/kg)	Primary/Duplicate Reporting Limit (µg/kg)	RPD (%)
478-SB-PP13-4.5/	benzene	30.0	23.1	1.94	26
478-Dup02	TPH-G	147,000	131,000	13.1	12

Notes
µg/kg = micrograms per kilogram
RPD= relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18F0358 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result	Qualifier Reason
478-SB-PP07-1	none		
478-SB-PP07-3	none		
478-SB-PP08-1	none		
478-SB-PP08-3	none		
478-SB-PP09-1	none		
478-SB-PP09-3	none		
478-SB-PP10-1	none		
478-SB-PP10-3	none		
478-SB-PP11-1	none		
478-SB-PP11-3	none		
478-SB-PP12-1	none		
478-SB-PP12-3	none		
478-SB-PP13-1	none		
478-SB-PP13-4.5	none		
478-Dup02	none		
478-SB-PP14-1	none		
478-SB-PP14-3	none		
478-SB-PP15-1	none		
478-SB-PP15-3	none		
478-SB-PP16-1	none		
478-SB-PP16-3	none		
478-SB-PP17-1.5	none		
478-SB-PP17-3	none		
478-SB-PP18-1	none		
478-SB-PP18-3	cis-1,2-dichloroethene	1.38 UJ	MS/MSD recovery
Trip Blank	none		

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

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Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: June 4, 2018

Project: 0088880100.2018
c: Project File

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
Former Fuel Farm AOC Group
ARI Work Order Number: 18E0132

This memo presents the summary data quality review of 10 primary groundwater samples and one field duplicate collected on May 7, 2018. The samples were submitted to Analytical Resources Inc. (ARI), a Washington State Department of Ecology (Ecology)-accredited laboratory located in Tukwila, Washington. The samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D), plus motor oil (TPH-O) and Jet A (TPH Jet A) ranges by Ecology Method NWTPH-Dx.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW211S-180507	18E0132-01	all
RGW212S-180507	18E0132-02	all
RGW224S-180507	18E0132-03	all
RGWDUP3-180507	18E0132-04	all
RGW256S-180507	18E0132-05	all
RGW255S-180507	18E0132-06	all
RGW257S-180507	18E0132-07	all
RGW258S-180507	18E0132-08	all
RGW183S-180507	18E0132-09	all
RGW184S-180507	18E0132-10	all
RGW221S-180507	18E0132-11	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014).

ARI received the samples on May 8, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for TPH-D plus TPH-O and TPH Jet A ranges. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of 5 percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The field duplicate relative percent difference (RPD) is within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW224S-180507/ RGWDUP3-180507	DRO C12-C24	0.560	0.664	0.100	17
	TPH JetA C10-C18	0.933	1.17	0.100	23

Abbreviations
mg/L = milligrams per liter
DRO = diesel range organics
RPD = relative percent difference
TPH = total petroleum hydrocarbons

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data review. The completeness of ARI work order number 18E0132 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW211S-180507	none
RGW212S-180507	none
RGW224S-180507	none
RGWDUP3-180507	none
RGW256S-180507	none
RGW255S-180507	none
RGW257S-180507	none
RGW258S-180507	none
RGW183S-180507	none
RGW184S-180507	none
RGW221S-180507	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	July 2, 2018		

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 18E0153

This memo presents the summary data quality review of 10 primary groundwater samples, one field duplicate, and one trip blank sample collected on May 8, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology).

The samples from AOC-001 and -002 were analyzed for the following:

- Volatile organic compounds (VOCs) (benzene only) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, and cis-1,2-dichloroethene) by EPA Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310C.

Samples from AOC-003 were analyzed for the following:

- VOCs (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by EPA Method 8260C SIM; and
- TOC by SM 5310C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP4-180508	18E0153-01	all AOC-001 and -002 analyses
RGW247S-180508	18E0153-02	all AOC-003 analyses
RGW249S-180508	18E0153-03	all AOC-003 analyses
RGW188S-180508	18E0153-04	all AOC-001 and -002 analyses
RGW248IS-180508	18E0153-05	all AOC-001 and -002 analyses
RGW197S-180508	18E0153-06	all AOC-001 and -002 analyses
RGW185S-180508	18E0153-07	all AOC-001 and -002 analyses
RGW196D-180508	18E0153-08	all AOC-001 and -002 analyses

Sample ID	Laboratory Sample ID	Requested Analyses
RGW245S-180508	18E0153-09	all AOC-001 and -002 analyses
RGW195S-180508	18E0153-10	all AOC-001 and -002 analyses
RGW194S-180508	18E0153-11	all AOC-001 and -002 analyses
Trip Blank	18E0153-12	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on May 9, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW185S-180508/ RGWDUP4-180508	benzene	0.21	0.20	0.20	NC
	cis-1,2-dichloroethene	0.157	0.164	0.020	4
	vinyl chloride	0.131	0.130	0.020	1

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for TOC analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The field duplicate RPD was within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg /L)	Reporting Limit (mg /L)	RPD (%)
RGW185S-180508/ RGWDUP4-180508	TOC	20.15	20.29	0.50	1

Abbreviations
mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18E0153 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGWDUP4-180508	none
RGW247S-180508	none
RGW249S-180508	none
RGW188S-180508	none
RGW248IS-180508	none
RGW197S-180508	none
RGW185S-180508	none
RGW196D-180508	none
RGW245S-180508	none
RGW195S-180508	none
RGW194S-180508	none
Trip Blank	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	July 2, 2018		

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
AOC-034 and -035
ARI Work Order Number: 18E0152

This memo presents the summary data quality review of four primary groundwater samples and one trip blank collected on May 8, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW216S-180508	18E0152-01	all
RGW218S-180508	18E0152-02	all
RGW217S-180508	18E0152-03	all
RGW251S-180508	18E0152-04	all
Trip Blank	18E0152-05	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidance documents (EPA, 2014).

ARI received the samples on May 9, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius .

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data review. The completeness of work order number 18E0152 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents referenced in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW216S-180508	none
RGW218S-180508	none
RGW217S-180508	none
RGW251S-180508	none
Trip Blank	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	July 2, 2018		

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
Building 10-71 Parcel
ARI Work Order Number: 18E0151

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on May 8, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride, cis-1,2-dichloroethene, trichloroethene, and toluene) by U.S. Environmental Protection Agency (EPA) Method 8260C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
10-71-MW2-180508	18E0151-01	VOCs
10-71-MW4-180508	18E0151-02	VOCs
10-71-MW1-180508	18E0151-03	VOCs
Trip Blank	18E0151-04	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014).

ARI received the samples on May 9, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius .

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18E0151 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data are not qualified and meet the project's data quality objectives.

Sample ID	Qualified Analyte
10-71-MW2-180508	none
10-71-MW4-180508	none
10-71-MW1-180508	none
Trip Blank	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	July 1, 2018		

Subject: Summary Data Quality Review
May 2018 Boeing Renton Groundwater Sampling
Apron A
ARI Work Order Number: 18E0133

This memo presents the summary data quality review of two primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on May 7, 2018. The samples were submitted to Analytical Resources, Inc., (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride and cis-1,2-dichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP5-180507	18E0133-01	all
RGW262S-180507	18E0133-02	all
RGW264S-180507	18E0133-03	all
Trip Blank	18E0133-04	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on May 8, 2018. The temperature of the coolers were recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius ~~(°C)~~.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of 5 percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The field duplicate relative percent difference (RPD) is within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW262S-180507/ RGWDUP5-180507	vinyl chloride	0.25	0.24	0.20	NC

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS/LCSD – Acceptable
4. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The PRDs are acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW262S-180507/ RGWDUP5-180507	TOC	33.87	33.07	0.50	2

Abbreviations
mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18E0133 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGWDUP5-180507	none
RGW262S-180507	none
RGW264S-180507	none
Trip Blank	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Appendix D

APPENDIX D

Summary of Remedial Actions at the Boeing Renton Facility
April - June 2018

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. K0357000

August 15, 2018

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1.0 Introduction

CALIBRE Systems, Inc. (CALIBRE) prepared this Technical Memorandum (Tech Memo) for the Boeing Company to summarize remedial actions implemented at the Boeing Renton Facility in the second quarter of 2018 (between April 1 and June 30, 2018). The ongoing remedial actions include:

1. Operation of two soil vapor extraction (SVE) systems located at Solid Waste Management Unit (SWMU) and Area of Concern (AOC) locations designated as SWMU-172/174 and Building 4-78/4-79 SWMU/AOC Group;
2. Biological treatment to promote Enhanced Reductive Dechlorination (ERD) of volatile organic compounds (VOCs) in groundwater underway at several AOCs located throughout the Renton Facility, and;
3. Anaerobic biodegradation of benzene by nitrate/sulfate injections at the 4-78/79 Building.

CALIBRE completed the work described in this Tech Memo to support remedial activities described in the Engineering Design Report (EDR), (AMEC, 2014) as supplemented by a document describing an approach for *in situ* treatment for benzene in groundwater (CALIBRE 2017).

1.1 Facility Location and Background

The Boeing Renton Facility is used for assembly of 737 airplanes and is located at the southern end of Lake Washington in Renton, Washington. The location of the Renton Facility and the locations of SWMU-172/174 and Building 4-78/79 within the Facility are shown on Figure 1-1 (SWMU-172/174 and Building 4-78/79 are the locations where the two SVE systems are operating). The locations of the other AOCs and SWMUs where groundwater treatment is ongoing are also included in Figure 1-1.

1.2 Objectives and Organization

The objective for this Tech Memo is to summarize work completed in accordance with the EDR in the second quarter of 2018. This includes rebound stabilization monitoring (asymptote test) for the SVE systems located at Building 4-78/79 and SWMU-172/174, subsequent soil characterization sampling, and a summary of the ongoing biological treatment of groundwater at the following areas:

SWMU-172/174
Building 4-78/4-79 SWMU/AOC Group (Building 4-78/79)
AOC-001/002
AOC-003
Lot 20/Former Building 10-71
AOC-060
AOC-090
Building 4-70, and
Apron A

This Tech Memo is organized as follows:

Section 1 – Introduction and Background
Section 2 – SVE System Operation and Monitoring
Section 3 – Groundwater Treatment
Section 4 – Conclusions and Recommendations
Section 5 – References
Attachment A – Field Data Sheets
Attachment B – Laboratory Report

2.0 SVE Systems Operation and Monitoring

SVE systems were installed in the Building 4-78/79 and SWMU-172/174 areas and began operation in April 2015. During the last quarter of 2017 photoionization detector (PID) results from both systems had shown low-level VOC concentrations removed at asymptotically low levels. Given these data, a rebound test for both systems was started on December 15, 2017 and continued for 80 days to March 2018. In May 2018, after an additional 76 day shut-down period, a rebound stabilization test was run for 29 days to test how fast the VOC mass removal rate would decline back down to the prior asymptote levels. The following sections summarize the rebound stabilization monitoring results for the SVE systems performed in May – June 2018.

2.1 SVE Rebound Test Summary

Both the Building 4-78/79 and SWMU-172/174 SVE systems were shut down for an additional period of 76 days starting March 6th, 2018. On May 22nd, 2018 the SVE systems were restarted and after approximately 10 minutes vapor concentrations were monitored at key points with a calibrated PID to determine if vapor concentrations had rebounded. Additional measurements were collected after approximately 1 hour and 3 hour operating periods. Vapor concentrations were measured again after 1 day, 9 days, 16 days and 29 days. The key operational question was to determine, if rebounding is present, how long the increased mass removal of accumulated vapors is sustained before the SVE systems decline back down to the asymptotic removal rates.

The vapor monitoring points tested at the Building 4-78/79 SVE area included SVE-1, SVE-5, SVE-6, SVE-10, SVE-12 and the SVE system inlet (refer to Figure 2-1). The vapor monitoring points tested in the SWMU-172/174 SVE area included SVE-1, SVE-2, SVE-3 and the SVE system inlet (refer to Figure 2-2).
In addition to PID measurements, selected samples were also collected for laboratory TO-15 analysis for VOCs (gas chromatography mass spectrometry analysis). The laboratory data packages are included in Attachment B.

2.2 Building 4-78/4-79 SWMU/AOC Group SVE System

The Building 4-78/79 SVE system consists of 15 vapor extraction wells and a SVE equipment trailer as shown in Figure 2-1. The SVE system is equipped with two vapor-phase granular-activated carbon (GAC) vessels each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapors from the outlet of the lead vessel passing through the lag vessel. The

system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate to remove and oxidize specific compounds, such as vinyl chloride, that are not efficiently adsorbed by GAC.

At the start of the additional rebound study, PID measurements were collected from five wells that have historically shown higher concentrations (SVE-1, SVE-5, SVE-6, SVE-10, and SVE-12). Based on those PID measurements, three wells (SVE-1, SVE-6, and SVE-10; one from each manifold) and the combined SVE system influent were selected for TO-15 analysis to provide operational baseline data for the planned rebound equilibrium test. These same locations were sampled for TO-15 analysis at 16 days of operation (June 7th, 2018) and 29 days of operation (June 20th, 2018) along with paired PID measurements.

The CVOCs and other VOCs detected in the TO-15 samples collected during the SVE operations and rebound periods for the Building 4-78/79 area are shown in Table 2-1. The data collected at the system influent, SVE-6, and SVE-10 during the 29 day stabilization test indicates that after 16 days all VOCs have declined and stabilized to levels equal to or below the prior asymptote levels. Concentrations remained at these asymptote levels throughout the remainder of the rebound test. TPH-G was detected at each of the four locations upon startup, with a singular high detection observed at SVE-6 (26,000 ppbv) on May 22nd, 2018. After 16 days of operation no TPH-G was detected from any of the four locations sampled. The TPH-G detection on the May 22 sampling appears to be an anomaly (no other subsequent samples had any detections) and may be associated with handling of fuel for a generator that day.

The measured PID data, displayed in Table 2-5, highlight that all six measuring points show significant reductions in detections of VOCs after only one day, with the exception of well SVE-1 which showed a temporary increase at one day after system restart. After 9 days of operation all six measuring points (including SVE-1) had stabilized below the prior asymptote levels.

2.3 VOC Mass Removal Rates from the Building 4-78/4-79 SVE System

Peak influent concentrations for the Building 4-78/79 area SVE system were measured at 5,860 ppbv (PID uncorrected) with a mass removal rate of approximately 0.213 pounds per day (lbs/day) in August 2015, approximately 4 months after SVE system startup. The baseline condition (asymptote at the end of SVE operation in December 2017) for the Building 4-78/79 area SVE system indicated an influent concentration of approximately 528 ppbv (PID uncorrected) and a mass removal rate of approximately 0.017 lbs/day; this asymptote represents approximately 8 percent of the prior peak mass removal (see Table 2-2).

The estimated daily mass removal rate for the Building 4-78/79 system at the start of the rebound test on May 22, 2018 was 0.039 lbs/day, which then dropped to 0.015 lbs/day at day 1, and down to 0.003 lbs/day by 29 day of the stabilization test. The monitoring at one-day and 29 days represent approximately 7 percent and 1 percent of the peak mass removal rate, respectively (see Table 2-2). On the second day of SVE rebound testing the system had dropped back to the asymptote observed at the end of prior SVE operation. Within that two-day operating period, mass removal was approximately 0.05 lbs.

2.4 SWMU-172/174 SVE System

The SWMU-172/174 SVE system consists of three vapor extraction wells and a SVE equipment trailer as shown in Figure 2-2. The SVE system is equipped with two vapor-phase GAC vessels, each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapor from the outlet of the lead vessel passing through the lag vessel. The system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate.

At the start of the additional rebound study, all three extraction wells along with the system inlet and outlet were measured using a calibrated PID. In addition, SVE-3 and the SVE-system inlet were sampled for TO-15 analysis of VOCs. Vent wells SVE-1 and SVE-2 displayed little to no rebound effect and the measured VOC concentrations were immediately close to the prior asymptote levels for both wells and therefore were not included in the TO-15 sampling. These same locations (SVE-3 and SVE system inlet) were sampled for TO-15 analysis at 16 days of operation (June 7th, 2018) and 29 days of operation (June 20th, 2018) with paired PID measurements.

