

GROUNDWATER MONITORING TECHNICAL
MEMORANDUM

FEBRUARY 2018 MONITORING EVENT

PSE Former Olympia MGP Site (Site)
320 Columbia Street NW
Olympia, Washington



17425 NE Union Hill Road
Suite 250
Redmond, Washington 98052
Telephone: 425.861.6000
Fax: 425.861.6050

| | |
|--|---|
| Report date: | April 5, 2018 |
| GeoEngineers file number: | 0186-774-05 |
| Client: | Greg Andrina, Puget Sound Energy 10885 NE 4 th Street, PSE-9S, Bellevue, Washington 98004-5591 |
| GeoEngineers project manager: | Nick Rohrbach |
| Sampling dates: | February 14, 2018 |
| Wells gauged and sampled: | On-property wells: MW-14 and MW-15. Off-property wells: MW-6, MW-10, and MW16. |
| Purging/sampling methods: | Low-flow methods with peristaltic pump and dedicated tubing. |
| Non-aqueous phase liquid observations (well/thickness): | Not observed in any wells. |
| Groundwater levels and gradients: | The measured depths to groundwater in the five shallow monitoring wells gauged and sampled in February 2018 ranged from 4.01 to 5.53 feet below the top of the well casings (Table 1). The calculated groundwater elevations in these wells are shown in Table 1. Inferred groundwater elevation contours are not presented in this report because the groundwater table in the Site vicinity is relatively flat and exhibits no consistent gradient based on current and historical monitoring results. |
| Groundwater levels/gradients similar to previous monitoring events? | The groundwater elevations in the five shallow monitoring wells were within the range of elevations previously measured in these wells. The calculated February 2018 groundwater elevations are slightly higher than the groundwater elevations observed in February 2015. The groundwater table beneath the property was likely influenced by higher amounts of precipitation during the current winter season. |
| Groundwater chemical analysis: | The groundwater samples collected during the February 2018 monitoring event were analyzed for one or more of the following constituents: <ul style="list-style-type: none">• Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by US Environmental Protection Agency (EPA) Method 8270D-SIM (samples collected from all wells);• Benzene by EPA Method 8260C (samples collected from wells MW-10, MW-14 and MW-15);• Diesel- and lube oil- range petroleum hydrocarbons by Washington State Department of Ecology (Ecology) approved method MWTH-Dx (samples collected from wells MW-14 and MW-15);• Total and dissolved lead by EPA Method 200.8/SW7470A (samples collected from wells MW-14 and MW-15);• Total and dissolved mercury by EPA Method 200.8/SW7470A (samples collected from wells MW-6, MW-10, MW-14 and MW-16). |

Summary of groundwater chemical analytical results:

The analytical results are presented in Table 2. No analytes were detected in the groundwater samples submitted for analysis. The PQLs for non-detected constituents were less than the MTCA Method A cleanup levels.

Attachments:

- Table 1. Measured Groundwater Levels in Monitoring Wells, 2008-2018
- Table 2. Groundwater Chemical Analytical Results, (August 2013, February 2015, August 2016 and February 2018)
- Figure 1. Vicinity Map
- Figure 2. February 2018 Groundwater Compliance Monitoring Locations
- Attachment A. Data Validation Report
- Attachment B. Laboratory Analytical Reports

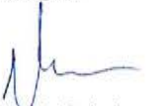
Distribution:

One electronic copy submitted to Greg Andrina

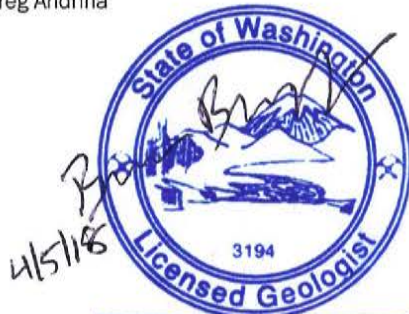
Sincerely,
GeoEngineers, Inc.



Brandon M. Brayfield, LG
Geologist



Nick E. Rohrbach
Senior Environmental Scientist



BRANDON BRAYFIELD



Stephen C. Woodward, LG
Principal

BMB:NER:SCW:lw

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

We have prepared this report for the exclusive use of PSE, their authorized agents, and regulatory agencies. No other party may place reliance on the product of our services unless we agree in advance and in writing to such reliance. Our services were provided in accordance with our agreement with PSE. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Table 1
Measured Groundwater Levels in Monitoring Wells
2008-2018
PSE Former Olympia MGP Site
Olympia, Washington

| Monitoring Well | Screened Interval (feet bgs) | Shallow/Deep Well | Top-of-Casing Elevation ¹ (feet NAVD88) | Date | Measured Depth to Groundwater ² (feet below TOC) | Calculated Groundwater Elevation (feet NAVD88) |
|--------------------|------------------------------|-------------------|--|----------|---|--|
| MW-6 ³ | 11.1 ³ | Shallow | 13.69 | 8/26/08 | 5.37 | 8.32 |
| | | | | 10/6/08 | 5.37 | 8.32 |
| | | | | 11/3/09 | 5.08 | 8.61 |
| | | | | 2/15/10 | 4.46 | 9.23 |
| | | | | 5/26/10 | 5.08 | 8.61 |
| | | | | 1/6/11 | 4.88 | 8.81 |
| | | | | 4/19/11 | 4.90 | 8.79 |
| | | | | 7/18/11 | NM | - |
| | | | | 10/18/11 | NM | - |
| | | | | 8/26/13 | 5.16 | 8.53 |
| | | | | 2/26/15 | 4.78 | 8.91 |
| | | | | 8/24/16 | 5.07 | 8.62 |
| | | | | 2/14/18 | 4.31 | 9.38 |
| MW-10 ³ | 14.0 ³ | Shallow | 13.76 | 8/26/08 | 5.31 | 8.45 |
| | | | | 10/6/08 | 5.25 | 8.51 |
| | | | | 11/3/09 | 5.14 | 8.62 |
| | | | | 2/15/10 | 4.66 | 9.1 |
| | | | | 5/26/10 | 4.96 | 8.8 |
| | | | | 1/6/11 | 4.91 | 8.85 |
| | | | | 4/19/11 | 4.92 | 8.84 |
| | | | | 7/18/11 | NM | - |
| | | | | 10/18/11 | NM | - |
| | | | | 8/26/13 | 5.30 | 8.46 |
| | | | | 2/26/15 | 4.91 | 8.85 |
| | | | | 8/24/16 | 5.30 | 8.46 |
| | | | | 2/14/18 | 4.81 | 8.95 |
| MW-14 ⁴ | 4 to 20 | Shallow | 14.64 | 8/26/13 | 6.24 | 8.40 |
| | | | | 2/26/15 | 5.95 | 8.69 |
| | | | | 8/24/16 | 6.21 | 8.43 |
| | | | | 2/14/18 | 5.53 | 9.11 |
| MW-15 ⁴ | 4 to 20 | Shallow | 14.20 | 8/26/13 | 5.81 | 8.39 |
| | | | | 2/26/15 | 5.38 | 8.82 |
| | | | | 8/24/16 | 5.79 | 8.41 |
| | | | | 2/14/18 | 4.98 | 9.22 |
| MW-16 ⁴ | 4 to 20 | Shallow | 13.39 | 8/26/13 | 4.98 | 8.41 |
| | | | | 2/26/15 | 4.51 | 8.88 |
| | | | | 8/24/16 | 4.86 | 8.53 |
| | | | | 2/14/18 | 4.01 | 9.38 |