The CVOCs and other VOCs detected in the TO-15 samples collected during the SWMU-172/174 SVE operations are shown in Table 2-3. The data collected at SVE-3 during the stabilization test period showed PCE as the primary VOC detected. Initial PCE concentrations at this well were 790 ppbv on May 22, 2018 which was an increase from the baseline data collected on December 8, 2017 (170 ppbv). PCE concentrations at this well then stabilized at 280 ppbv and 310 ppbv after 16 days and 29 days, respectively. Marginal increases were observed from other CVOCs.

2.5 VOC Mass Removal Rates from the SWMU-172/174 SVE System

Table 2-4 presents a summary of the mass removal measurements for the system influent in the test period and peak mass removal as a reference point. The baseline condition for the SWMU-172/174 area SVE system indicated an influent concentration of approximately 1,208 ppbv (PID uncorrected) and a mass removal rate of approximately 0.029 lbs/day. This mass removal rate was not exceeded at any time during the 29 day stabilization test and the final mass removal rate for day 29 of operation was 0.004 lbs/day; approximately 7 percent of the prior peak mass removal.

2.6 Data Evaluation

A key question identified in the rebound study data evaluation is:

1. *Is the increased mass removal rate sustained for any significant time period after a rest/rebound period and is any increased mass removed sufficient to justify prolonged SVE system operation?*

Table 2-5 presents the raw PID field measurements (uncorrected for TCE or PCE) at the various wells sampled during the rebound period at both the Building 4-78/79 and the SWMU-172/174 SVE systems. The trend for PID measurements at the Building 4-78/79 system influent show that after one day VOC

concentrations have dropped significantly and after 9 days VOC concentrations at both the 4-78/79 and SWMU-172/174 SVE systems were below the prior asymptote levels. Based on this, the effect of rebounding within the systems is marginal after 9 days of operation and a majority of the temporary increase is removed within a couple of days.

Table 2-6 presents the approximate total pore volume exchanges (PVEs) for the two SVE systems since startup. SVE design guidance from the US Army Corps of Engineers indicates that approximately 1,000 to 1,500 PVEs would be a reasonable estimate of the required air exchanges (PVEs) for SVE remediation (USACE 2002). In addition, training guidance from the EPA and Department of Defense (DOD) suggest a range of 100 to greater than a 1,000 PVEs could be expected for typical operations. The 4-78/79 and 172/174 SVE systems have both achieved close to 2,000 PVEs which is consistent with the empirical data demonstrating the SVE systems have reached asymptotic levels.

The second key question identified in the rebound study is:

2. *Are there data to indicate that continued SVE system operation is having a measurable improvement on the groundwater system, over and beyond what is being accomplished with the groundwater ERD system?*

Data collected during regular SVE operation indicate TCE is the primary compound detected and recovered at the 4-78/79 area and PCE is the primary compound detected and recovered at the SWMU-172/174 area. The rebound test data collected in the previous quarter show very low remaining concentrations of these compounds in soil vapor at both of the SVE systems. The prolonged rebound stabilization test, confirmed that the mass removal of TCE and PCE at the respective SVE systems declines rapidly after a few days of operation. Simultaneously, concentrations of these two compounds in groundwater have declined with the ERD treatment; TCE (at the 4-78/79 area) and PCE (at the 172/174 area) concentrations have been significantly reduced or eliminated from virtually all wells at these two areas.

Soil confirmation samples at the 4-78/79 system confirm that the benefit of continued SVE operation in the area would be very limited. The soil confirmation sample from PP-13 revealed that there are petroleum products trapped in a clay-silt layer/zone in the area. The SVE vent well directly adjacent to PP-13, SVE-08, has been sampled for TO-15 analysis twice since the start of SVE operation, once in September 2016 and again in April 2017, and both samples showed concentrations of TPH-G as non-detect. The historical spill at this location was associated with an underground fuel tank, and based on the soil, soil vapor and groundwater monitoring results in this area, it appears that any remaining hydrocarbon residuals are located in a low permeable media (silt/clay). Continued operation of the SVE system in this area is not expected have an impact on the TPH-G concentrations in soil or groundwater.

At the SWMU-172/174 area, source area well GW-152S shows PCE at 1.39 µg/L while the other source are wells GW-153S is non-detect and all conditional point of compliance wells are non-detect for PCE. These

groundwater monitoring data indicate that continued SVE system operation in the 172/174 area is unlikely to have a measurable impact on the groundwater remediation. However, the soil confirmation samples identified a location between SVE-2 and SVE-3 which still shows elevated PCE levels in soil. The SVE system will be adjusted to alter the flushing pattern through this area by using SVE-3 as vent well with continued extraction through SVE-2.

3.0 Ongoing Groundwater Treatment

Groundwater treatment is being implemented at several AOCs/SWMUs at the Renton Facility. The remedy being implemented is enhanced reductive dechlorination (ERD) of chlorinated solvents in targeted areas. The ERD treatment involves substrate injection using sucrose as a carbon source to stimulate biological degradation of the chlorinated solvents between December 2014 and January 2018. Beginning in late 2017, anaerobic biodegradation of benzene using nitrate and sulfate injections was implemented for a small area at the 4-78/79 Building.

A third round of nitrate/sulfate injections was performed in April 2018, and groundwater samples were collected from the injection wells and monitoring wells in May 2018. The results of the performance monitoring are presented in Table 3-1 and discussed in the main text of the quarterly report. Site wide groundwater sampling was conducted as part of the quarterly monitoring program during this reporting period and the results are discussed in the main text of the quarterly report as well. Table 3-2 presents a summary of those groundwater monitoring results, by area, related to groundwater treatment/ERD implementation.

Selected wells at the SWMU-172/174, 4-78/79 Building Area, AOC-60, and AOC-90 were amended with sucrose substrate in July 2018. In addition, Boeing recently completed a 4th round of nitrate/sulfate injections for the benzene plume near Building 4-78/79 in July 2018. Performance monitoring results for those areas will be included in the next quarterly summary and will be used to make recommendations for further groundwater treatment actions.

4.0 Conclusions and Recommendations

The rebound stabilization test revealed that the effect of rebounding at the Building 4-78/79 and SWMU-172/174 SVE systems is diminished after less than 9 days of restarted SVE operation, following almost 6 months of shutdown/rest period. Since the VOC concentrations were reduced to the baseline asymptotic levels within this 30-day period, the systems were shut down for soil confirmation sampling to assess attainment of the soil cleanup levels for soil vapor COCs as discussed in the main body of the quarterly report.

The soil confirmation samples revealed that cleanup standards for CVOCs were met at all but one of the 24 samples at the 4-78/79 area. The single sample which exceed cleanup standards for TPH-G was collected from a low permeable silty/clay layer. TO-15 samples from the nearest extraction well to this location showed TPH-G was non-detect in both samples, therefore it is unlikely that continued SVE operation will

impact this layer. It is recommended that SVE operation be stopped for this area and an evaluation of utilities present and potential access for soil excavation be completed for the area near the sample location exceeding cleanup standards.

The soil confirmation samples at the SWMU-172/174 area showed some low level exceedances of selected CVOCs and metals and one sample with elevated concentrations of PCE. It is recommended that SVE operations be modified to increase flushing between extraction wells SVE-2 and SVE-3 (the area with the elevated PCE detection). The initial modification will be to open SVE-3 as a surface vent and continue extraction from SVE-2, in an attempt to flush the system further. PID measurements will be collected to monitor this operational change.

Groundwater monitoring will continue according to the EDR, with supplemental VOC and TOC sampling at selected wells. Additional substrate injections were recently completed in July 2018 at selected areas of the SWMU-172/174, Building 4-78/79, AOC-60, and AOC-90 sites for continued ERD treatment and nitrate/sulfate injections for benzene treatment at the Building 4-78/79 area. Those events will be summarized in the next quarterly report.

5.0 References

AMEC 2014. Draft Engineering Design Report Boeing Renton Cleanup Action Plan Implementation. Prepared by AMEC Environment & Infrastructure, Inc. for The Boeing Company. July 2014.

CALIBRE 2014. Operations and Maintenance Plan for the Renton Cleanup Action Soil Vapor Extraction Systems. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. July 2014.

CALIBRE 2017. Bioremediation of Benzene in Groundwater; Building 4-78/79 Area, Boeing Renton Facility Rev. 1. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. September 2017.

USACE 2002. Engineering and Design - Soil Vapor Extraction and Bioventing. Prepared by US Army Corps of Engineers. EM 1110-1-4001. June 2002.

TABLES

Table 2-1 TO-15 Analytical Results - 4-78/79 SVE System

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Cumene	Styrene	Total Chlorinated	Total VOCs
4/17/2015[1]	2.9	280	5.2	ND	ND	8.0	ND	ND	ND	ND	98	ND	ND	1.2	ND	21	ND	ND	ND	ND	ND	ND	ND	ND	296	416
5/18/2015	11	800	27	ND	ND	21.0	ND	ND	ND	ND	120	ND	ND	ND	ND	61	ND	ND	ND	ND	ND	ND	ND	ND	859	1,040
10/13/2015	2.7	160	11	ND	ND	2.7	ND	ND	12	ND	48	9.4	ND	ND	1,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	176	1,646
3/18/2016	ND	49	2.5	ND	ND	ND	ND	ND	19	ND	16	6.6	13	2.3	69	ND	ND	ND	ND	ND	ND	ND	ND	ND	52	177
6/30/2016	1.2	100	6.0	ND	2.3	2.2	ND	ND	32	ND	49	ND	ND	ND	ND	ND	7.2	ND	ND	ND	ND	ND	ND	ND	112	200
9/12/2016	1.6	110	20	ND	5.9	2.2	ND	ND	ND	ND	54	26	100	ND	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	920
12/14/2016	ND	17	6.3	ND	2.4	ND	ND	ND	ND	ND	18	4.5	33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.7	81.2
4/5/2017	ND	43	3.0	ND	ND	1.7	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	47.7	58.7
8/16/2017	1.3	91	8.0	ND	ND	3.1	ND	ND	ND	ND	6.4	ND	ND	7	ND	ND	ND	0.96	ND	ND	ND	ND	ND	ND	103	118
12/8/2017 - Rebound Start	ND	42	2.5	ND	ND	1.3	ND	ND	ND	ND	1.7	1.7	5.2	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	45.8	56.3
1/19/2018 - 35-Day 60 Minute Sample	ND	68	2.6	ND	2.0	5.8	ND	ND	ND	ND	13	13	26	1.0	280	7.1	ND	ND	ND	ND	ND	ND	ND	ND	78.4	419
3/6/2018 - 80-Day 60 Min Sample	ND	67	3.2	ND	8.9	7.6	ND	ND	ND	ND	40	44	48	1.0	510	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.7	730
5/22/2018	**2.6**	**260**	**10**	**ND**	**4.6**	**19**	**ND**	**ND**	**22**	**ND**	**50**	**49**	**110**	**2.8**	**2,000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**296**	**2,530**
6/7/2018	**ND**	**69**	**3.7**	**ND**	**ND**	**2.1**	**ND**	**ND**	**ND**	**ND**	**2.8**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**74.8**	**77.6**
6/20/2018	**1.3**	**87**	**3.7**	**ND**	**ND**	**2.6**	**ND**	**ND**	**ND**	**ND**	**3.4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**94.6**	**98.0**

SVE-01

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Cumene	Styrene	Total Chlorinated	Total VOCs
10/13/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,111
6/30/2016	ND	1.2	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	12.2
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	62	160	1.3	1,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,037
12/8/2017 - Rebound Start	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	27	2.0	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	290
5/22/2018	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**26**	**83**	**ND**	**630**	**ND**	**16**	**ND**	**ND**	**ND**	**ND**	**ND**	**1.7**	**ND**	**ND**	**757**
6/7/2018	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**11**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**11**
6/20/2018	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0**

SVE-6

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Cumene	Styrene	Total Chlorinated	Total VOCs
9/12/2016	ND	98	ND	ND	190	ND	ND	ND	ND	ND	6,900	55	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	288	7,603
8/16/2017	16	100	4.5	ND	ND	5.4	1.5	ND	ND	ND	75	ND	ND	ND	440	ND	ND	ND	ND	ND	5.0	ND	ND	ND	127	647
12/8/2017 - Rebound Start	5.4	37	ND	ND	ND	2.7	ND	ND	ND	ND	7.2	ND	ND	6.4	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	45	60
1/19/2018 - 35-Day 60 Minute Sample	6.4	52	1.0	ND	ND	4.6	ND	ND	ND	ND	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	64	89
3/6/2018 - 80-Day 60 Min Sample	9.8	67	ND	ND	ND	10	ND	ND	ND	ND	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	87	2,087
5/22/2018	**36**	**220**	**ND**	**ND**	**29**	**28**	**ND**	**ND**	**ND**	**ND**	**1,900**	**350**	**690**	**ND**	**26,000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**313**	**29,253**
6/7/2018	**20**	**120**	**3.3**	**ND**	**ND**	**5.9**	**1.4**	**ND**	**ND**	**ND**	**65**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2**	**ND**	**ND**	**ND**	**151**	**218**
6/20/2018	**24**	**120**	**2.7**	**ND**	**ND**	**4.2**	**1.5**	**ND**	**ND**	**1.5**	**57**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**3.4**	**ND**	**ND**	**ND**	**152**	**214**

Table 2-1 TO-15 Analytical Results - 4-78/79 SVE System

SVE-10

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Cumene	Styrene	Total Chlorinated	Total VOCs
3/18/2016	ND	250	13	ND	ND	6.9	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270	286
6/30/2016	1.5	250	17	ND	7.1	6.2	ND	ND	ND	ND	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	282	402
9/12/2016	2.6	320	97	2.1	18	7.9	2.3	1.6	ND	ND	130	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	452	584
12/16/2016	ND	91	95	1.4	28	3.3	1.6	1.4	ND	ND	95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	222	317
4/5/2017	1.4	240	19	ND	ND	10	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270	290
8/16/2017	2.6	300	42	ND	ND	14	1.4	ND	ND	ND	34	ND	ND	9.5	260	ND	ND	2.9	1.6	ND	ND	1.5	ND	ND	360	670
12/8/2017 - Rebound Start	ND	180	11	ND	ND	6.3	ND	ND	ND	ND	8.9	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	197	207
1/19/2018 - 35-Day 60 Minute Sample	1.7	330	13	ND	ND	28	1.2	ND	ND	ND	39	ND	ND	1.4	ND	17	ND	ND	ND	ND	ND	ND	ND	ND	374	431
1/19/2018 - 35-Day 180 Minute Sample	1.8	350	15	ND	ND	24	1.3	ND	ND	ND	31	ND	ND	ND	ND	37	ND	ND	ND	ND	ND	ND	ND	ND	392	460
3/6/2018 - 80-Day 60 Min Sample	1.7	330	12	ND	ND	41	1.7	ND	ND	ND	59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	386	445
3/6/2018 - 80-Day 180 Min Sample	1.6	300	12	ND	ND	32	ND	ND	ND	ND	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	346	387
5/22/2018	**5.4**	**720**	**23**	**ND**	**ND**	**70**	**ND**	**ND**	**ND**	**ND**	**77**	**ND**	**17**	**38**	**480**	**ND**	**ND**	**19**	**7.6**	**6.9**	**ND**	**ND**	**ND**	**11**	**818**	**1,475**
6/7/2018	**1.6**	**230**	**14**	**ND**	**ND**	**8.5**	**ND**	**ND**	**ND**	**ND**	**11**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**254**	**265**
6/20/2018	**1.9**	**300**	**15**	**ND**	**ND**	**11**	**ND**	**ND**	**11**	**ND**	**11**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**328**	**350**

Notes:
(1) The TO-15 sample results from this day were considered anomalously low based on multiple PID measurements at the time and subsequent TO-15 samples from system operation
All results are in parts per billion by volume (ppbv).
ND = non-detect
DCA = Dichloroethane
DCE = Dichloroethene
MEK = methyl ethyl ketone or 2-butanone
PCE = Tetrachloroethene
TCA = Trichloroethane
TCE = Trichloroethene
Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE.