Notes:

¹MW-6 and MW-10 Elevations surveyed in December 2010 by Barghausen Consulting Engineers, Inc. relative to NAVD88. MW-14, MW-15, and MW-16 elevations are based on a laser level survey (utilizing the same datum) performed by GeoEngineers.

²Water levels measured with an electronic water level indicator.

³Pre-existing monitoring well installed by others; screened interval unknown. Value shown for bottom of screened interval is the approximate depth to bottom of well casing measured with an electronic water level indicator on February 15, 2010.

⁴Monitoring well installed by Cascade Drilling and observed by GeoEngineers in August 2013.

bgs = Below ground surface

MW = Monitoring well

NAVD88 = North American Vertical Datum of 1988.

NM = Not measured

TOC = Top of well casing

Table 2
Groundwater Chemical Analytical Results (August 2013, February 2015, August 2016, and February 2018)
PSE Former Olympia MGP Site
Olympia, Washington

| Analyte | Units | Location ID Sample ID Sample Date | MW-6 | MW-6 | MW-6 | MW-6 | MW-10 | MW-10 | MW-10 | MW-10 | MW-14 | MW-14 | MW-14 | MW-14 |
|--|-------|---|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | MW-6-082613-W 8/26/2013 | MW-6-022615-W 2/26/2015 | MW-6-082416-W 8/24/2016 | MW-6-021418-W 2/14/2018 | MW-10-082613-W 8/26/2013 | MW-10-022615-W 2/26/2015 | MW-10-082416-W 8/24/2016 | MW-10-021418-W 2/14/2018 | MW-14-082613-W 8/26/2013 | MW-14-022615-W 2/26/2015 | MW-14-082416-W 8/24/2016 | MW-14-021418-W 2/14/2018 |
| Benzene by 8260C | | | | | | | | | | | | | | |
| Benzene | µg/L | 5 | -- | -- | -- | -- | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Total Petroleum Hydrocarbons (NWTPH-Dx) | | | | | | | | | | | | | | |
| Diesel-range hydrocarbons | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | -- | -- | 0.26 U | 0.26 U | 0.26 U | 0.26 U |
| Lube Oil-range hydrocarbons | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | -- | -- | 0.41 U | 0.41 U | 0.42 U | 0.41 U |
| cPAHs by 8270D-SIM | | | | | | | | | | | | | | |
| Benzo(a)anthracene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.018 | 0.010 U |
| Chrysene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.013 | 0.010 U |
| Benzo(b)fluoranthene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.0096 U | 0.010 U |
| Benzo(j,k)fluoranthene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.0096 U | 0.010 U |
| Benzo(a)pyrene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.0096 U | 0.010 U |
| Indeno(1,2,3-cd)pyrene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.0096 U | 0.010 U |
| Dibenzo(a,h)anthracene | µg/L | NE | 0.0095 U | 0.0097 U | 0.0097 U | 0.010 U | 0.0094 U | 0.0094 U | 0.0095 U | 0.010 U | 0.0094 U | 0.0095 U | 0.0096 U | 0.010 U |
| Total cPAHs TEC | µg/L | 0.1 | 0.0072 UT | 0.0073 UT | 0.0073 UT | 0.0076 UT | 0.0071 UT | 0.0076 T | 0.0072 UT | 0.0076 UT | 0.0071 UT | 0.0072 UT | 0.0087 T | 0.0076 UT |
| Metals by 200.8/7470 | | | | | | | | | | | | | | |
| Total Lead | mg/L | 0.015 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U |
| Dissolved Lead ² | mg/L | 0.015 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U |
| Total Mercury | mg/L | 0.002 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Dissolved Mercury ² | mg/L | 0.002 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

Notes:

¹Model Toxics Control Act (MTCA) Method A cleanup levels for potable groundwater (Washington Administrative Code [WAC] 173-340-720[3]).

²Groundwater samples analyzed for dissolved metals were field-filtered with a 45 micron filter.

*Field duplicate sample of MW-14.

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

mg/L = milligrams per liter

NE = Cleanup level not established

T = Calculated by GeoEngineers.

TEC = Total toxic equivalent concentration calculated by GeoEngineers per WAC 173-340-708[8][e][iii][A]. For non-detected constituents, one-half the method reporting limit was used in the calculation. All values calculated using toxicity equivalency factors from WAC 173-340 Table 708-2 (Nov. 2007).

U = The analyte was analyzed for, but was not detected above the listed method reporting limit.

µg/L = micrograms per liter

-- = Constituent not analyzed

Chemical analyses performed by OnSite Environmental, Inc. in Redmond, Washington.

Table 2 (cont.)