Table 2-2 Mass Removal Data - 4-78/79 SVE System

Building 4-78/79 Influent	Date	PID Reading (ppbv)	Corrected Value (TCE) (ppbv)[1]	System Flow (cfm)	Mass removal (lbs/day)	Percent of Peak Removal
Peak Mass Removal	8/17/2015	5,320	2,873	150	0.213	
Baseline Condition	12/8/2017	528	285	119	0.017	8%
Rebound Start	5/22/2018	1,300	702	112	0.039	18%
1-Day	5/23/2018	502	271	112	0.015	7%
9-Day	5/31/2018	0	0	112	0.000	0%
16 -Day	6/7/2018	155	84	119	0.005	2%
29-Day	6/20/2018	79	43	119	0.003	1%

[1] Corrected PID measurements, 0.54 for TCE.

Table 2-3 TO-15 Analytical Results - SWMU-172/174 SVE System

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	Acetone	Toluene	m,p-Xylene	Chloroform	o-Xylene	Pentane	Hexane	Total Chlorinated	Total VOCs
4/17/2015	1,500	130	120	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	1,763	1,763
10/13/2015	400	31	13	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	447	447
3/8/2016	82	5.4	3.1	ND	ND	ND	ND	ND	1.1	2.2	ND	ND	ND	ND	91	94
6/30/2016	230	18	10	ND	ND	1.8	ND	11	ND	ND	2.4	ND	ND	ND	260	273
9/12/2016	230	16	8.3	ND	ND	1.9	ND	ND	ND	ND	1.2	ND	ND	ND	256	257
12/14/2016	100	6.2	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	110
5/30/2017 - 30 min	520	220	17	ND	ND	13	2.7	ND	ND	ND	ND	ND	ND	ND	773	773
5/30/2017 - 100 min	530	200	17	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	761	761
5/30/2017 - 225 min	510	130	16	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	668	668
8/16/2017	180	16	7.8	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	206	206
12/8/2017 - Rebound Start	99	7.6	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	110
5/22/2018	**430**	**43**	**13**	**ND**	**ND**	**12**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**498**	**498**
6/7/2018	**160**	**13**	**5.4**	**ND**	**ND**	**1.8**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**180**	**180**
6/20/2018	**170**	**14**	**5.7**	**ND**	**ND**	**1.8**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**192**	**192**

SVE-3

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	Acetone	Toluene	m,p-Xylene	Chloroform	o-Xylene	Pentane	Hexane	Total Chlorinated	Total VOCs
5/30/2017 - 30 min	540	51	18	ND	ND	14	2.6	ND	2.2	ND	ND	ND	ND	ND	626	628
5/30/2017 - 100 min	200	16	6.5	ND	ND	5.5	ND	ND	ND	ND	ND	ND	ND	ND	228	228
8/16/2017	350	30	15	ND	ND	3.5	ND	ND	ND	ND	1.3	ND	ND	ND	399	400
12/8/2017 - Rebound Start	170	13	5.8	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	191	191
1/19/2018 - 35-Day 60 Minute Sample	310	30	13	ND	ND	6.9	1.3	ND	ND	ND	1.1	ND	ND	ND	361	362
1/19/2018 - 35-Day 180 Minute Sample	310	28	12	ND	ND	7.9	1.1	ND	ND	ND	1.1	ND	ND	ND	359	360
3/6/2018 - 80-Day 60 Min Sample	440	41	15	ND	ND	14	2.2	ND	ND	ND	ND	ND	ND	ND	512	512
3/6/2018 - 80-Day 180 Min Sample	410	33	13	ND	ND	13	1.6	ND	ND	ND	ND	ND	ND	ND	471	471
5/22/2018	**790**	**66**	**22**	**ND**	**ND**	**22**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**900**	**900**
6/7/2018	**280**	**23**	**9.6**	**ND**	**ND**	**3**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**316**	**316**
6/20/2018	**310**	**24**	**11**	**ND**	**ND**	**3.4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**348**	**348**

Notes:

All results are in parts per billion by volume (ppbv).

ND = non-detect

DCE = Dichloroethene

PCE = tetrachloroethene

TCE = trichloroethene

Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, and 1,1-DCA.

Table 2-4 Mass Removal Data - SWMU-172/174 SVE System

SWMU-172/174 Influent	Date	PID Reading (ppbv)	Corrected Value (PCE) (ppbv)[1]	System Flow (cfm)[2,3]	Mass removal (lbs/day)	Percent of Peak Removal
Peak Mass Removal	4/17/2015	NA	1,500	73	0.068	
Baseline Condition	12/8/2017	1,208	689	86	0.029	43%
Rebound Start	5/22/2018	580	331	98	0.016	24%
1-Day	5/23/2018	1,173	669	98	0.032	48%
9-Day	5/31/2018	301	171	98	0.008	12%
16 -Day	6/7/2018	454	258	105	0.013	20%
29-Day	6/20/2018	153	87	103	0.004	7%

[1] Corrected PID measurements, 0.57 for PCE, or as TO-15 lab results if adjacent column is NA

[2] System changes included a new blower before this test with an increased flow rate so direct comparison of mass removal needs to consider increased flow rate

[3] Process changes included replacement of a plugged air filter with an increased flow rate so direct comparison of mass removal needs to consider increased flow rate

Table 2-5 Rebound Study PID Field Measurements

4-78/79 SVE	Sample Event	Date	Sample Time	PID Reading 1 (ppb)	PID Reading 2 (ppb)	Average Uncorrected PID (ppb)	Average Corrected PID (ppb)		TO-15 Results (TCE ppbv)
SVE-1	Initial Start	5/22/2018	5/22/18 10:21 AM	262	138	200	108		
			5/22/18 11:56 AM	189	145	167	90		ND
			5/22/18 1:56 PM	189	149	169	91		
	1 Day	5/23/2018	5/23/18 2:19 PM	509	378	444	239		
	9 Day	5/31/2018	5/31/18 11:30 AM	32	19	26	14		
	16 Day	6/7/2018	6/7/18 9:22 AM	44	17	31	16		ND
	29 Day	6/20/2018	6/20/18 3:18 PM	4	6	5	3		ND
SVE-5	Initial Start	5/22/2018	5/22/18 10:09 AM	12,700	15,250	13,975	7,547		
			5/22/18 12:10 PM	6,918	9,643	8,281	4,471		
			5/22/18 2:05 PM	5,589	5,568	5,579	3,012		
	1 Day	5/23/2018	5/23/18 2:22 PM	1,131	1,044	1,088	587		
	9 Day	5/31/2018	5/31/18 11:05 AM	145	139	142	77		
	16 Day	6/7/2018	6/7/18 9:28 AM	157	128	143	77		
	29 Day	6/20/2018	6/20/18 3:22 PM	31	37	34	18		
SVE-6	Initial Start	5/22/2018	5/22/18 10:18 AM	3,908	3,782	3,845	2,076		
			5/22/18 12:02 PM	4,122	4,330	4,226	2,282		220
			5/22/18 2:10 PM	3,624	4,021	3,823	2,064		
	1 Day	5/23/2018	5/23/18 2:25 PM	1,601	1,430	1,516	818		
	9 Day	5/31/2018	5/31/18 11:10 AM	181	159	170	92		
	16 Day	6/7/2018	6/7/18 9:36 AM	167	203	185	100		120
	29 Day	6/20/2018	6/20/18 3:21 PM	93	107	100	54		120
SVE-10	Initial Start	5/22/2018	5/22/18 10:22 AM	1,626	1,525	1,576	851		
			5/22/18 12:02 PM	1,319	1,366	1,343	725		720
			5/22/18 2:14 PM	1,148	874	1,011	546		
	1 Day	5/23/2018	5/23/18 2:31 PM	696	701	699	377		
	9 Day	5/31/2018	5/31/18 11:15 AM	301	254	278	150		
	16 Day	6/7/2018	6/7/18 9:40 AM	369	386	378	204		230
	29 Day	6/20/2018	6/20/18 3:27 PM	241	221	231	125		300
SVE-12	Initial Start	5/22/2018	5/22/18 10:30 AM	741	681	711	384		
			5/22/18 12:20 PM	923	518	721	389		
			5/22/18 2:17 PM	736	611	674	364		
	1 Day	5/23/2018	5/23/18 2:33 PM	558	578	568	307		
	9 Day	5/31/2018	5/31/18 11:20 AM	348	276	312	168		
	16 Day	6/7/2018	6/7/18 9:46 AM	411	390	401	216		
	29 Day	6/20/2018	6/20/18 3:28 PM	243	261	252	136		
VPC Inlet	Initial Start	5/22/2018	5/22/18 10:16 AM	1,975	2,048	2,012	1,086		
			5/22/18 11:49 AM	1,291	1,308	1,300	702		260
			5/22/18 1:59 PM	1,419	1,178	1,299	701		
	1 Day	5/23/2018	5/23/18 2:12 PM	501	503	502	271		
	9 Day	5/31/2018	5/31/18 8:40 AM	-	-	-	-		
	16 Day	6/7/2018	6/7/18 9:19 AM	162	148	155	84		69
	29 Day	6/20/2018	6/20/18 3:15 PM	79	79	79	43		87
VPC Outlet	Initial Start	5/22/2018	5/22/18 10:13 AM	-	-	-	-		
			5/22/18 11:53 AM	-	-	-	-		
			5/22/18 1:58 PM	-	-	-	-		
	1 Day	5/23/2018	5/23/18 2:15 PM	-	-	-	-		
	9 Day	5/31/2018	5/31/18 8:50 AM	-	-	-	-		
	16 Day	6/7/2018	6/7/18 9:15 AM	57	52	55	29		
	29 Day	6/20/2018	6/20/18 3:12 PM	-	-	-	-		

Table 2-5 Rebound Study PID Field Measurements

5-09 SVE	Sample Event	Date	Sample Time	PID Reading 1 (ppb)	PID Reading 2 (ppb)	Average Uncorrected PID (ppb)	Average Corrected PID (ppb)		TO-15 Results (PCE ppbv)
SVE-1	Initial Start	5/22/2018	5/22/18 9:06 AM	74	131	103	58		
			5/22/18 10:54 AM	46	37	42	24		
			5/22/18 1:30 PM	43	4	24	13		
	1 Day	5/23/2018	5/23/18 3:00 PM	62	42	52	30		
	9 Day	5/31/2018	5/31/18 10:26 AM	96	86	91	52		
	16 Day	6/7/2018	6/7/18 3:20 PM	64	45	55	31		
	29 Day	6/20/2018	6/20/18 2:47 PM	-	-	-	-		
SVE-2	Initial Start	5/22/2018	5/22/18 9:10 AM	185	135	160	91		
			5/22/18 10:52 AM	143	147	145	83		
			5/22/18 1:32 PM	163	97	130	74		
	1 Day	5/23/2018	5/23/18 2:57 PM	192	131	162	92		
	9 Day	5/31/2018	5/31/18 10:31 AM	-	-	-	-		
	16 Day	6/7/2018	6/7/18 3:17 PM	232	203	218	124		
	29 Day	6/20/2018	6/20/18 2:45 PM	51	31	41	23		
SVE-3	Initial Start	5/22/2018	5/22/18 9:16 AM	1,394	1,428	1,411	804		
			5/22/18 10:50 AM	1,030	1,029	1,030	587		790
			5/22/18 1:28 PM	1,048	963	1,006	573		
	1 Day	5/23/2018	5/23/18 2:51 PM	755	845	800	456		
	9 Day	5/31/2018	5/31/18 10:32 AM	275	255	265	151		
	16 Day	6/7/2018	6/7/18 3:14 PM	636	607	622	354		280
	29 Day	6/20/2018	6/20/18 2:39 PM	200	181	191	109		310
VPC Inlet	Initial Start	5/22/2018	5/22/18 8:59 AM	649	511	580	331		
			5/22/18 10:47 AM	576	608	592	337		430
			5/22/18 1:25 PM	894	873	884	504		
	1 Day	5/23/2018	5/23/18 2:48 PM	1,201	1,145	1,173	669		
	9 Day	5/31/2018	5/31/18 10:18 AM	276	325	301	171		
	16 Day	6/7/2018	6/7/18 3:10 PM	455	452	454	258		160
	29 Day	6/20/2018	6/20/18 2:35 PM	153	153	153	87		170
VPC Outlet	Initial Start	5/22/2018	5/22/18 8:50 AM	-	-	-	-		
			5/22/18 10:46 AM	-	-	-	-		
			5/22/18 1:24 PM	-	-	-	-		
	1 Day	5/23/2018	5/23/18 2:47 PM	-	-	-	-		
	9 Day	5/31/2018	5/31/18 10:12 AM	-	-	-	-		
	16 Day	6/7/2018	6/7/18 3:05 PM	-	-	-	-		
	29 Day	6/20/2018	6/20/18 2:33 PM	-	-	-	-		

PID measurments presented in columns PID Reading 1, PID Reading 2, and Average Uncorrected PID are raw data and do not include a correction factor. Column "Average Corrected PID" includes the correction factor for TCE (0.54) or PCE (0.57) applied to the preceeding column "Average Uncorrected PID".

Table 2-6 Approximate Pore Volume Exchanges for the SWMU-172/174 and 4-78/79 SVE Systems

	SWMU-172/174		Building 4-78/79	
Area	13,500	ft^2	25,500	ft^2
Vadose Zone Thickness	12	ft	8	ft
Volume of Treatment Area	162,000	ft^3	204,000	ft^3
Porosity	0.3		0.3	
Pore Volume of Treatment Area	48,600	ft^3	61,200	ft^3
Average Total CFM	81	ft^3/min	105	ft^3/min
Total Run Time	2.02	yr	2.17	yr
	738	day	792	day
	1,062,000	min	1,140,000	min
Total Air Extracted	86,022,000	ft^3	119,700,000	ft^3
Total Pore Volume Exchanges	1,770		1,956	

Notes

Area for the SWMU-172/174 site is based on three wells each with a radius of influence of 38 ft.

Area for the 4-78/79 site is based on fifteen wells each with a radius of influence of 20 ft.

Table 3-1 - Baseline and Performance Monitoring Groundwater Data; 4-78/79 Benzene Treatment Area

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)		Duplicate Well ID
B78-11-8-113017	11/30/2017	8	0.42		0.98		1.11		9.66		<0.100	U	<0.100	U	1.94		
B78-11-021418	2/14/2018	8	1.16		0.84		1.09		14.8		<0.100	U	<0.100	U	9.22	D	
B78-11-051518	5/15/2018	8	1.86		0.78		1.06		12.6		<0.100	U	<0.100	U	34.1	D	
B78-13-15-112917	11/29/2017	15	0.24		1.29		2.02		9.92		0.135		<0.100	U	0.652		
B78-13-021418	2/14/2018	15	<0.2	U	1.78		8.49		4.11		<0.100	U	<0.100	U	1.31		
B78-13-051518	5/15/2018	15	<0.2	U	0.85		0.87		4.94		0.182		<0.100	U	4.32	D	
B78-17-9-100617	10/6/2017	9	<0.2	U	0.17	J	0.33		4.84		-		-		-		
B78-17-15-112917	11/29/2017	9	1.25		0.81		1.31		6.52		<0.100	U	<0.100	U	17.1	D	
B78-17-021418	2/14/2018	9	2.57		1.78		1.47		4.61		<0.100	U	<0.100	U	7.35	D	
B78-17-051518	5/15/2018	9	0.91		1.63		0.53		2.6		<0.100	U	<0.100	U	8.66	D	
B78-18-8-100617	10/6/2017	15	<0.2	U	0.07	J	0.29		0.72		-		-		-		
B78-18-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.35	M	3.10		<0.100	U	<0.100	U	0.343		
DUP-01-112917	11/29/2017	15	<0.2	U	<0.2	U	0.36		2.96		<0.100	U	<0.100	U	1.68		B78-18-15
B78-18-021418	2/14/2018	15	<0.2	U	<0.2	U	0.24		1.28		<0.100	U	<0.100	U	1.47		
B78-18-051518	5/15/2018	15	<0.2	U	<0.2	U	0.23		1.68		<0.100	U	<0.100	U	27.6	D	
B78-19-9-100617	10/6/2017	15	<0.2	U	0.06	J	0.22		0.69		-		-		-		
B78-19-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.27	M	0.36		<0.100	U	<0.100	U	0.255		
B78-19-021418	2/14/2018	15	<0.2	U	<0.2	U	0.21		0.23		<0.100	U	<0.100	U	1.22		
B78-19-051518	5/15/2018	15	<0.2	U	<0.2	U	0.21		0.34		<0.100	U	<0.100	U	22.4	D	
B78-20-8-100617	10/6/2017	15	<0.2	U	<0.2	U	0.14	J	8.81		-		-		-		
B78-20-15-113017	11/30/2017	15	0.41		<0.2	U	<0.2	U	25.9		2.93	D	<0.100	U	53.9	D	
B78-20-021418	2/14/2018	15	0.25		0.49	M	<0.2	U	40.0		<0.100	U	<0.100	U	21.1	D	
B78-20-051518	5/15/2018	15	<0.2	U	0.39		0.22		54.2		<0.100	U	<0.100	U	15.5	D	
B78-21-8-100617	10/6/2017	15	<0.2	U	0.13	J	0.21		1.42		-		-		-		
Dup01-100617	10/6/2017	15	<0.2	U	0.15	J	0.20	J	2.01		-		-		-		B78-21-8
B78-21-15-112917	11/29/2017	15	<0.2	U	0.31	M	0.26		2.27		0.101		<0.100	U	4.43	D	
B78-21-021418	2/14/2018	15	<0.2	U	0.24		0.30		0.86		<0.100	U	<0.100	U	1.60		
B78-21-051518	5/15/2018	15	<0.2	U	0.27		0.27		1.08		<0.100	U	<0.100	U	4.59	D	
GW-244S-13-112917	11/29/2017	13	3.48		8.06		5.68		7.97		<0.100	U	<0.100	U	0.753		
GW-244S-021418	2/14/2018	13	1.01		1.25		1.22		5.34		<0.100	U	<0.100	U	1.25		
GW-244S	3/6/2018	13	1.26		2		1.56		6.86		-		-		-		
GW-244S-051518	5/15/2018	13	<0.2	U	0.3		0.41		3.89		<0.100	U	<0.100	U	<0.100	U	
GW-031S-23-113017	11/30/2017	23	<0.2	U	<0.2	U	<0.2	U	17.6		<0.100	U	<0.100	U	2.54	D	
GW-031S-021418	2/14/2018	23	<0.2	U	0.45	M	0.49		21.9		<0.100	U	<0.100	U	3.67	D	
DUP-01-021418	2/14/2018	23	<0.2	U	0.46		0.42		21.4		-		-		-		GW-031S
GW-031S	3/6/2018	23	<0.2	U	1.18		<0.2	U	60.3		-		-		-		
GW-031S-051518	5/15/2018	23	0.36		0.4		0.21		2.68		<0.100	U	<0.100	U	2.95	D	
Dup-01-051518	5/15/2018	23	0.32		0.34		0.2		2.64		<0.100	U	<0.100	U	2.87	D	GW-031S

Table 3-2 Groundwater Monitoring Results Summary and Recommended ERD Treatment

GW Treatment Area	Source and downgradient	CPOC wells	Treatment IWs	ERD Treatment
SWMU-172/174	All detections are less than 1.5 ug/L.	All detections are at 0.4 ug/L or less.	*Prior data, North and South IWS showed total CVOCs range from 0.03 ug/L to 6.90 ug/L. TOC near background.*	**Substrate injection in all IWs B172-1 through B172-14 completed in July 2018.**
Building 4-78/4-79 SWMU/AOC Group	Most source area MWs are ND or less than 1.0 ug/L. One central well shows significant decrease in total CVOCs from 1,430 ug/L in Nov 2017 to 150 ug/L in May 2018, after substrate injections in January 2018. Benzene remains in selected wells/area (<10 typically). GW-031S was at 60 ug/L in March 2018 and now at 11 ug/L in May 2018; Nitrate/sulfate injected in July 2018.	Six of seven CPOC wells are ND or below CULs for CVOCs. The one well with detections above CUL show VC at 0.23 ug/L.	*Prior data, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L. One central well shows total CVOCs at 2,440 ug/L. TOC near background.*	**Substrate injection in selected IWs/areas around GW-033S completed in July 2018.**
AOC-001/002	*Prior data, MW near source at 0.8 ug/L; downgradient all detections are less than 1.5 ug/L.*	All detections are less than 0.20 ug/L.	*Prior data, detections at or below 0.30 ug/L.*	**Inject infiltration galleries at source (IPRA and IPRB) when area is accessible.**
AOC-003	All detections are less than 0.50 ug/L.	Detections at or below 0.60 ug/L.	*Prior data, in May 2017 one of four IWs sampled – VC detection less than 0.30 ug/L*	**No action**
Lot 20 / former 10-71	One well with VC at 0.24 ug/L, all other MWs are ND.	-	-	**No action**
AOC-60	*Prior data, detections less than 3 ug/L.*	*Prior data, all detections less than 0.30 ug/L*	-	**Substrate injections at MWs GW-012S and GW-147S completed in July 2018.**
AOC – 90	*Prior data, MW near source at 3.0 ug/L CVOCs; downgradient wells less than 0.50 ug/L.*	*Prior data, all detections are less than 0.60 ug/L.*	-	**Substrate injection at GW-189S completed in July 2018.**
Apron A	Detections of VC range from 0.24 ug/L to 1.63 ug/L.	-	-	**Substrate injection to be considered in conjunction with AOC-001/002.**
Building 4-70	-	*Prior data, CVOCs at 0.75 ug/L and 0.26 ug/L.*	-	**No action**

FIGURES

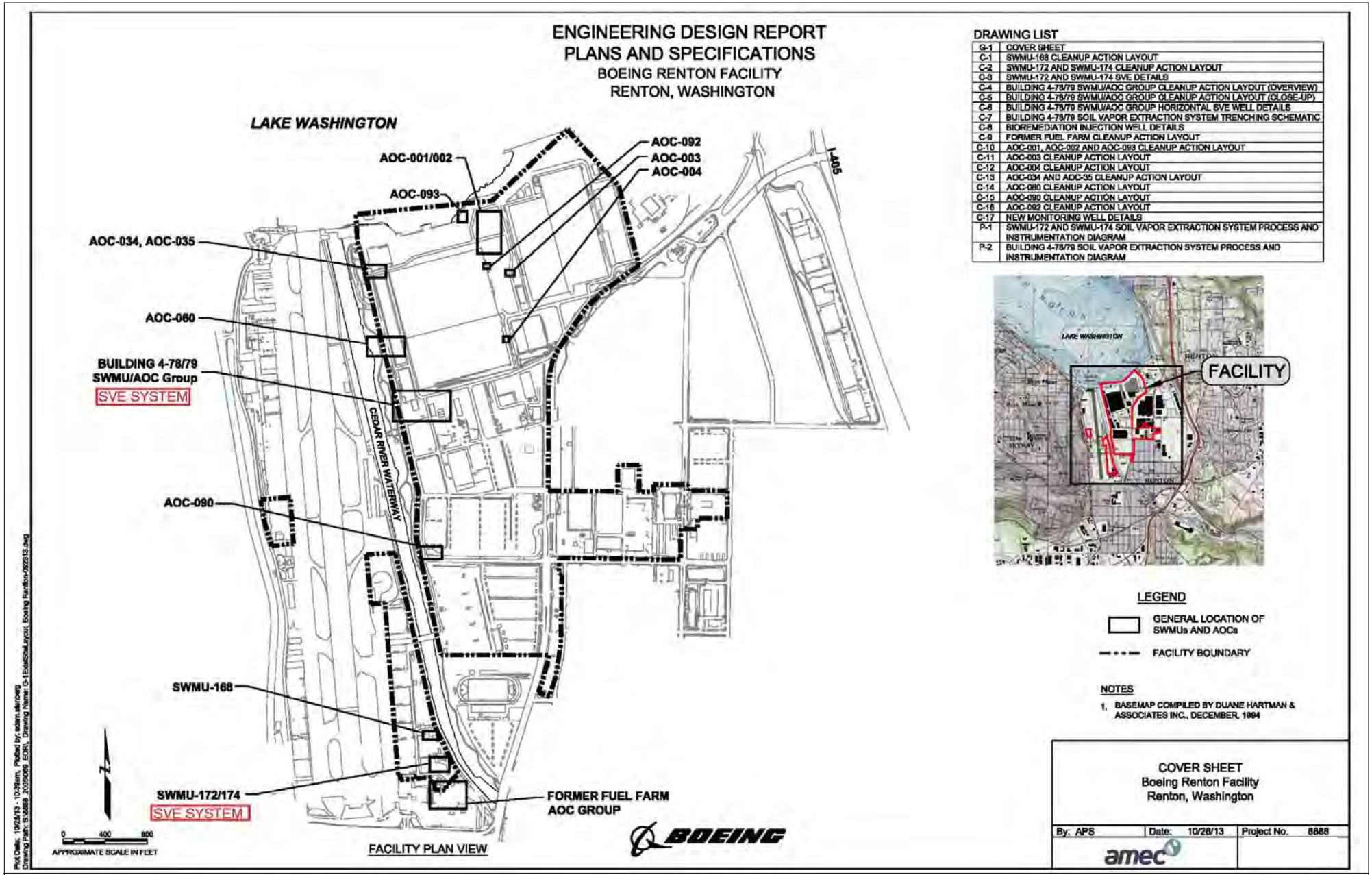

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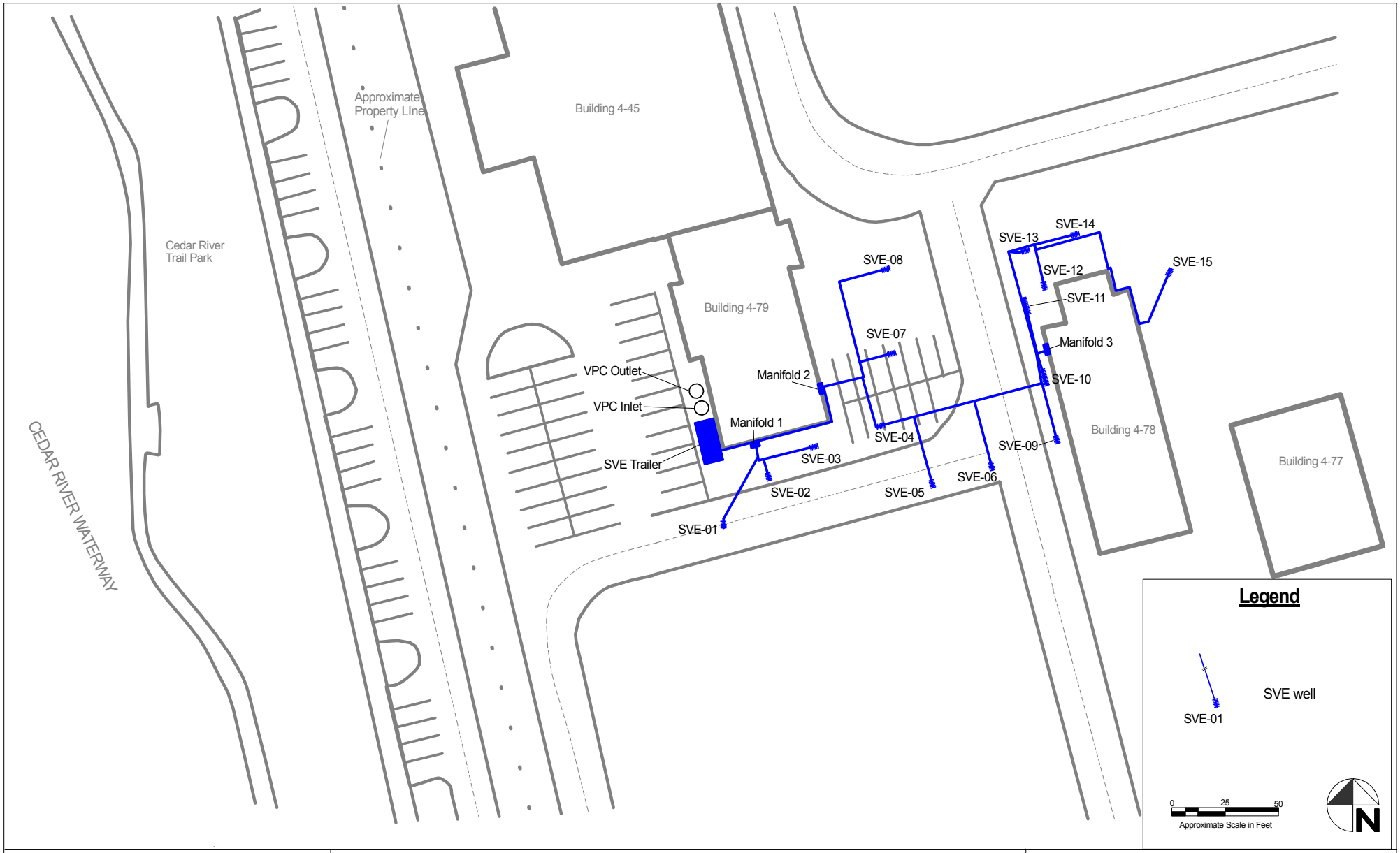
Figure 1-1 Site Location/ AOC Outlines



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Spring 2017 SVE Quarterly Summary Report

Figure 2-1 Building 4-78/79

SVE System Layout

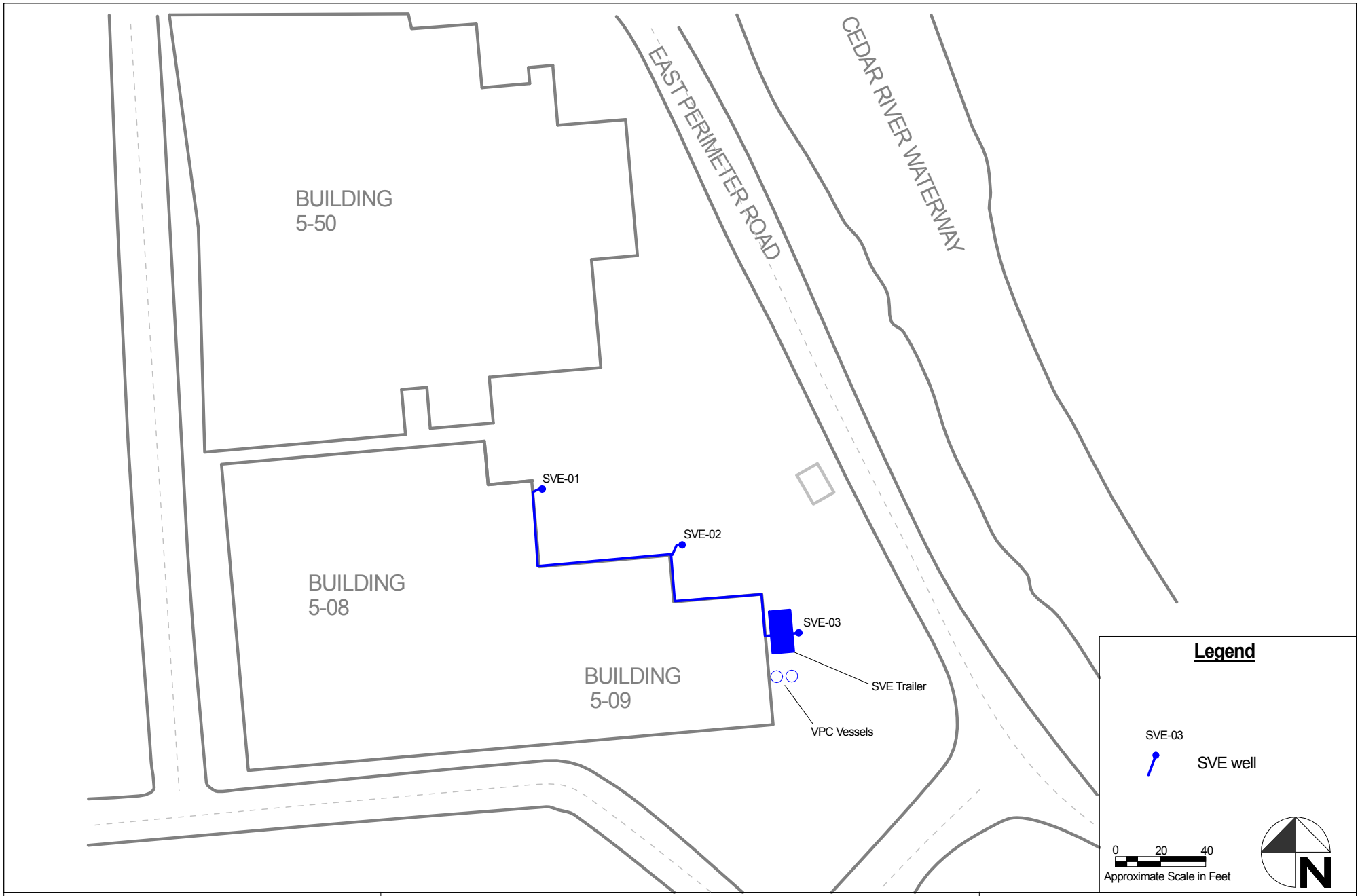

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Figure 2-2 SWMU-172/174 Area
SVE System Layout