Groundwater Chemical Analytical Results (August 2013, February 2015, August 2016, and February 2018)

PSE Former Olympia MGP Site

Olympia, Washington

| Analyte | Units | Location ID Sample ID Sample Date | MW-14 (Dup)* | MW-14 (Dup)* | MW-14 (Dup)* | MW-14 (Dup)* | MW-15 | MW-15 | MW-15 | MW-15 | MW-16 | MW-16 | MW-16 | MW-16 |
|--|-------|---|------------------------------|------------------------------|------------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | MW-DUP-052613-W 8/26/2013 | MW-DUP-022615-W 2/26/2015 | MW-DUP-082416-W 8/24/2016 | MW-DUP-021418 2/14/2018 | MW-15-082613-W 8/26/2013 | MW-15-022615-W 2/26/2015 | MW-15-082416-W 8/24/2016 | MW-15-021418-W 2/14/2018 | MW-16-082613-W 8/26/2013 | MW-16-022615-W 2/26/2015 | MW-16-082416-W 8/24/2016 | MW-16-021418-W 2/14/2018 |
| | | MTCA Method A Cleanup Level ¹ | | | | | | | | | | | | |
| Benzene by 8260C | | | | | | | | | | | | | | |
| Benzene | µg/L | 5 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | -- | -- | -- |
| Total Petroleum Hydrocarbons (NWTPH-Dx) | | | | | | | | | | | | | | |
| Diesel-range hydrocarbons | mg/L | 0.5 | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | -- | -- | -- |
| Lube Oil-range hydrocarbons | mg/L | 0.5 | 0.42 U | 0.41 U | 0.41 U | 0.41 U | 0.41 U | 0.41 U | 0.41 U | 0.41 U | 0.41 U | -- | -- | -- |
| cPAHs by 8270D-SIM | | | | | | | | | | | | | | |
| Benzo(a)anthracene | µg/L | NE | 0.0095 U | 0.0094 U | 0.016 | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Chrysene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Benzo(b)fluoranthene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Benzo(j,k)fluoranthene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Benzo(a)pyrene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Indeno(1,2,3-cd)pyrene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Dibenzo(a,h)anthracene | µg/L | NE | 0.0095 U | 0.0094 U | 0.0094 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0096 U | 0.010 U | 0.0095 U | 0.0095 U | 0.0097 U | 0.011 U |
| Total cPAHs TEC | µg/L | 0.1 | 0.0072 UT | 0.0071 UT | 0.0082 T | 0.0076 UT | 0.0072 UT | 0.0072 UT | 0.0072 UT | 0.0076 UT | 0.0072 UT | 0.0072 UT | 0.0073 UT | 0.0083 UT |
| Metals by 200.8/7470 | | | | | | | | | | | | | | |
| Total Lead | mg/L | 0.015 | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | 0.0011 U | -- | -- | -- |
| Dissolved Lead ² | mg/L | 0.015 | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | 0.0010 U | -- | -- | -- |
| Total Mercury | mg/L | 0.002 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | -- | -- | -- | -- | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Dissolved Mercury ² | mg/L | 0.002 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | -- | -- | -- | -- | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

Notes: (from Page 1)

¹Model Toxics Control Act (MTCA) Method A cleanup levels for potable groundwater (Washington Administrative Code [WAC] 173-340-720[3]).

²Groundwater samples analyzed for dissolved metals were field-filtered with a 45 micron filter.

*Field duplicate sample of MW-14.

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

mg/L = milligrams per liter

NE = Cleanup level not established

T = Calculated by GeoEngineers.

TEC = Total toxic equivalent concentration calculated by GeoEngineers per WAC 173-340-708[8][e][iii][A]. For non-detected constituents, one-half the method reporting limit was used in the calculation. All values calculated using toxicity equivalency factors from WAC 173-340 Table 708-2 (Nov. 2007).

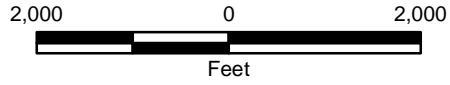
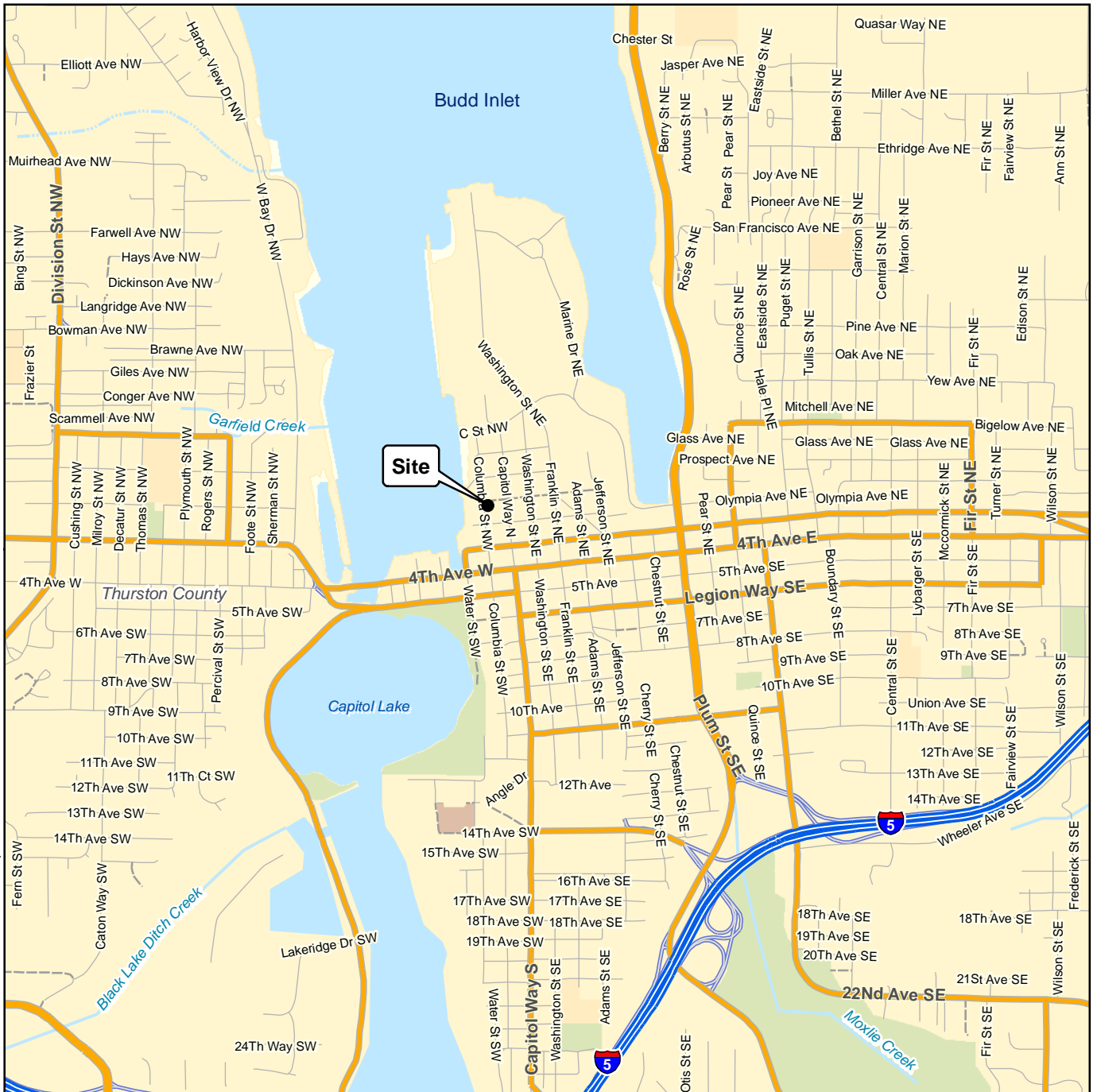
U = The analyte was analyzed for, but was not detected above the listed method reporting limit.

µg/L = micrograms per liter

-- = Constituent not analyzed

Chemical analyses performed by OnSite Environmental, Inc. in Redmond, Washington.

Office: SEA Path: \\seal\projects\010186774\GIS\018677400_F1_VM.mxd Map Revised: 14 October 2011 amanza



- Notes:
1. The locations of all features shown are approximate.
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
 3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

| | |
|--|-----------------|
| Vicinity Map | |
| Former Olympia MGP Site Olympia, Washington | |
| | Figure 1 |

ATTACHMENT A
Data Validation Report

Project: PSE - Columbia Street Manufactured Gas Plant Property
February 2018 Groundwater Samples

GEI File No.: 0186-774-05

Date: February 27, 2018

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of groundwater samples collected as part of the February 2018 sampling event, and the associated laboratory and field quality control (QC) samples. The samples were obtained from the 320 Columbia Street NW Site located in Olympia, Washington.

OBJECTIVE AND QUALITY CONTROL ELEMENTS

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2016a) and Inorganic Superfund Data Review (USEPA, 2016b) (National Functional Guidelines) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with the Quality Assurance Project Plan (QAPP), Appendix B of the Groundwater Compliance Monitoring Plan (GeoEngineers, 2013), the data validation included review of the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries
- Method and Trip Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Laboratory/Field Duplicates

VALIDATED SAMPLE DELIVERY GROUPS

This data validation included review of the sample delivery group (SDG) listed below in Table 1.

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

| Laboratory SDG | Samples Validated |
|----------------|---|
| 1802-160 | MW-6-021418-W, MW-10-021418-W, MW-14-021418-W, MW-DUP-021418, MW-15-021418-W, MW-16-021418-W, Trip Blank-021418 |

CHEMICAL ANALYSIS PERFORMED

OnSite Environmental, Inc. (OnSite), located in Redmond, Washington, performed laboratory analysis on the groundwater samples using one or more of the following methods:

- Petroleum Hydrocarbons (NWTPH-Dx) by Method NWTPH-Dx;
- Benzene by Method SW 8260C;
- Polycyclic Aromatic Hydrocarbons (PAHs) by Method SW 8270D-SIM;
- Total Metals by Methods EPA 200.8 and EPA 7470A; and
- Dissolved Metals by Methods EPA 200.8 and EPA 7470A

DATA VALIDATION SUMMARY

The results for each of the QC elements are summarized below.

Data Package Completeness

OnSite provided the required deliverables for the data validation according to the National Functional Guidelines. The laboratory followed adequate corrective action processes and the identified anomalies were discussed in the relevant laboratory case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COCs were accurate and complete when submitted to the laboratory.

Holding Times and Sample Preservation

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for each analysis. The sample coolers arrived at the laboratory outside the appropriate temperatures of between two and six degrees Celsius. The out-of-compliance temperatures are detailed below.

SDG 1802-160: Four sample cooler temperatures were recorded at the laboratory at -1.0, -1.0, 0.0, and 1.0 degree Celsius. It was determined through professional judgment that since the samples were not frozen, these temperatures should not affect the sample analytical results.



Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in an environmental sample. Surrogates are used for organic analyses and are added to the samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recoveries are calculated following analysis. The surrogate percent recoveries for field samples were within the laboratory control limits.

Method and Trip Blanks

Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. A method blank was analyzed with each batch of samples, at a frequency of 1 per 20 samples. For each sample batch, method blanks for the applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in the method blanks.

Trip Blanks

Trip blanks are analyzed to assess whether field sampling or sample transport processes may have introduced measurable concentrations of volatile analytes of interest into project samples. None of the analytes of interest were detected above the reporting limits in the trip blank.

Matrix Spikes/Matrix Spike Duplicates

Since the actual analyte concentration in an environmental sample is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis on one sample from the associated batch, known as the parent sample. One aliquot of the sample is analyzed in the normal manner and then a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery is calculated. Matrix spike duplicate (MSD) analyses are generally performed for organic analyses as a precision check and analyzed in the same sequence as a matrix spike. Using the result values from the MS and MSD, the relative percent difference (RPD) is calculated. The percent recovery control limits for MS and MSD analyses are specified in the laboratory documents, as are the RPD control limits for MS/MSD sample sets.

One MS/MSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for each analysis and the percent recovery and RPD values were within the proper control limits.