Attachment A: Field Log Forms

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 5/22/18 Date of last inspection: 3/6/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0815		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H_2O	Changed blower oil 1000 system start for SVE Rebound
Pressure gauge	17" H_2O	
System flow rate	112 SCFM	
Blower Temperature	88°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 ppb / 10.02 ppm				
Calibration time/ date: 5/22/18 ~0850				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)**	**PID Reading (2)**	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01	1021	726 ppb	262 ppb / 138 ppb					
SVE-02								
SVE-03								
SVE-04								
SVE-05	1009	12500 ppb	15250 ppb					
SVE-06	1018	3908 ppb	3782					
SVE-07								
SVE-08								
SVE-09								
SVE-10	1024	1626 ppb	1,525 ppb					
SVE-11								
SVE-12	1030	741 ppb	681 ppb					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	1016	1,975 ppb	2,048 ppb					
VPC Midpoint								
VPC Outlet	1013	0 ppb	0 ppb					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date _____

Sample	Time	PID [ppb]	PID [ppb]
★ IN	1149	1291	1308
Out	1153	0	0
★ 1	1156	189 ppb	145 ppb
5	1210	6918	9,643
★ 6	1202	4822 ppb	4,330 ppb
★ 10	1202	1314	1366
12 1220	923	518	

Time	PID (1)	PID (2)
1359	1,419	1,178
1358	0	0
1354	489	149
1405	5,589	5568
1410	3,624	4021
1414	1,148	874
1417	736	611

★ 4-78-SVE-IN-052218 @ 1225
4-78-SVE-1-052218 @ 1224
4-78-SVE-6-052218 @ 1230
4-78-SVE-10-052218 @

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 5/23/18 Date of last inspection: 5/22/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1400		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge		Day 1 Monitoring for SVE Rebound
Pressure gauge		
System flow rate		
Blower Temperature		
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details:				
Calibration time/ date:				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)** ppb	**PID Reading (2)** ppb	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01	1419	509	378					
SVE-02								
SVE-03								
SVE-04								
SVE-05	1422	1,131	1,044					
SVE-06	1425	1,601	1,430					
SVE-07								
SVE-08								
SVE-09								
SVE-10	1431	698	701					
SVE-11								
SVE-12	1433	558	578					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	1412	501	503					
VPC Midpoint								
VPC Outlet	1415	0	0					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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Signature _____ Printed Name _____ Signature _____ Date

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 5/31/18 Date of last inspection: 5/23/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0830		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge		Day 9 - SVE Rebound monitoring
Pressure gauge		
System flow rate		
Blower Temperature		
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model:	Details:
Calibration time/ date:	PID check after monitoring:

Sampling Point	Time	PID Reading (1) ppb	PID Reading (2) ppb	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
SVE-01	1130	32	19					
SVE-02								
SVE-03								
SVE-04								
SVE-05	1105	145	139					
SVE-06	1110	181	159					
SVE-07								
SVE-08								
SVE-09								
SVE-10	1115	301	254					
SVE-11								
SVE-12	1120	348	276					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	0840	0	0					
VPC Midpoint								
VPC Outlet	0850	0	0					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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Signature _____ Printed Name _____ Signature _____ Date

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 6-7-18 Date of last inspection: 5/31/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0900		Motor Hours: 3592.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	35" H_2O	
Pressure gauge	15 ~~22~~ " H_2O	
System flow rate	119 scfm	
Blower Temperature	116°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 ppb / 10.00 ppm				
Calibration time/ date: 6/7/18 0900				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)**	**PID Reading (2)**	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01	0922	44	17					
SVE-02								
SVE-03								
SVE-04								
SVE-05	0928	157	128					
SVE-06	0936	167	203					
SVE-07								
SVE-08								
SVE-09								
SVE-10	0940	369	386					
SVE-11								
SVE-12	0946	411	390					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	0919	162	148					
VPC Midpoint								
VPC Outlet	0915	57	52					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature

Justin Neste
Printed Name

Signature

6/7/18
Date

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 6/20/18 Date of last inspection: 6/7/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1500		Motor Hours: 3910.3
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H_2O	Day 29 SVE Rebound
Pressure gauge	16" H_2O	
System flow rate	119 SCFm	
Blower Temperature	142° F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 PPb / 10.00 PPm				
Calibration time/ date: 6/20/18 0645				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)**	**PID Reading (2)**	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01	1518	4 PPb	6 PPb					
SVE-02								
SVE-03								
SVE-04								
SVE-05	1522	31	37					
SVE-06	1521	93	107					
SVE-07								
SVE-08								
SVE-09								
SVE-10	1527	241	221					
SVE-11								
SVE-12	1528	243	261					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	1515	79	79					
VPC Midpoint								
VPC Outlet	1512	0	0					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature

Justin Neste
Printed Name

Signature

6/20/18
Date

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 5/22/18 Date of last inspection: 3/6/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0800		Motor Hours: 3058.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	38 "H2O	Changed Blower oil 0850 system start
Pressure gauge	23 "H2O	
System flow rate	~98 SCFM	
Blower Temperature	97°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 10.02 ppm
Calibration time/ date: 0900 5/22/18	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	0906	74 ppb	131 ppb	37	98		
SVE-02	0910	185 ppb	185 ppb				
SVE-03	0916	1,394 ppb	1,428 ppb				
VPC Inlet	859	649	391				
VPC Midpoint	856	117	21				
VPC Outlet	856	~~0~~ 0 ppb	3				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 5/23/18 Date of last inspection: 5/22/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time:		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge		Day 1 SVE Rebound
Pressure gauge		
System flow rate		
Blower Temperature		
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details:
Calibration time/ date:	PID check after monitoring:

Sampling Point	Time	PID Reading (1) ppb	PID Reading (2) ppb	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	1500	62	42				
SVE-02	1457	192	131				
SVE-03	1451	755	845				
VPC Inlet	1448	1,201	1,145				
VPC Midpoint							
VPC Outlet	1447	0	0				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 5/31/18 Date of last inspection: 5/23/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time:		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge		Day 9 - SVE Rebound Monitoring
Pressure gauge		
System flow rate		
Blower Temperature		
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details:
Calibration time/ date:	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	1026	96	86				
SVE-02	1031	0	0				
SVE-03	1032	275	255				
VPC Inlet	1018	276	325				
VPC Midpoint							
VPC Outlet	1012	0	0				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 6/7/18 Date of last inspection: 5/31/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1500		Motor Hours: 3416.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H_2O	
Pressure gauge	24" H_2O	
System flow rate	105 SCFM	
Blower Temperature	117°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 10.00 ppm
Calibration time/ date: 6/7/18 0900	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	1520	64	45				
SVE-02	1517	232	203				
SVE-03	1514	636	607				
VPC Inlet	1510	455	452				
VPC Midpoint							
VPC Outlet	1505	0/0	0				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) (Signature) 6/7/18 (Date)

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 6/20/18 Date of last inspection: 6/7/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1430		Motor Hours: 3618.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H20	Day 29 - Rebound monitoring
Pressure gauge	26" H20	
System flow rate	103 SCFM	
Blower Temperature	124°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PDR RAE 3000	Details: 0.ppb / 10.00 ppm
Calibration time/ date: 6/20/18 0645	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	1447	0 ppb	0 ppb				
SVE-02	1445	51	31				
SVE-03	1439	200	181				
VPC Inlet	1435	153	153				
VPC Midpoint							
VPC Outlet	1433	0	0				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) _____ (Signature) 6/20/18 (Date)

Attachment B: Laboratory Data Package

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6/11/2018

Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Boeing Renton
Project #:
Workorder #: 1805531

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 5/29/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1805531

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	
FAX:		**PROJECT #**	Boeing Renton
DATE RECEIVED:	05/29/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/11/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-SVE-IN-052218	TO-15	3.9 "Hg	14.2 psi
02A	5-09-SVE-3-052218	TO-15	5.7 "Hg	14.2 psi
03A	4-78-SVE-1-052218	TO-15	6.3 "Hg	14.9 psi
04A	4-78-SVE-IN-052218	TO-15	4.9 "Hg	14.8 psi
05A	4-78-SVE-6-052218	TO-15	6.5 "Hg	14.8 psi
06A	4-78-SVE-10-052218	TO-15	0.6 "Hg	14.9 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/11/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1805531

Six 1 Liter Summa Canister samples were received on May 29, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Dilution was performed on samples 5-09-SVE-IN-052218, 5-09-SVE-3-052218, 4-78-SVE-IN-052218, 4-78-SVE-6-052218 and 4-78-SVE-10-052218 due to the presence of high level target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-IN-052218

Lab ID#: 1805531-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.9	13	7.5	50
1,1,1-Trichloroethane	1.9	12	10	67
Trichloroethene	1.9	43	10	230
Tetrachloroethene	1.9	430	13	2900

Client Sample ID: 5-09-SVE-3-052218

Lab ID#: 1805531-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	4.0	22	16	85
1,1,1-Trichloroethane	4.0	22	22	120
Trichloroethene	4.0	66	22	350
Tetrachloroethene	4.0	790	27	5300

Client Sample ID: 4-78-SVE-1-052218

Lab ID#: 1805531-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	5.1	16	16	49
Hexane	1.3	26	4.5	93
Cumene	1.3	1.7	6.3	8.5
TPH ref. to Gasoline (MW=100)	130	630	520	2600
Pentane	5.1	83	15	240

Client Sample ID: 4-78-SVE-IN-052218

Lab ID#: 1805531-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	1.7	4.6	4.4	12
Freon 113	1.7	50	13	380
Acetone	17	22	41	53
Hexane	1.7	49	6.0	170

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-IN-052218

Lab ID#: 1805531-04A

cis-1,2-Dichloroethene	1.7	10	6.8	40
1,1,1-Trichloroethane	1.7	19	9.4	100
Trichloroethene	1.7	260	9.2	1400
Toluene	1.7	2.8	6.5	11
Tetrachloroethene	1.7	2.6	12	18
TPH ref. to Gasoline (MW=100)	170	2000	700	8200
Pentane	6.9	110	20	340

Client Sample ID: 4-78-SVE-6-052218

Lab ID#: 1805531-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	26	29	65	74
Freon 113	26	1900	200	15000
Hexane	26	350	90	1200
1,1,1-Trichloroethane	26	28	140	160
Trichloroethene	26	220	140	1200
Tetrachloroethene	26	36	170	250
TPH ref. to Gasoline (MW=100)	2600	26000	10000	110000
Pentane	100	690	300	2000

Client Sample ID: 4-78-SVE-10-052218

Lab ID#: 1805531-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	3.4	77	26	590
cis-1,2-Dichloroethene	3.4	23	14	92
1,1,1-Trichloroethane	3.4	70	19	380
Trichloroethene	3.4	720	18	3900
Toluene	3.4	38	13	140
Tetrachloroethene	3.4	5.4	23	37
Ethyl Benzene	3.4	6.9	15	30
m,p-Xylene	3.4	19	15	82
o-Xylene	3.4	7.6	15	33

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-10-052218

Lab ID#: 1805531-06A

Styrene	3.4	11	14	48
TPH ref. to Gasoline (MW=100)	340	480	1400	2000
Pentane	14	17	40	50

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Client Sample ID: 5-09-SVE-IN-052218

Lab ID#: 1805531-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060711**	**Date of Collection:**	**5/22/18 11:10:00 AM**
Dil. Factor:	**3.77**	**Date of Analysis:**	**6/7/18 03:59 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	19	Not Detected	39	Not Detected
Vinyl Chloride	1.9	Not Detected	4.8	Not Detected
Freon 113	1.9	Not Detected	14	Not Detected
1,1-Dichloroethene	1.9	Not Detected	7.5	Not Detected
Acetone	19	Not Detected	45	Not Detected
Carbon Disulfide	7.5	Not Detected	23	Not Detected
Methylene Chloride	19	Not Detected	65	Not Detected
trans-1,2-Dichloroethene	1.9	Not Detected	7.5	Not Detected
Hexane	1.9	Not Detected	6.6	Not Detected
1,1-Dichloroethane	1.9	Not Detected	7.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	7.5	Not Detected	22	Not Detected
cis-1,2-Dichloroethene	1.9	13	7.5	50
Chloroform	1.9	Not Detected	9.2	Not Detected
1,1,1-Trichloroethane	1.9	12	10	67
Benzene	1.9	Not Detected	6.0	Not Detected
Trichloroethene	1.9	43	10	230
Toluene	1.9	Not Detected	7.1	Not Detected
1,1,2-Trichloroethane	1.9	Not Detected	10	Not Detected
Tetrachloroethene	1.9	430	13	2900
Chlorobenzene	1.9	Not Detected	8.7	Not Detected
Ethyl Benzene	1.9	Not Detected	8.2	Not Detected
m,p-Xylene	1.9	Not Detected	8.2	Not Detected
o-Xylene	1.9	Not Detected	8.2	Not Detected
Styrene	1.9	Not Detected	8.0	Not Detected
Cumene	1.9	Not Detected	9.3	Not Detected
Propylbenzene	1.9	Not Detected	9.3	Not Detected
1,3,5-Trimethylbenzene	1.9	Not Detected	9.3	Not Detected
1,2,4-Trimethylbenzene	1.9	Not Detected	9.3	Not Detected
TPH ref. to Gasoline (MW=100)	190	Not Detected	770	Not Detected
Acetonitrile	19	Not Detected	32	Not Detected
Vinyl Acetate	7.5	Not Detected	26	Not Detected
Octane	7.5	Not Detected	35	Not Detected
Pentane	7.5	Not Detected	22	Not Detected
Butylbenzene	7.5	Not Detected	41	Not Detected
Decane	7.5	Not Detected	44	Not Detected
Dodecane	19	Not Detected	130	Not Detected
sec-Butylbenzene	7.5	Not Detected	41	Not Detected
p-Cymene	7.5	Not Detected	41	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-IN-052218

Lab ID#: 1805531-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060711**	**Date of Collection:**	**5/22/18 11:10:00 AM**
Dil. Factor:	**3.77**	**Date of Analysis:**	**6/7/18 03:59 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: 5-09-SVE-3-052218