Laboratory Control Samples/Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. Given that matrix interference is not an issue, the LCS/LCSD control limits for accuracy and precision are usually more rigorous than for MS/MSD analyses. Additionally, data qualification based on LCS/LCSD analyses would apply to each sample in the associated batch, instead of just the parent sample. The percent recovery control limits for LCS and LCSD analyses are specified in the laboratory documents, as are the RPD control limits for LCS/LCSD sample sets.

One LCS/LCSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for each analysis and the percent recovery and RPD values were within the proper control limits.

Laboratory Duplicates

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the samples used has a concentration less than five times the reporting limit for that sample, the absolute difference is used instead of the RPD. The RPD control limits are specified in the laboratory documents.

Field Duplicates

In order to assess precision, a field duplicate sample was collected and analyzed along with the reviewed sample batches. The duplicate sample was analyzed for the same parameters as the associated parent sample. Precision is determined by calculating the RPD of sample concentrations between each pair of samples. If one or more of the sample analytes has a concentration less than five times the reporting limit for that sample, then the absolute difference is used instead of the RPD. The RPD control limit for water samples is 35 percent.

SDG 1802-160: One field duplicate sample pair, MW-14-021418-W and MW-DUP-021418, was submitted with this SDG. The precision criteria for the target analytes were met for this sample pair.

OVERALL ASSESSMENT

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD, MS/MSD, and laboratory/field duplicate RPD values.

No analytical results were qualified. The data are acceptable for the intended use.

REFERENCES

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA), 2016a. "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-2016-002. September 2016.

U.S. Environmental Protection Agency (USEPA), 2016b. "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review," EPA-540-R-2016-001. September 2016.

GeoEngineers, Inc. "Groundwater Compliance Monitoring Plan," prepared for Puget Sound Energy. October 8, 2013.



ATTACHMENT B
Laboratory Analytical Reports



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

February 26, 2018

Nick Rohrbach
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0186-774-05; PSE - Columbia St. MGP Site
Laboratory Reference No. 1802-160

Dear Nick:

Enclosed are the analytical results and associated quality control data for samples submitted on February 15, 2018.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal stroke extending to the right.

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

Case Narrative

Samples were collected on February 14, 2018 and received by the laboratory on February 15, 2018. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

ANALYTICAL REPORT FOR SAMPLES

| Client ID | Laboratory ID | Matrix | Date Sampled | Date Received | Notes |
|-------------------|---------------|--------|--------------|---------------|-------|
| MW-6-021418-W | 02-160-01 | Water | 2-14-18 | 2-15-18 | |
| MW-16-021418-W | 02-160-02 | Water | 2-14-18 | 2-15-18 | |
| MW-10-021418-W | 02-160-03 | Water | 2-14-18 | 2-15-18 | |
| MW-14-021418-W | 02-160-04 | Water | 2-14-18 | 2-15-18 | |
| MW-15-021418-W | 02-160-05 | Water | 2-14-18 | 2-15-18 | |
| MW-DUP-021418 | 02-160-06 | Water | 2-14-18 | 2-15-18 | |
| Trip Blank-021418 | 02-160-07 | Water | 2-14-18 | 2-15-18 | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

NWTPH-Dx

Matrix: Water
 Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|----------|---------------|---------------|-------|
| Client ID: | MW-14-021418-W | | | | | |
| Laboratory ID: | 02-160-04 | | | | | |
| Diesel Range Organics | ND | 0.26 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| Lube Oil Range Organics | ND | 0.41 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>o-Terphenyl</i> | 92 | 50-150 | | | | |
| Client ID: | MW-15-021418-W | | | | | |
| Laboratory ID: | 02-160-05 | | | | | |
| Diesel Range Organics | ND | 0.26 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| Lube Oil Range Organics | ND | 0.41 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>o-Terphenyl</i> | 94 | 50-150 | | | | |
| Client ID: | MW-DUP-021418 | | | | | |
| Laboratory ID: | 02-160-06 | | | | | |
| Diesel Range Organics | ND | 0.26 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| Lube Oil Range Organics | ND | 0.41 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>o-Terphenyl</i> | 88 | 50-150 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

BENZENE EPA 8260C

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|-------------------------|-----------------------|-----------|---------------|---------------|-------|
| Client ID: | MW-10-021418-W | | | | | |
| Laboratory ID: | 02-160-03 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 101 | 75-127 | | | | |
| <i>Toluene-d8</i> | 107 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 97 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

BENZENE EPA 8260C

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|-------------------------|-----------------------|-----------|---------------|---------------|-------|
| Client ID: | MW-14-021418-W | | | | | |
| Laboratory ID: | 02-160-04 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 98 | 75-127 | | | | |
| <i>Toluene-d8</i> | 106 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 97 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

BENZENE EPA 8260C

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|-------------------------|-----------------------|-----------|---------------|---------------|-------|
| Client ID: | MW-15-021418-W | | | | | |
| Laboratory ID: | 02-160-05 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 102 | 75-127 | | | | |
| <i>Toluene-d8</i> | 111 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 100 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

BENZENE EPA 8260C

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|-------------------------|-----------------------|-----------|---------------|---------------|-------|
| Client ID: | MW-DUP-021418 | | | | | |
| Laboratory ID: | 02-160-06 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 98 | 75-127 | | | | |
| <i>Toluene-d8</i> | 106 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 97 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

BENZENE EPA 8260C

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|--------------------------|-----------------------|-----------|---------------|---------------|-------|
| Client ID: | Trip Blank-021418 | | | | | |
| Laboratory ID: | 02-160-07 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 96 | 75-127 | | | | |
| <i>Toluene-d8</i> | 105 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 97 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-6-021418-W | | | | | |
| Laboratory ID: | 02-160-01 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo(j,k)fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>55</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>65</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>71</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-16-021418-W | | | | | |
| Laboratory ID: | 02-160-02 | | | | | |
| Benzo[a]anthracene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo(j,k)fluoranthene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.011 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>69</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>80</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>85</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-10-021418-W | | | | | |
| Laboratory ID: | 02-160-03 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo(j,k)fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>72</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>87</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>90</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-14-021418-W | | | | | |
| Laboratory ID: | 02-160-04 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo(j,k)fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>62</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>85</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>89</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-15-021418-W | | | | | |
| Laboratory ID: | 02-160-05 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo(j,k)fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>59</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>79</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>82</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

cPAHs EPA 8270D/SIM

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|---------------|---------------|-------|
| Client ID: | MW-DUP-021418 | | | | | |
| Laboratory ID: | 02-160-06 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Benzo(j,k)fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-17-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>2-Fluorobiphenyl</i> | <i>55</i> | <i>25 - 107</i> | | | | |
| <i>Pyrene-d10</i> | <i>85</i> | <i>28 - 103</i> | | | | |
| <i>Terphenyl-d14</i> | <i>89</i> | <i>36 - 129</i> | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL METALS
 EPA 200.8/7470A**

Matrix: Water
 Units: ug/L (ppb)

| Analyte | Result | PQL | EPA Method | Date Prepared | Date Analyzed | Flags |
|---------------------------|--------|------|------------|---------------|---------------|-------|
| Lab ID: 02-160-01 | | | | | | |
| Client ID: MW-6-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | 2-21-18 | 2-21-18 | |
| Lab ID: 02-160-02 | | | | | | |
| Client ID: MW-16-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | 2-21-18 | 2-21-18 | |
| Lab ID: 02-160-03 | | | | | | |
| Client ID: MW-10-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | 2-21-18 | 2-21-18 | |
| Lab ID: 02-160-04 | | | | | | |
| Client ID: MW-14-021418-W | | | | | | |
| Lead | ND | 1.1 | 200.8 | 2-23-18 | 2-23-18 | |
| Mercury | ND | 0.50 | 7470A | 2-21-18 | 2-21-18 | |
| Lab ID: 02-160-05 | | | | | | |
| Client ID: MW-15-021418-W | | | | | | |
| Lead | ND | 1.1 | 200.8 | 2-23-18 | 2-23-18 | |
| Lab ID: 02-160-06 | | | | | | |
| Client ID: MW-DUP-021418 | | | | | | |
| Lead | ND | 1.1 | 200.8 | 2-23-18 | 2-23-18 | |
| Mercury | ND | 0.50 | 7470A | 2-21-18 | 2-21-18 | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
 Units: ug/L (ppb)

| Analyte | Result | PQL | EPA Method | Date Prepared | Date Analyzed | Flags |
|---------------------------|--------|------|------------|---------------|---------------|-------|
| Lab ID: 02-160-01 | | | | | | |
| Client ID: MW-6-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | | 2-21-18 | |
| Lab ID: 02-160-02 | | | | | | |
| Client ID: MW-16-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | | 2-21-18 | |
| Lab ID: 02-160-03 | | | | | | |
| Client ID: MW-10-021418-W | | | | | | |
| Mercury | ND | 0.50 | 7470A | | 2-21-18 | |
| Lab ID: 02-160-04 | | | | | | |
| Client ID: MW-14-021418-W | | | | | | |
| Lead | ND | 1.0 | 200.8 | | 2-23-18 | |
| Mercury | ND | 0.50 | 7470A | | 2-21-18 | |
| Lab ID: 02-160-05 | | | | | | |
| Client ID: MW-15-021418-W | | | | | | |
| Lead | ND | 1.0 | 200.8 | | 2-23-18 | |
| Lab ID: 02-160-06 | | | | | | |
| Client ID: MW-DUP-021418 | | | | | | |
| Lead | ND | 1.0 | 200.8 | | 2-23-18 | |
| Mercury | ND | 0.50 | 7470A | | 2-21-18 | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**NWTPH-Dx
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|----------|---------------|---------------|-------|
| METHOD BLANK | | | | | | |
| Laboratory ID: | MB0216W1 | | | | | |
| Diesel Range Organics | ND | 0.25 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| Lube Oil Range Organics | ND | 0.40 | NWTPH-Dx | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>o-Terphenyl</i> | 91 | 50-150 | | | | |

| Analyte | Result | Spike Level | Source Result | Percent Recovery | Recovery Limits | RPD | RPD Limit | Flags |
|--------------------|-----------|-------------|---------------|------------------|-----------------|--------|-----------|-------|
| DUPLICATE | | | | | | | | |
| Laboratory ID: | 02-160-04 | | | | | | | |
| | ORIG | DUP | | | | | | |
| Diesel Range | ND | ND | NA | NA | NA | NA | NA | NA |
| Lube Oil Range | ND | ND | NA | NA | NA | NA | NA | NA |
| <i>Surrogate:</i> | | | | | | | | |
| <i>o-Terphenyl</i> | | | | 92 | 93 | 50-150 | | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**NWTPH-Dx
CONTINUING CALIBRATION SUMMARY**

| Lab ID | True Value (ppm) | Calc. Value | Percent Difference | Control Limits |
|---------------|-------------------------|--------------------|---------------------------|-----------------------|
| CCV0216R-V2 | 100 | 102 | -2.2 | +/-15% |
| CCV0216R-V3 | 100 | 104 | -3.8 | +/-15% |
| CCV0216R-V4 | 100 | 106 | -5.6 | +/-15% |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**BENZENE EPA 8260C
 METHOD BLANK QUALITY CONTROL**

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-----------------------------|-------------------------|-----------------------|---------------|----------------------|----------------------|--------------|
| Laboratory ID: | MB0216W1 | | | | | |
| Benzene | ND | 0.20 | EPA 8260C | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| <i>Dibromofluoromethane</i> | 97 | 75-127 | | | | |
| <i>Toluene-d8</i> | 103 | 80-127 | | | | |
| <i>4-Bromofluorobenzene</i> | 96 | 78-125 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**BENZENE EPA 8260C
 SB/SBD QUALITY CONTROL**