Lab ID#: 1805531-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060712**	**Date of Collection:**	**5/22/18 11:05:00 AM**
Dil. Factor:	**8.09**	**Date of Analysis:**	**6/7/18 04:23 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	40	Not Detected	84	Not Detected
Vinyl Chloride	4.0	Not Detected	10	Not Detected
Freon 113	4.0	Not Detected	31	Not Detected
1,1-Dichloroethene	4.0	Not Detected	16	Not Detected
Acetone	40	Not Detected	96	Not Detected
Carbon Disulfide	16	Not Detected	50	Not Detected
Methylene Chloride	40	Not Detected	140	Not Detected
trans-1,2-Dichloroethene	4.0	Not Detected	16	Not Detected
Hexane	4.0	Not Detected	14	Not Detected
1,1-Dichloroethane	4.0	Not Detected	16	Not Detected
2-Butanone (Methyl Ethyl Ketone)	16	Not Detected	48	Not Detected
cis-1,2-Dichloroethene	4.0	22	16	85
Chloroform	4.0	Not Detected	20	Not Detected
1,1,1-Trichloroethane	4.0	22	22	120
Benzene	4.0	Not Detected	13	Not Detected
Trichloroethene	4.0	66	22	350
Toluene	4.0	Not Detected	15	Not Detected
1,1,2-Trichloroethane	4.0	Not Detected	22	Not Detected
Tetrachloroethene	4.0	790	27	5300
Chlorobenzene	4.0	Not Detected	19	Not Detected
Ethyl Benzene	4.0	Not Detected	18	Not Detected
m,p-Xylene	4.0	Not Detected	18	Not Detected
o-Xylene	4.0	Not Detected	18	Not Detected
Styrene	4.0	Not Detected	17	Not Detected
Cumene	4.0	Not Detected	20	Not Detected
Propylbenzene	4.0	Not Detected	20	Not Detected
1,3,5-Trimethylbenzene	4.0	Not Detected	20	Not Detected
1,2,4-Trimethylbenzene	4.0	Not Detected	20	Not Detected
TPH ref. to Gasoline (MW=100)	400	Not Detected	1600	Not Detected
Acetonitrile	40	Not Detected	68	Not Detected
Vinyl Acetate	16	Not Detected	57	Not Detected
Octane	16	Not Detected	76	Not Detected
Pentane	16	Not Detected	48	Not Detected
Butylbenzene	16	Not Detected	89	Not Detected
Decane	16	Not Detected	94	Not Detected
Dodecane	40	Not Detected	280	Not Detected
sec-Butylbenzene	16	Not Detected	89	Not Detected
p-Cymene	16	Not Detected	89	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-052218

Lab ID#: 1805531-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060712**	**Date of Collection:**	**5/22/18 11:05:00 AM**
Dil. Factor:	**8.09**	**Date of Analysis:**	**6/7/18 04:23 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: 4-78-SVE-1-052218

Lab ID#: 1805531-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060709**	**Date of Collection:**	**5/22/18 12:24:00 PM**
Dil. Factor:	**2.55**	**Date of Analysis:**	**6/7/18 03:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
Freon 113	1.3	Not Detected	9.8	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Acetone	13	Not Detected	30	Not Detected
Carbon Disulfide	5.1	16	16	49
Methylene Chloride	13	Not Detected	44	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Hexane	1.3	26	4.5	93
1,1-Dichloroethane	1.3	Not Detected	5.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.1	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Chloroform	1.3	Not Detected	6.2	Not Detected
1,1,1-Trichloroethane	1.3	Not Detected	7.0	Not Detected
Benzene	1.3	Not Detected	4.1	Not Detected
Trichloroethene	1.3	Not Detected	6.8	Not Detected
Toluene	1.3	Not Detected	4.8	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	7.0	Not Detected
Tetrachloroethene	1.3	Not Detected	8.6	Not Detected
Chlorobenzene	1.3	Not Detected	5.9	Not Detected
Ethyl Benzene	1.3	Not Detected	5.5	Not Detected
m,p-Xylene	1.3	Not Detected	5.5	Not Detected
o-Xylene	1.3	Not Detected	5.5	Not Detected
Styrene	1.3	Not Detected	5.4	Not Detected
Cumene	1.3	1.7	6.3	8.5
Propylbenzene	1.3	Not Detected	6.3	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.3	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.3	Not Detected
TPH ref. to Gasoline (MW=100)	130	630	520	2600
Acetonitrile	13	Not Detected	21	Not Detected
Vinyl Acetate	5.1	Not Detected	18	Not Detected
Octane	5.1	Not Detected	24	Not Detected
Pentane	5.1	83	15	240
Butylbenzene	5.1	Not Detected	28	Not Detected
Decane	5.1	Not Detected	30	Not Detected
Dodecane	13	Not Detected	89	Not Detected
sec-Butylbenzene	5.1	Not Detected	28	Not Detected
p-Cymene	5.1	Not Detected	28	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-1-052218

Lab ID#: 1805531-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060709**	**Date of Collection:**	**5/22/18 12:24:00 PM**
Dil. Factor:	**2.55**	**Date of Analysis:**	**6/7/18 03:11 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: 4-78-SVE-IN-052218

Lab ID#: 1805531-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060710**	**Date of Collection:**	**5/22/18 12:25:00 PM**
Dil. Factor:	**3.43**	**Date of Analysis:**	**6/7/18 03:36 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	17	Not Detected	35	Not Detected
Vinyl Chloride	1.7	4.6	4.4	12
Freon 113	1.7	50	13	380
1,1-Dichloroethene	1.7	Not Detected	6.8	Not Detected
Acetone	17	22	41	53
Carbon Disulfide	6.9	Not Detected	21	Not Detected
Methylene Chloride	17	Not Detected	60	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.8	Not Detected
Hexane	1.7	49	6.0	170
1,1-Dichloroethane	1.7	Not Detected	6.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.9	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.7	10	6.8	40
Chloroform	1.7	Not Detected	8.4	Not Detected
1,1,1-Trichloroethane	1.7	19	9.4	100
Benzene	1.7	Not Detected	5.5	Not Detected
Trichloroethene	1.7	260	9.2	1400
Toluene	1.7	2.8	6.5	11
1,1,2-Trichloroethane	1.7	Not Detected	9.4	Not Detected
Tetrachloroethene	1.7	2.6	12	18
Chlorobenzene	1.7	Not Detected	7.9	Not Detected
Ethyl Benzene	1.7	Not Detected	7.4	Not Detected
m,p-Xylene	1.7	Not Detected	7.4	Not Detected
o-Xylene	1.7	Not Detected	7.4	Not Detected
Styrene	1.7	Not Detected	7.3	Not Detected
Cumene	1.7	Not Detected	8.4	Not Detected
Propylbenzene	1.7	Not Detected	8.4	Not Detected
1,3,5-Trimethylbenzene	1.7	Not Detected	8.4	Not Detected
1,2,4-Trimethylbenzene	1.7	Not Detected	8.4	Not Detected
TPH ref. to Gasoline (MW=100)	170	2000	700	8200
Acetonitrile	17	Not Detected	29	Not Detected
Vinyl Acetate	6.9	Not Detected	24	Not Detected
Octane	6.9	Not Detected	32	Not Detected
Pentane	6.9	110	20	340
Butylbenzene	6.9	Not Detected	38	Not Detected
Decane	6.9	Not Detected	40	Not Detected
Dodecane	17	Not Detected	120	Not Detected
sec-Butylbenzene	6.9	Not Detected	38	Not Detected
p-Cymene	6.9	Not Detected	38	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-IN-052218

Lab ID#: 1805531-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060710**	**Date of Collection:**	**5/22/18 12:25:00 PM**
Dil. Factor:	**3.43**	**Date of Analysis:**	**6/7/18 03:36 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: 4-78-SVE-6-052218

Lab ID#: 1805531-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060714**	**Date of Collection:**	**5/22/18 12:30:00 PM**
Dil. Factor:	**51.2**	**Date of Analysis:**	**6/7/18 05:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	260	Not Detected	530	Not Detected
Vinyl Chloride	26	29	65	74
Freon 113	26	1900	200	15000
1,1-Dichloroethene	26	Not Detected	100	Not Detected
Acetone	260	Not Detected	610	Not Detected
Carbon Disulfide	100	Not Detected	320	Not Detected
Methylene Chloride	260	Not Detected	890	Not Detected
trans-1,2-Dichloroethene	26	Not Detected	100	Not Detected
Hexane	26	350	90	1200
1,1-Dichloroethane	26	Not Detected	100	Not Detected
2-Butanone (Methyl Ethyl Ketone)	100	Not Detected	300	Not Detected
cis-1,2-Dichloroethene	26	Not Detected	100	Not Detected
Chloroform	26	Not Detected	120	Not Detected
1,1,1-Trichloroethane	26	28	140	160
Benzene	26	Not Detected	82	Not Detected
Trichloroethene	26	220	140	1200
Toluene	26	Not Detected	96	Not Detected
1,1,2-Trichloroethane	26	Not Detected	140	Not Detected
Tetrachloroethene	26	36	170	250
Chlorobenzene	26	Not Detected	120	Not Detected
Ethyl Benzene	26	Not Detected	110	Not Detected
m,p-Xylene	26	Not Detected	110	Not Detected
o-Xylene	26	Not Detected	110	Not Detected
Styrene	26	Not Detected	110	Not Detected
Cumene	26	Not Detected	120	Not Detected
Propylbenzene	26	Not Detected	120	Not Detected
1,3,5-Trimethylbenzene	26	Not Detected	120	Not Detected
1,2,4-Trimethylbenzene	26	Not Detected	120	Not Detected
TPH ref. to Gasoline (MW=100)	2600	26000	10000	110000
Acetonitrile	260	Not Detected	430	Not Detected
Vinyl Acetate	100	Not Detected	360	Not Detected
Octane	100	Not Detected	480	Not Detected
Pentane	100	690	300	2000
Butylbenzene	100	Not Detected	560	Not Detected
Decane	100	Not Detected	600	Not Detected
Dodecane	260	Not Detected	1800	Not Detected
sec-Butylbenzene	100	Not Detected	560	Not Detected
p-Cymene	100	Not Detected	560	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-6-052218

Lab ID#: 1805531-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060714**	**Date of Collection:**	**5/22/18 12:30:00 PM**
Dil. Factor:	**51.2**	**Date of Analysis:**	**6/7/18 05:11 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: 4-78-SVE-10-052218

Lab ID#: 1805531-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060713**	**Date of Collection:**	**5/22/18 12:36:00 PM**
Dil. Factor:	**6.85**	**Date of Analysis:**	**6/7/18 04:46 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	34	Not Detected	71	Not Detected
Vinyl Chloride	3.4	Not Detected	8.8	Not Detected
Freon 113	3.4	77	26	590
1,1-Dichloroethene	3.4	Not Detected	14	Not Detected
Acetone	34	Not Detected	81	Not Detected
Carbon Disulfide	14	Not Detected	43	Not Detected
Methylene Chloride	34	Not Detected	120	Not Detected
trans-1,2-Dichloroethene	3.4	Not Detected	14	Not Detected
Hexane	3.4	Not Detected	12	Not Detected
1,1-Dichloroethane	3.4	Not Detected	14	Not Detected
2-Butanone (Methyl Ethyl Ketone)	14	Not Detected	40	Not Detected
cis-1,2-Dichloroethene	3.4	23	14	92
Chloroform	3.4	Not Detected	17	Not Detected
1,1,1-Trichloroethane	3.4	70	19	380
Benzene	3.4	Not Detected	11	Not Detected
Trichloroethene	3.4	720	18	3900
Toluene	3.4	38	13	140
1,1,2-Trichloroethane	3.4	Not Detected	19	Not Detected
Tetrachloroethene	3.4	5.4	23	37
Chlorobenzene	3.4	Not Detected	16	Not Detected
Ethyl Benzene	3.4	6.9	15	30
m,p-Xylene	3.4	19	15	82
o-Xylene	3.4	7.6	15	33
Styrene	3.4	11	14	48
Cumene	3.4	Not Detected	17	Not Detected
Propylbenzene	3.4	Not Detected	17	Not Detected
1,3,5-Trimethylbenzene	3.4	Not Detected	17	Not Detected
1,2,4-Trimethylbenzene	3.4	Not Detected	17	Not Detected
TPH ref. to Gasoline (MW=100)	340	480	1400	2000
Acetonitrile	34	Not Detected	58	Not Detected
Vinyl Acetate	14	Not Detected	48	Not Detected
Octane	14	Not Detected	64	Not Detected
Pentane	14	17	40	50
Butylbenzene	14	Not Detected	75	Not Detected
Decane	14	Not Detected	80	Not Detected
Dodecane	34	Not Detected	240	Not Detected
sec-Butylbenzene	14	Not Detected	75	Not Detected
p-Cymene	14	Not Detected	75	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-052218

Lab ID#: 1805531-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060713**	**Date of Collection:**	**5/22/18 12:36:00 PM**
Dil. Factor:	**6.85**	**Date of Analysis:**	**6/7/18 04:46 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1805531-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060708a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 12:26 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: Lab Blank

Lab ID#: 1805531-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060708a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 12:26 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: CCV

Lab ID#: 1805531-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 09:32 AM**	

Compound	%Recovery
Chloromethane	94
Vinyl Chloride	93
Freon 113	96
1,1-Dichloroethene	93
Acetone	97
Carbon Disulfide	91
Methylene Chloride	103
trans-1,2-Dichloroethene	100
Hexane	95
1,1-Dichloroethane	99
2-Butanone (Methyl Ethyl Ketone)	97
cis-1,2-Dichloroethene	96
Chloroform	98
1,1,1-Trichloroethane	96
Benzene	99
Trichloroethene	97
Toluene	97
1,1,2-Trichloroethane	98
Tetrachloroethene	103
Chlorobenzene	101
Ethyl Benzene	101
m,p-Xylene	99
o-Xylene	99
Styrene	97
Cumene	99
Propylbenzene	100
1,3,5-Trimethylbenzene	98
1,2,4-Trimethylbenzene	97
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	92
Vinyl Acetate	97
Octane	103
Pentane	106
Butylbenzene	104
Decane	105
Dodecane	96
sec-Butylbenzene	106
p-Cymene	107

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 1805531-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 09:32 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1805531-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 09:57 AM**	

Compound	%Recovery	Method Limits
Chloromethane	94	70-130
Vinyl Chloride	96	70-130
Freon 113	97	70-130
1,1-Dichloroethene	92	70-130
Acetone	94	70-130
Carbon Disulfide	91	70-130
Methylene Chloride	100	70-130
trans-1,2-Dichloroethene	108	70-130
Hexane	97	70-130
1,1-Dichloroethane	97	70-130
2-Butanone (Methyl Ethyl Ketone)	98	70-130
cis-1,2-Dichloroethene	90	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	96	70-130
Benzene	102	70-130
Trichloroethene	102	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	102	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	99	70-130
o-Xylene	99	70-130
Styrene	98	70-130
Cumene	99	70-130
Propylbenzene	102	70-130
1,3,5-Trimethylbenzene	100	70-130
1,2,4-Trimethylbenzene	100	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	97	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 1805531-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 09:57 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1805531-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 10:22 AM**	

Compound	%Recovery	Method Limits
Chloromethane	93	70-130
Vinyl Chloride	96	70-130
Freon 113	97	70-130
1,1-Dichloroethene	97	70-130
Acetone	96	70-130
Carbon Disulfide	93	70-130
Methylene Chloride	103	70-130
trans-1,2-Dichloroethene	109	70-130
Hexane	100	70-130
1,1-Dichloroethane	99	70-130
2-Butanone (Methyl Ethyl Ketone)	97	70-130
cis-1,2-Dichloroethene	90	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	96	70-130
Benzene	100	70-130
Trichloroethene	104	70-130
Toluene	98	70-130
1,1,2-Trichloroethane	100	70-130
Tetrachloroethene	102	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	100	70-130
o-Xylene	100	70-130
Styrene	99	70-130
Cumene	99	70-130
Propylbenzene	102	70-130
1,3,5-Trimethylbenzene	101	70-130
1,2,4-Trimethylbenzene	99	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	101	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 1805531-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3060704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/7/18 10:22 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	101	70-130

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6/20/2018

Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Boeing Renton
Project #:
Workorder #: 1806244

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 6/12/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1806244

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	Boeing Renton
FAX:		**PROJECT #**	Boeing Renton
DATE RECEIVED:	06/12/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/20/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	4-78-SVE-IN-060718	TO-15	2.8 "Hg	15.1 psi
02A	4-78-SVE-1-060718	TO-15	6.1 "Hg	15 psi
03A	4-78-SVE-6-060718	TO-15	5.5 "Hg	14.5 psi
04A	4-78-SVE-10-060718	TO-15	5.1 "Hg	14.7 psi
05A	5-09-SVE-IN-060718	TO-15	3.5 "Hg	15.1 psi
06A	5-09-SVE-3-060718	TO-15	5.5 "Hg	14.4 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/20/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1806244

Six 1 Liter Summa Canister samples were received on June 12, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-IN-060718

Lab ID#: 1806244-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	2.8	8.6	22
cis-1,2-Dichloroethene	1.1	3.7	4.4	14
1,1,1-Trichloroethane	1.1	2.1	6.1	12
Trichloroethene	1.1	69	6.0	370

Client Sample ID: 4-78-SVE-1-060718

Lab ID#: 1806244-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	1.3	11	4.8	43

Client Sample ID: 4-78-SVE-6-060718

Lab ID#: 1806244-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	65	9.3	500
1,1-Dichloroethane	1.2	1.4	4.9	5.7
cis-1,2-Dichloroethene	1.2	3.3	4.8	13
Chloroform	1.2	2.0	5.9	10
1,1,1-Trichloroethane	1.2	5.9	6.6	32
Trichloroethene	1.2	120	6.5	650
Tetrachloroethene	1.2	20	8.2	140

Client Sample ID: 4-78-SVE-10-060718

Lab ID#: 1806244-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	11	9.2	84
cis-1,2-Dichloroethene	1.2	14	4.8	57
1,1,1-Trichloroethane	1.2	8.5	6.6	46
Trichloroethene	1.2	230	6.5	1200
Tetrachloroethene	1.2	1.6	8.2	11

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-IN-060718

Lab ID#: 1806244-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.1	5.4	4.5	21
1,1,1-Trichloroethane	1.1	1.8	6.2	9.9
Trichloroethene	1.1	13	6.2	72
Tetrachloroethene	1.1	160	7.8	1100

Client Sample ID: 5-09-SVE-3-060718

Lab ID#: 1806244-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.2	9.6	4.8	38
1,1,1-Trichloroethane	1.2	3.0	6.6	16
Trichloroethene	1.2	23	6.5	120
Tetrachloroethene	1.2	280	8.2	1900

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Client Sample ID: 4-78-SVE-IN-060718

Lab ID#: 1806244-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061509**	**Date of Collection:**	**6/7/18 10:35:00 AM**
Dil. Factor:	**2.24**	**Date of Analysis:**	**6/15/18 03:12 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
Freon 113	1.1	2.8	8.6	22
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	Not Detected	27	Not Detected
Carbon Disulfide	4.5	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	39	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	3.7	4.4	14
Chloroform	1.1	Not Detected	5.5	Not Detected
1,1,1-Trichloroethane	1.1	2.1	6.1	12
Benzene	1.1	Not Detected	3.6	Not Detected
Trichloroethene	1.1	69	6.0	370
Toluene	1.1	Not Detected	4.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.1	Not Detected
Tetrachloroethene	1.1	Not Detected	7.6	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	Not Detected	4.9	Not Detected
o-Xylene	1.1	Not Detected	4.9	Not Detected
Styrene	1.1	Not Detected	4.8	Not Detected
Cumene	1.1	Not Detected	5.5	Not Detected
Propylbenzene	1.1	Not Detected	5.5	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	460	Not Detected
Acetonitrile	11	Not Detected	19	Not Detected
Vinyl Acetate	4.5	Not Detected	16	Not Detected
Octane	4.5	Not Detected	21	Not Detected
Pentane	4.5	Not Detected	13	Not Detected
Butylbenzene	4.5	Not Detected	24	Not Detected
Decane	4.5	Not Detected	26	Not Detected
Dodecane	11	Not Detected	78	Not Detected
sec-Butylbenzene	4.5	Not Detected	24	Not Detected
p-Cymene	4.5	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-IN-060718

Lab ID#: 1806244-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061509**	**Date of Collection:**	**6/7/18 10:35:00 AM**
Dil. Factor:	**2.24**	**Date of Analysis:**	**6/15/18 03:12 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 4-78-SVE-1-060718

Lab ID#: 1806244-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061510**	**Date of Collection:**	**6/7/18 10:43:00 AM**
Dil. Factor:	**2.54**	**Date of Analysis:**	**6/15/18 03:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
Freon 113	1.3	Not Detected	9.7	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Acetone	13	Not Detected	30	Not Detected
Carbon Disulfide	5.1	Not Detected	16	Not Detected
Methylene Chloride	13	Not Detected	44	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Hexane	1.3	Not Detected	4.5	Not Detected
1,1-Dichloroethane	1.3	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.1	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Chloroform	1.3	Not Detected	6.2	Not Detected
1,1,1-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Benzene	1.3	Not Detected	4.0	Not Detected
Trichloroethene	1.3	Not Detected	6.8	Not Detected
Toluene	1.3	11	4.8	43
1,1,2-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Tetrachloroethene	1.3	Not Detected	8.6	Not Detected
Chlorobenzene	1.3	Not Detected	5.8	Not Detected
Ethyl Benzene	1.3	Not Detected	5.5	Not Detected
m,p-Xylene	1.3	Not Detected	5.5	Not Detected
o-Xylene	1.3	Not Detected	5.5	Not Detected
Styrene	1.3	Not Detected	5.4	Not Detected
Cumene	1.3	Not Detected	6.2	Not Detected
Propylbenzene	1.3	Not Detected	6.2	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
TPH ref. to Gasoline (MW=100)	130	Not Detected	520	Not Detected
Acetonitrile	13	Not Detected	21	Not Detected
Vinyl Acetate	5.1	Not Detected	18	Not Detected
Octane	5.1	Not Detected	24	Not Detected
Pentane	5.1	Not Detected	15	Not Detected
Butylbenzene	5.1	Not Detected	28	Not Detected
Decane	5.1	Not Detected	30	Not Detected
Dodecane	13	Not Detected	88	Not Detected
sec-Butylbenzene	5.1	Not Detected	28	Not Detected
p-Cymene	5.1	Not Detected	28	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-1-060718

Lab ID#: 1806244-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061510**	**Date of Collection:**	**6/7/18 10:43:00 AM**
Dil. Factor:	**2.54**	**Date of Analysis:**	**6/15/18 03:38 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 4-78-SVE-6-060718

Lab ID#: 1806244-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061511**	**Date of Collection:**	**6/7/18 10:53:00 AM**
Dil. Factor:	**2.43**	**Date of Analysis:**	**6/15/18 04:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Freon 113	1.2	65	9.3	500
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	Not Detected	29	Not Detected
Carbon Disulfide	4.9	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.3	Not Detected
1,1-Dichloroethane	1.2	1.4	4.9	5.7
2-Butanone (Methyl Ethyl Ketone)	4.9	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	3.3	4.8	13
Chloroform	1.2	2.0	5.9	10
1,1,1-Trichloroethane	1.2	5.9	6.6	32
Benzene	1.2	Not Detected	3.9	Not Detected
Trichloroethene	1.2	120	6.5	650
Toluene	1.2	Not Detected	4.6	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	20	8.2	140
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.3	Not Detected
m,p-Xylene	1.2	Not Detected	5.3	Not Detected
o-Xylene	1.2	Not Detected	5.3	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Cumene	1.2	Not Detected	6.0	Not Detected
Propylbenzene	1.2	Not Detected	6.0	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	6.0	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	6.0	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	500	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.9	Not Detected	17	Not Detected
Octane	4.9	Not Detected	23	Not Detected
Pentane	4.9	Not Detected	14	Not Detected
Butylbenzene	4.9	Not Detected	27	Not Detected
Decane	4.9	Not Detected	28	Not Detected
Dodecane	12	Not Detected	85	Not Detected
sec-Butylbenzene	4.9	Not Detected	27	Not Detected
p-Cymene	4.9	Not Detected	27	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-6-060718

Lab ID#: 1806244-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061511**	**Date of Collection:**	**6/7/18 10:53:00 AM**
Dil. Factor:	**2.43**	**Date of Analysis:**	**6/15/18 04:04 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 4-78-SVE-10-060718

Lab ID#: 1806244-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061512**	**Date of Collection:**	**6/7/18 11:03:00 AM**
Dil. Factor:	**2.41**	**Date of Analysis:**	**6/15/18 04:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Freon 113	1.2	11	9.2	84
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	Not Detected	29	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.2	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	14	4.8	57
Chloroform	1.2	Not Detected	5.9	Not Detected
1,1,1-Trichloroethane	1.2	8.5	6.6	46
Benzene	1.2	Not Detected	3.8	Not Detected
Trichloroethene	1.2	230	6.5	1200
Toluene	1.2	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	1.6	8.2	11
Chlorobenzene	1.2	Not Detected	5.5	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.1	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	490	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.8	Not Detected	17	Not Detected
Octane	4.8	Not Detected	22	Not Detected
Pentane	4.8	Not Detected	14	Not Detected
Butylbenzene	4.8	Not Detected	26	Not Detected
Decane	4.8	Not Detected	28	Not Detected
Dodecane	12	Not Detected	84	Not Detected
sec-Butylbenzene	4.8	Not Detected	26	Not Detected
p-Cymene	4.8	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-060718

Lab ID#: 1806244-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061512**	**Date of Collection:**	**6/7/18 11:03:00 AM**
Dil. Factor:	**2.41**	**Date of Analysis:**	**6/15/18 04:30 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: 5-09-SVE-IN-060718

Lab ID#: 1806244-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061513**	**Date of Collection:**	**6/7/18 3:25:00 PM**
Dil. Factor:	**2.29**	**Date of Analysis:**	**6/15/18 04:56 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	24	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
Freon 113	1.1	Not Detected	8.8	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	Not Detected	27	Not Detected
Carbon Disulfide	4.6	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	40	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.1	5.4	4.5	21
Chloroform	1.1	Not Detected	5.6	Not Detected
1,1,1-Trichloroethane	1.1	1.8	6.2	9.9
Benzene	1.1	Not Detected	3.6	Not Detected
Trichloroethene	1.1	13	6.2	72
Toluene	1.1	Not Detected	4.3	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	160	7.8	1100
Chlorobenzene	1.1	Not Detected	5.3	Not Detected
Ethyl Benzene	1.1	Not Detected	5.0	Not Detected
m,p-Xylene	1.1	Not Detected	5.0	Not Detected
o-Xylene	1.1	Not Detected	5.0	Not Detected
Styrene	1.1	Not Detected	4.9	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	470	Not Detected
Acetonitrile	11	Not Detected	19	Not Detected
Vinyl Acetate	4.6	Not Detected	16	Not Detected
Octane	4.6	Not Detected	21	Not Detected
Pentane	4.6	Not Detected	14	Not Detected
Butylbenzene	4.6	Not Detected	25	Not Detected
Decane	4.6	Not Detected	27	Not Detected
Dodecane	11	Not Detected	80	Not Detected
sec-Butylbenzene	4.6	Not Detected	25	Not Detected
p-Cymene	4.6	Not Detected	25	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-IN-060718

Lab ID#: 1806244-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061513**	**Date of Collection:**	**6/7/18 3:25:00 PM**
Dil. Factor:	**2.29**	**Date of Analysis:**	**6/15/18 04:56 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 5-09-SVE-3-060718

Lab ID#: 1806244-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061514**	**Date of Collection:**	**6/7/18 3:35:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**6/15/18 05:23 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	Not Detected	29	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.3	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	9.6	4.8	38
Chloroform	1.2	Not Detected	5.9	Not Detected
1,1,1-Trichloroethane	1.2	3.0	6.6	16
Benzene	1.2	Not Detected	3.9	Not Detected
Trichloroethene	1.2	23	6.5	120
Toluene	1.2	Not Detected	4.6	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	280	8.2	1900
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	490	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.8	Not Detected	17	Not Detected
Octane	4.8	Not Detected	23	Not Detected
Pentane	4.8	Not Detected	14	Not Detected
Butylbenzene	4.8	Not Detected	26	Not Detected
Decane	4.8	Not Detected	28	Not Detected
Dodecane	12	Not Detected	84	Not Detected
sec-Butylbenzene	4.8	Not Detected	26	Not Detected
p-Cymene	4.8	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-060718

Lab ID#: 1806244-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061514**	**Date of Collection:**	**6/7/18 3:35:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**6/15/18 05:23 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1806244-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061508a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 12:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: Lab Blank

Lab ID#: 1806244-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061508a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 12:34 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1806244-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 09:44 AM**	

Compound	%Recovery
Chloromethane	95
Vinyl Chloride	92
Freon 113	97
1,1-Dichloroethene	91
Acetone	95
Carbon Disulfide	88
Methylene Chloride	102
trans-1,2-Dichloroethene	98
Hexane	95
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	95
cis-1,2-Dichloroethene	97
Chloroform	97
1,1,1-Trichloroethane	95
Benzene	95
Trichloroethene	92
Toluene	93
1,1,2-Trichloroethane	93
Tetrachloroethene	98
Chlorobenzene	95
Ethyl Benzene	94
m,p-Xylene	94
o-Xylene	93
Styrene	92
Cumene	94
Propylbenzene	95
1,3,5-Trimethylbenzene	96
1,2,4-Trimethylbenzene	92
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	90
Vinyl Acetate	96
Octane	102
Pentane	102
Butylbenzene	96
Decane	98
Dodecane	84
sec-Butylbenzene	97
p-Cymene	96

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 1806244-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 09:44 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1806244-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 10:09 AM**	

Compound	%Recovery	Method Limits
Chloromethane	88	70-130
Vinyl Chloride	87	70-130
Freon 113	91	70-130
1,1-Dichloroethene	86	70-130
Acetone	86	70-130
Carbon Disulfide	84	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	101	70-130
Hexane	91	70-130
1,1-Dichloroethane	90	70-130
2-Butanone (Methyl Ethyl Ketone)	90	70-130
cis-1,2-Dichloroethene	82	70-130
Chloroform	90	70-130
1,1,1-Trichloroethane	92	70-130
Benzene	90	70-130
Trichloroethene	90	70-130
Toluene	92	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	96	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	96	70-130
o-Xylene	95	70-130
Styrene	97	70-130
Cumene	95	70-130
Propylbenzene	98	70-130
1,3,5-Trimethylbenzene	99	70-130
1,2,4-Trimethylbenzene	95	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	88	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 1806244-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 10:09 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1806244-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 10:34 AM**	

Compound	%Recovery	Method Limits
Chloromethane	88	70-130
Vinyl Chloride	86	70-130
Freon 113	92	70-130
1,1-Dichloroethene	83	70-130
Acetone	88	70-130
Carbon Disulfide	84	70-130
Methylene Chloride	94	70-130
trans-1,2-Dichloroethene	101	70-130
Hexane	90	70-130
1,1-Dichloroethane	89	70-130
2-Butanone (Methyl Ethyl Ketone)	89	70-130
cis-1,2-Dichloroethene	83	70-130
Chloroform	91	70-130
1,1,1-Trichloroethane	92	70-130
Benzene	94	70-130
Trichloroethene	94	70-130
Toluene	94	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	97	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	97	70-130
m,p-Xylene	96	70-130
o-Xylene	96	70-130
Styrene	96	70-130
Cumene	96	70-130
Propylbenzene	98	70-130
1,3,5-Trimethylbenzene	101	70-130
1,2,4-Trimethylbenzene	95	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	89	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 1806244-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3061504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/15/18 10:34 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	102	70-130

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7/9/2018

Mr. Justin Neste

CALIBRE, Environmental Technology Solutions

20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Boeing Renton

Project #:

Workorder #: 1806512

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 6/25/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1806512

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	Boeing Renton
FAX:		**PROJECT #**	Boeing Renton
DATE RECEIVED:	06/25/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	07/09/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-SVE-IN-062018	TO-15	0.5 psi	15.1 psi
02A	5-09-SVE-3-062018	TO-15	0.8 "Hg	15 psi
03A	4-78-SVE-IN-062018	TO-15	0.6 psi	15.2 psi
04A	4-78-SVE-6-062018	TO-15	2.4 "Hg	15.1 psi
05A	4-78-SVE-1-062018	TO-15	2.0 "Hg	15.3 psi
06A	4-78-SVE-10-062018	TO-15	2.2 "Hg	14.7 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 07/09/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1806512

Six 1 Liter Summa Canister samples were received on June 25, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for sample 4-78-SVE-1-062018 did not match the information on the canister with regard to canister identification. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

The Chain of Custody (COC) information for sample 4-78-SVE-10-062018 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-IN-062018

Lab ID#: 1806512-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.98	5.7	3.9	23
1,1,1-Trichloroethane	0.98	1.8	5.3	9.9
Trichloroethene	0.98	14	5.3	75
Tetrachloroethene	0.98	170	6.6	1100

Client Sample ID: 5-09-SVE-3-062018

Lab ID#: 1806512-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.0	11	4.1	42
1,1,1-Trichloroethane	1.0	3.4	5.7	19
Trichloroethene	1.0	24	5.6	130
Tetrachloroethene	1.0	310	7.0	2100

Client Sample ID: 4-78-SVE-IN-062018

Lab ID#: 1806512-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	0.98	3.4	7.5	26
cis-1,2-Dichloroethene	0.98	3.7	3.9	15
1,1,1-Trichloroethane	0.98	2.6	5.3	14
Trichloroethene	0.98	87	5.2	470
Tetrachloroethene	0.98	1.3	6.6	9.1

Client Sample ID: 4-78-SVE-6-062018

Lab ID#: 1806512-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	57	8.4	440
1,1-Dichloroethane	1.1	1.5	4.4	6.1
cis-1,2-Dichloroethene	1.1	2.7	4.4	11
Chloroform	1.1	3.4	5.4	16

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-6-062018

Lab ID#: 1806512-04A

1,1,1-Trichloroethane	1.1	4.2	6.0	23
Benzene	1.1	1.5	3.5	4.7
Trichloroethene	1.1	120	5.9	680
Tetrachloroethene	1.1	24	7.5	160

Client Sample ID: 4-78-SVE-1-062018

Lab ID#: 1806512-05A

No Detections Were Found.