Matrix: Water
 Units: ug/L

| Analyte | Result | | Spike Level | | Percent Recovery | | Recovery | RPD | | Flags |
|----------------------|-------------|-------------|-------------|------|------------------|-----|----------|-----|-------|-------|
| | | | | | SB | SBD | Limits | RPD | Limit | |
| SPIKE BLANKS | | | | | | | | | | |
| Laboratory ID: | SB0216W1 | | | | | | | | | |
| | SB | SBD | SB | SBD | SB | SBD | | | | |
| Benzene | 10.7 | 9.46 | 10.0 | 10.0 | 107 | 95 | 78-122 | 12 | 19 | |
| <i>Surrogate:</i> | | | | | | | | | | |
| Dibromofluoromethane | | | | | 97 | 99 | 75-127 | | | |
| Toluene-d8 | | | | | 105 | 104 | 80-127 | | | |
| 4-Bromofluorobenzene | | | | | 100 | 97 | 78-125 | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**cPAHs EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Water
 Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|-------------------------|-------------------------|-----------------------|---------------|----------------------|----------------------|--------------|
| Laboratory ID: | MB0216W1 | | | | | |
| Benzo[a]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Chrysene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[b]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[j,k]fluoranthene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Benzo[a]pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Indeno(1,2,3-c,d)pyrene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| Dibenz[a,h]anthracene | ND | 0.010 | EPA 8270D/SIM | 2-16-18 | 2-16-18 | |
| <i>Surrogate:</i> | <i>Percent Recovery</i> | <i>Control Limits</i> | | | | |
| 2-Fluorobiphenyl | 67 | 25 - 107 | | | | |
| Pyrene-d10 | 87 | 28 - 103 | | | | |
| Terphenyl-d14 | 97 | 36 - 129 | | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**cPAHs EPA 8270D/SIM
 MS/MSD QUALITY CONTROL**

Matrix: Water
 Units: ug/L

| Analyte | Result | | Spike Level | | Source Result | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|-------------------------|--------------|--------------|-------------|-------|---------------|------------------|-----|-----------------|-----|-----------|-------|
| MATRIX SPIKES | | | | | | | | | | | |
| Laboratory ID: | 02-160-02 | | | | | | | | | | |
| | MS | MSD | MS | MSD | | MS | MSD | | | | |
| Benzo[a]anthracene | 0.521 | 0.625 | 0.527 | 0.530 | ND | 99 | 118 | 47 - 131 | 18 | 27 | |
| Chrysene | 0.438 | 0.521 | 0.527 | 0.530 | ND | 83 | 98 | 48 - 120 | 17 | 29 | |
| Benzo[b]fluoranthene | 0.511 | 0.641 | 0.527 | 0.530 | ND | 97 | 121 | 42 - 128 | 23 | 29 | |
| Benzo(j,k)fluoranthene | 0.489 | 0.605 | 0.527 | 0.530 | ND | 93 | 114 | 46 - 121 | 21 | 27 | |
| Benzo[a]pyrene | 0.463 | 0.571 | 0.527 | 0.530 | ND | 88 | 108 | 34 - 121 | 21 | 29 | |
| Indeno(1,2,3-c,d)pyrene | 0.540 | 0.681 | 0.527 | 0.530 | ND | 102 | 128 | 39 - 128 | 23 | 28 | |
| Dibenz[a,h]anthracene | 0.512 | 0.643 | 0.527 | 0.530 | ND | 97 | 121 | 39 - 125 | 23 | 30 | |
| <i>Surrogate:</i> | | | | | | | | | | | |
| 2-Fluorobiphenyl | | | | | | 74 | 73 | 25 - 107 | | | |
| Pyrene-d10 | | | | | | 80 | 93 | 28 - 103 | | | |
| Terphenyl-d14 | | | | | | 87 | 96 | 36 - 129 | | | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**cPAHs EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Water
 Units: ug/L

| Analyte | Result | | Spike Level | | Percent Recovery | | Recovery | RPD | RPD | Flags |
|-------------------------|--------------|--------------|-------------|-------|------------------|-----|----------|-------|-----|-------|
| | | | | | SB | SBD | Limits | Limit | | |
| SPIKE BLANKS | | | | | | | | | | |
| Laboratory ID: | SB0216W1 | | | | | | | | | |
| | SB | SBD | SB | SBD | SB | SBD | | | | |
| Benzo[a]anthracene | 0.532 | 0.538 | 0.500 | 0.500 | 106 | 108 | 47 - 131 | 1 | 27 | |
| Chrysene | 0.456 | 0.465 | 0.500 | 0.500 | 91 | 93 | 48 - 120 | 2 | 29 | |
| Benzo[b]fluoranthene | 0.481 | 0.509 | 0.500 | 0.500 | 96 | 102 | 42 - 128 | 6 | 29 | |
| Benzo(j,k)fluoranthene | 0.505 | 0.515 | 0.500 | 0.500 | 101 | 103 | 46 - 121 | 2 | 27 | |
| Benzo[a]pyrene | 0.449 | 0.473 | 0.500 | 0.500 | 90 | 95 | 34 - 121 | 5 | 29 | |
| Indeno(1,2,3-c,d)pyrene | 0.495 | 0.512 | 0.500 | 0.500 | 99 | 102 | 39 - 128 | 3 | 28 | |
| Dibenz[a,h]anthracene | 0.489 | 0.523 | 0.500 | 0.500 | 98 | 105 | 39 - 125 | 7 | 30 | |
| <i>Surrogate:</i> | | | | | | | | | | |
| 2-Fluorobiphenyl | | | | | 68 | 63 | 25 - 107 | | | |
| Pyrene-d10 | | | | | 86 | 86 | 28 - 103 | | | |
| Terphenyl-d14 | | | | | 94 | 92 | 36 - 129 | | | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL LEAD
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-23-18
Date Analyzed: 2-23-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0223WM1

| Analyte | Method | Result | PQL |
|---------|--------|-----------|-----|
| Lead | 200.8 | ND | 1.1 |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

TOTAL MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-21-18
Date Analyzed: 2-21-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0221W1

| Analyte | Method | Result | PQL |
|---------|--------|-----------|------|
| Mercury | 7470A | ND | 0.50 |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL LEAD
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-23-18

Date Analyzed: 2-23-18

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-160-04

| Analyte | Sample Result | Duplicate Result | RPD | PQL | Flags |
|---------|------------------|---------------------|-----|-----|-------|
| Lead | ND | ND | NA | 1.1 | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-21-18

Date Analyzed: 2-21-18

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-160-02

| Analyte | Sample Result | Duplicate Result | RPD | PQL | Flags |
|---------|------------------|---------------------|-----|------|-------|
| Mercury | ND | ND | NA | 0.50 | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL LEAD
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 2-23-18