Client Sample ID: 4-78-SVE-10-062018

Lab ID#: 1806512-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	11	8.3	81
Acetone	11	11	26	27
cis-1,2-Dichloroethene	1.1	15	4.3	61
1,1,1-Trichloroethane	1.1	11	5.9	62
Trichloroethene	1.1	300	5.8	1600
Tetrachloroethene	1.1	1.9	7.3	13

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Client Sample ID: 5-09-SVE-IN-062018

Lab ID#: 1806512-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070314**	**Date of Collection:**	**6/20/18 2:40:00 PM**
Dil. Factor:	**1.96**	**Date of Analysis:**	**7/3/18 06:59 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.8	Not Detected	20	Not Detected
Vinyl Chloride	0.98	Not Detected	2.5	Not Detected
Freon 113	0.98	Not Detected	7.5	Not Detected
1,1-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Acetone	9.8	Not Detected	23	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.8	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Hexane	0.98	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.98	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.98	5.7	3.9	23
Chloroform	0.98	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	0.98	1.8	5.3	9.9
Benzene	0.98	Not Detected	3.1	Not Detected
Trichloroethene	0.98	14	5.3	75
Toluene	0.98	Not Detected	3.7	Not Detected
1,1,2-Trichloroethane	0.98	Not Detected	5.3	Not Detected
Tetrachloroethene	0.98	170	6.6	1100
Chlorobenzene	0.98	Not Detected	4.5	Not Detected
Ethyl Benzene	0.98	Not Detected	4.2	Not Detected
m,p-Xylene	0.98	Not Detected	4.2	Not Detected
o-Xylene	0.98	Not Detected	4.2	Not Detected
Styrene	0.98	Not Detected	4.2	Not Detected
Cumene	0.98	Not Detected	4.8	Not Detected
Propylbenzene	0.98	Not Detected	4.8	Not Detected
1,3,5-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
1,2,4-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
TPH ref. to Gasoline (MW=100)	98	Not Detected	400	Not Detected
Acetonitrile	9.8	Not Detected	16	Not Detected
Vinyl Acetate	3.9	Not Detected	14	Not Detected
Octane	3.9	Not Detected	18	Not Detected
Pentane	3.9	Not Detected	12	Not Detected
Butylbenzene	3.9	Not Detected	22	Not Detected
Decane	3.9	Not Detected	23	Not Detected
Dodecane	9.8	Not Detected	68	Not Detected
sec-Butylbenzene	3.9	Not Detected	22	Not Detected
p-Cymene	3.9	Not Detected	22	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-IN-062018

Lab ID#: 1806512-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070314**	**Date of Collection:**	**6/20/18 2:40:00 PM**
Dil. Factor:	**1.96**	**Date of Analysis:**	**7/3/18 06:59 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 5-09-SVE-3-062018

Lab ID#: 1806512-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070315**	**Date of Collection:**	**6/20/18 2:50:00 PM**
Dil. Factor:	**2.08**	**Date of Analysis:**	**7/3/18 07:25 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Freon 113	1.0	Not Detected	8.0	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Acetone	10	Not Detected	25	Not Detected
Carbon Disulfide	4.2	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	36	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Hexane	1.0	Not Detected	3.7	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.2	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	11	4.1	42
Chloroform	1.0	Not Detected	5.1	Not Detected
1,1,1-Trichloroethane	1.0	3.4	5.7	19
Benzene	1.0	Not Detected	3.3	Not Detected
Trichloroethene	1.0	24	5.6	130
Toluene	1.0	Not Detected	3.9	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.7	Not Detected
Tetrachloroethene	1.0	310	7.0	2100
Chlorobenzene	1.0	Not Detected	4.8	Not Detected
Ethyl Benzene	1.0	Not Detected	4.5	Not Detected
m,p-Xylene	1.0	Not Detected	4.5	Not Detected
o-Xylene	1.0	Not Detected	4.5	Not Detected
Styrene	1.0	Not Detected	4.4	Not Detected
Cumene	1.0	Not Detected	5.1	Not Detected
Propylbenzene	1.0	Not Detected	5.1	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	420	Not Detected
Acetonitrile	10	Not Detected	17	Not Detected
Vinyl Acetate	4.2	Not Detected	15	Not Detected
Octane	4.2	Not Detected	19	Not Detected
Pentane	4.2	Not Detected	12	Not Detected
Butylbenzene	4.2	Not Detected	23	Not Detected
Decane	4.2	Not Detected	24	Not Detected
Dodecane	10	Not Detected	72	Not Detected
sec-Butylbenzene	4.2	Not Detected	23	Not Detected
p-Cymene	4.2	Not Detected	23	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: 5-09-SVE-3-062018

Lab ID#: 1806512-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070315**	**Date of Collection:**	**6/20/18 2:50:00 PM**
Dil. Factor:	**2.08**	**Date of Analysis:**	**7/3/18 07:25 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-IN-062018

Lab ID#: 1806512-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070323**	**Date of Collection:**	**6/20/18 3:17:00 PM**
Dil. Factor:	**1.95**	**Date of Analysis:**	**7/3/18 11:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.8	Not Detected	20	Not Detected
Vinyl Chloride	0.98	Not Detected	2.5	Not Detected
Freon 113	0.98	3.4	7.5	26
1,1-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Acetone	9.8	Not Detected	23	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.8	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Hexane	0.98	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.98	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.98	3.7	3.9	15
Chloroform	0.98	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	0.98	2.6	5.3	14
Benzene	0.98	Not Detected	3.1	Not Detected
Trichloroethene	0.98	87	5.2	470
Toluene	0.98	Not Detected	3.7	Not Detected
1,1,2-Trichloroethane	0.98	Not Detected	5.3	Not Detected
Tetrachloroethene	0.98	1.3	6.6	9.1
Chlorobenzene	0.98	Not Detected	4.5	Not Detected
Ethyl Benzene	0.98	Not Detected	4.2	Not Detected
m,p-Xylene	0.98	Not Detected	4.2	Not Detected
o-Xylene	0.98	Not Detected	4.2	Not Detected
Styrene	0.98	Not Detected	4.2	Not Detected
Cumene	0.98	Not Detected	4.8	Not Detected
Propylbenzene	0.98	Not Detected	4.8	Not Detected
1,3,5-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
1,2,4-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
TPH ref. to Gasoline (MW=100)	98	Not Detected	400	Not Detected
Acetonitrile	9.8	Not Detected	16	Not Detected
Vinyl Acetate	3.9	Not Detected	14	Not Detected
Octane	3.9	Not Detected	18	Not Detected
Pentane	3.9	Not Detected	12	Not Detected
Butylbenzene	3.9	Not Detected	21	Not Detected
Decane	3.9	Not Detected	23	Not Detected
Dodecane	9.8	Not Detected	68	Not Detected
sec-Butylbenzene	3.9	Not Detected	21	Not Detected
p-Cymene	3.9	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-IN-062018

Lab ID#: 1806512-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070323**	**Date of Collection:**	**6/20/18 3:17:00 PM**
Dil. Factor:	**1.95**	**Date of Analysis:**	**7/3/18 11:30 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: 4-78-SVE-6-062018

Lab ID#: 1806512-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070321**	**Date of Collection:**	**6/20/18 3:25:00 PM**
Dil. Factor:	**2.20**	**Date of Analysis:**	**7/3/18 10:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	57	8.4	440
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	Not Detected	26	Not Detected
Carbon Disulfide	4.4	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	1.5	4.4	6.1
2-Butanone (Methyl Ethyl Ketone)	4.4	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	2.7	4.4	11
Chloroform	1.1	3.4	5.4	16
1,1,1-Trichloroethane	1.1	4.2	6.0	23
Benzene	1.1	1.5	3.5	4.7
Trichloroethene	1.1	120	5.9	680
Toluene	1.1	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Tetrachloroethene	1.1	24	7.5	160
Chlorobenzene	1.1	Not Detected	5.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Cumene	1.1	Not Detected	5.4	Not Detected
Propylbenzene	1.1	Not Detected	5.4	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	450	Not Detected
Acetonitrile	11	Not Detected	18	Not Detected
Vinyl Acetate	4.4	Not Detected	15	Not Detected
Octane	4.4	Not Detected	20	Not Detected
Pentane	4.4	Not Detected	13	Not Detected
Butylbenzene	4.4	Not Detected	24	Not Detected
Decane	4.4	Not Detected	26	Not Detected
Dodecane	11	Not Detected	77	Not Detected
sec-Butylbenzene	4.4	Not Detected	24	Not Detected
p-Cymene	4.4	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-6-062018

Lab ID#: 1806512-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070321**	**Date of Collection:**	**6/20/18 3:25:00 PM**
Dil. Factor:	**2.20**	**Date of Analysis:**	**7/3/18 10:38 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: 4-78-SVE-1-062018

Lab ID#: 1806512-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070324**	**Date of Collection:**	**6/20/18 3:35:00 PM**
Dil. Factor:	**2.19**	**Date of Analysis:**	**7/3/18 11:57 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	Not Detected	8.4	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Acetone	11	Not Detected	26	Not Detected
Carbon Disulfide	4.4	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Hexane	1.1	Not Detected	3.8	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.4	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Chloroform	1.1	Not Detected	5.3	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Benzene	1.1	Not Detected	3.5	Not Detected
Trichloroethene	1.1	Not Detected	5.9	Not Detected
Toluene	1.1	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Tetrachloroethene	1.1	Not Detected	7.4	Not Detected
Chlorobenzene	1.1	Not Detected	5.0	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Cumene	1.1	Not Detected	5.4	Not Detected
Propylbenzene	1.1	Not Detected	5.4	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	450	Not Detected
Acetonitrile	11	Not Detected	18	Not Detected
Vinyl Acetate	4.4	Not Detected	15	Not Detected
Octane	4.4	Not Detected	20	Not Detected
Pentane	4.4	Not Detected	13	Not Detected
Butylbenzene	4.4	Not Detected	24	Not Detected
Decane	4.4	Not Detected	25	Not Detected
Dodecane	11	Not Detected	76	Not Detected
sec-Butylbenzene	4.4	Not Detected	24	Not Detected
p-Cymene	4.4	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-1-062018

Lab ID#: 1806512-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070324**	**Date of Collection:**	**6/20/18 3:35:00 PM**
Dil. Factor:	**2.19**	**Date of Analysis:**	**7/3/18 11:57 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: 4-78-SVE-10-062018

Lab ID#: 1806512-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070322**	**Date of Collection:**	**6/20/18 3:30:00 PM**
Dil. Factor:	**2.16**	**Date of Analysis:**	**7/3/18 11:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	22	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	11	8.3	81
1,1-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Acetone	11	11	26	27
Carbon Disulfide	4.3	Not Detected	13	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Hexane	1.1	Not Detected	3.8	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.3	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	15	4.3	61
Chloroform	1.1	Not Detected	5.3	Not Detected
1,1,1-Trichloroethane	1.1	11	5.9	62
Benzene	1.1	Not Detected	3.4	Not Detected
Trichloroethene	1.1	300	5.8	1600
Toluene	1.1	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	5.9	Not Detected
Tetrachloroethene	1.1	1.9	7.3	13
Chlorobenzene	1.1	Not Detected	5.0	Not Detected
Ethyl Benzene	1.1	Not Detected	4.7	Not Detected
m,p-Xylene	1.1	Not Detected	4.7	Not Detected
o-Xylene	1.1	Not Detected	4.7	Not Detected
Styrene	1.1	Not Detected	4.6	Not Detected
Cumene	1.1	Not Detected	5.3	Not Detected
Propylbenzene	1.1	Not Detected	5.3	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.3	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.3	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	440	Not Detected
Acetonitrile	11	Not Detected	18	Not Detected
Vinyl Acetate	4.3	Not Detected	15	Not Detected
Octane	4.3	Not Detected	20	Not Detected
Pentane	4.3	Not Detected	13	Not Detected
Butylbenzene	4.3	Not Detected	24	Not Detected
Decane	4.3	Not Detected	25	Not Detected
Dodecane	11	Not Detected	75	Not Detected
sec-Butylbenzene	4.3	Not Detected	24	Not Detected
p-Cymene	4.3	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-062018

Lab ID#: 1806512-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070322**	**Date of Collection:**	**6/20/18 3:30:00 PM**
Dil. Factor:	**2.16**	**Date of Analysis:**	**7/3/18 11:04 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1806512-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070311a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 05:43 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: Lab Blank

Lab ID#: 1806512-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070311a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 05:43 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1806512-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:04 AM**	

Compound	%Recovery
Chloromethane	90
Vinyl Chloride	89
Freon 113	93
1,1-Dichloroethene	86
Acetone	92
Carbon Disulfide	84
Methylene Chloride	98
trans-1,2-Dichloroethene	94
Hexane	91
1,1-Dichloroethane	94
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	92
Chloroform	94
1,1,1-Trichloroethane	92
Benzene	93
Trichloroethene	92
Toluene	92
1,1,2-Trichloroethane	92
Tetrachloroethene	98
Chlorobenzene	94
Ethyl Benzene	92
m,p-Xylene	92
o-Xylene	91
Styrene	88
Cumene	92
Propylbenzene	93
1,3,5-Trimethylbenzene	94
1,2,4-Trimethylbenzene	89
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	90
Vinyl Acetate	94
Octane	98
Pentane	103
Butylbenzene	98
Decane	98
Dodecane	98
sec-Butylbenzene	101
p-Cymene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 1806512-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:04 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	101	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1806512-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:29 AM**	

Compound	%Recovery	Method Limits
Chloromethane	92	70-130
Vinyl Chloride	90	70-130
Freon 113	91	70-130
1,1-Dichloroethene	84	70-130
Acetone	85	70-130
Carbon Disulfide	84	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	101	70-130
Hexane	90	70-130
1,1-Dichloroethane	91	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	85	70-130
Chloroform	92	70-130
1,1,1-Trichloroethane	92	70-130
Benzene	92	70-130
Trichloroethene	93	70-130
Toluene	92	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	96	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	94	70-130
m,p-Xylene	93	70-130
o-Xylene	95	70-130
Styrene	95	70-130
Cumene	94	70-130
Propylbenzene	96	70-130
1,3,5-Trimethylbenzene	98	70-130
1,2,4-Trimethylbenzene	94	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	92	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 1806512-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:29 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1806512-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:54 AM**	

Compound	%Recovery	Method Limits
Chloromethane	88	70-130
Vinyl Chloride	87	70-130
Freon 113	90	70-130
1,1-Dichloroethene	84	70-130
Acetone	88	70-130
Carbon Disulfide	84	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	102	70-130
Hexane	90	70-130
1,1-Dichloroethane	90	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	83	70-130
Chloroform	90	70-130
1,1,1-Trichloroethane	91	70-130
Benzene	94	70-130
Trichloroethene	94	70-130
Toluene	94	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	98	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	94	70-130
o-Xylene	94	70-130
Styrene	96	70-130
Cumene	95	70-130
Propylbenzene	97	70-130
1,3,5-Trimethylbenzene	99	70-130
1,2,4-Trimethylbenzene	94	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	92	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 1806512-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3070304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/3/18 11:54 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	102	70-130