Date Analyzed: 2-23-18

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-160-04

| Analyte | Spike Level | MS | Percent Recovery | MSD | Percent Recovery | RPD | Flags |
|---------|-------------|------------|------------------|------------|------------------|-----|-------|
| Lead | 222 | 236 | 106 | 236 | 106 | 0 | |



Date of Report: February 20, 2018
 Samples Submitted: February 15, 2018
 Laboratory Reference: 1802-160
 Project: 0186-774-05; PSE - Columbia St. MGP Site

**TOTAL MERCURY
 EPA 7470A
 MS/MSD QUALITY CONTROL**

Date Extracted: 2-21-18

Date Analyzed: 2-21-18

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-160-02

| Analyte | Spike Level | MS | Percent Recovery | MSD | Percent Recovery | RPD | Flags |
|---------|-------------|-------------|------------------|-------------|------------------|-----|-------|
| Mercury | 12.5 | 13.6 | 109 | 13.1 | 105 | 4 | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

DISSOLVED LEAD
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Analyzed: 2-23-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0223D1

| Analyte | Method | Result | PQL |
|---------|--------|-----------|-----|
| Lead | 200.8 | ND | 1.0 |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**DISSOLVED MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 2-21-18

Matrix: Water

Units: ug/L (ppb)

Lab ID: MB0221D1

| Analyte | Method | Result | PQL |
|---------|--------|-----------|------|
| Mercury | 7470A | ND | 0.50 |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**DISSOLVED LEAD
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 2-23-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-160-04

| Analyte | Sample Result | Duplicate Result | RPD | PQL | Flags |
|---------|------------------|---------------------|-----|-----|-------|
| Lead | ND | ND | NA | 1.0 | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**DISSOLVED MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL**

Date Analyzed: 2-21-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-160-02

| Analyte | Sample Result | Duplicate Result | RPD | PQL | Flags |
|---------|------------------|---------------------|-----|------|-------|
| Mercury | ND | ND | NA | 0.50 | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

DISSOLVED LEAD
EPA 200.8
MS/MSD QUALITY CONTROL

Date Analyzed: 2-23-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-160-04

| Analyte | Spike Level | MS | Percent Recovery | MSD | Percent Recovery | RPD | Flags |
|---------|-------------|------------|------------------|------------|------------------|-----|-------|
| Lead | 200 | 193 | 97 | 198 | 99 | 3 | |



Date of Report: February 20, 2018
Samples Submitted: February 15, 2018
Laboratory Reference: 1802-160
Project: 0186-774-05; PSE - Columbia St. MGP Site

**DISSOLVED MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL**

Date Analyzed: 2-21-18

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-160-02

| Analyte | Spike Level | MS | Percent Recovery | MSD | Percent Recovery | RPD | Flags |
|---------|-------------|-------------|------------------|-------------|------------------|-----|-------|
| Mercury | 12.5 | 13.1 | 105 | 13.0 | 104 | 1 | |





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference



Sample/Cooler Receipt and Acceptance Checklist

Client: GET

Client Project Name/Number: 0186-774-05

OnSite Project Number: 02-160

Initiated by: *MM*

Date Initiated: 2/15/18

1.0 Cooler Verification

| | | | | |
|--|--------------------------------------|--|----------------------------------|------------------|
| 1.1 Were there custody seals on the outside of the cooler? | <input checked="" type="radio"/> Yes | No | N/A | 1 2 3 4 |
| 1.2 Were the custody seals intact? | <input checked="" type="radio"/> Yes | No | N/A | 1 2 3 4 |
| 1.3 Were the custody seals signed and dated by last custodian? | <input checked="" type="radio"/> Yes | No | N/A | 1 2 3 4 |
| 1.4 Were the samples delivered on ice or blue ice? | <input checked="" type="radio"/> Yes | No | | 1 2 3 4 |
| 1.5 Were samples received between 0-6 degrees Celsius? | Yes | <input checked="" type="radio"/> No | Temperature: <u>-1, -1, 0, 1</u> | |
| 1.6 Have shipping bills (if any) been attached to the back of this form? | Yes | <input checked="" type="radio"/> N/A | | |
| 1.7 How were the samples delivered? | Client | <input checked="" type="radio"/> Courier | UPS/FedEx | OSE Pickup Other |

2.0 Chain of Custody Verification

| | | | |
|--|--------------------------------------|-------------------------------------|---------|
| 2.1 Was a Chain of Custody submitted with the samples? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 2.2 Was the COC legible and written in permanent ink? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 2.3 Have samples been relinquished and accepted by each custodian? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 2.4 Did the sample labels (ID, date, time, preservative) agree with COC? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 2.5 Were all of the samples listed on the COC submitted? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 2.6 Were any of the samples submitted omitted from the COC? | Yes | <input checked="" type="radio"/> No | 1 2 3 4 |

3.0 Sample Verification

| | | | |
|--|--------------------------------------|-------------------------------------|--|
| 3.1 Were any sample containers broken or compromised? | Yes | <input checked="" type="radio"/> No | 1 2 3 4 |
| 3.2 Were any sample labels missing or illegible? | Yes | <input checked="" type="radio"/> No | 1 2 3 4 |
| 3.3 Have the correct containers been used for each analysis requested? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 3.4 Have the samples been correctly preserved? | <input checked="" type="radio"/> Yes | No | N/A 1 2 3 4 |
| 3.5 Are volatile samples free from headspace and bubbles greater than 6mm? | <input checked="" type="radio"/> Yes | No | N/A 1 2 3 4 |
| 3.6 Is there sufficient sample submitted to perform requested analyses? | <input checked="" type="radio"/> Yes | No | 1 2 3 4 |
| 3.7 Have any holding times already expired or will expire in 24 hours? | Yes | <input checked="" type="radio"/> No | 1 2 3 4 |
| 3.8 Was method 5035A used? | Yes | No | <input checked="" type="radio"/> N/A 1 2 3 4 |
| 3.9 If 5035A was used, which sampling option was used (#1, 2, or 3). | # | | <input checked="" type="radio"/> N/A 1 2 3 4 |

Explain any discrepancies:

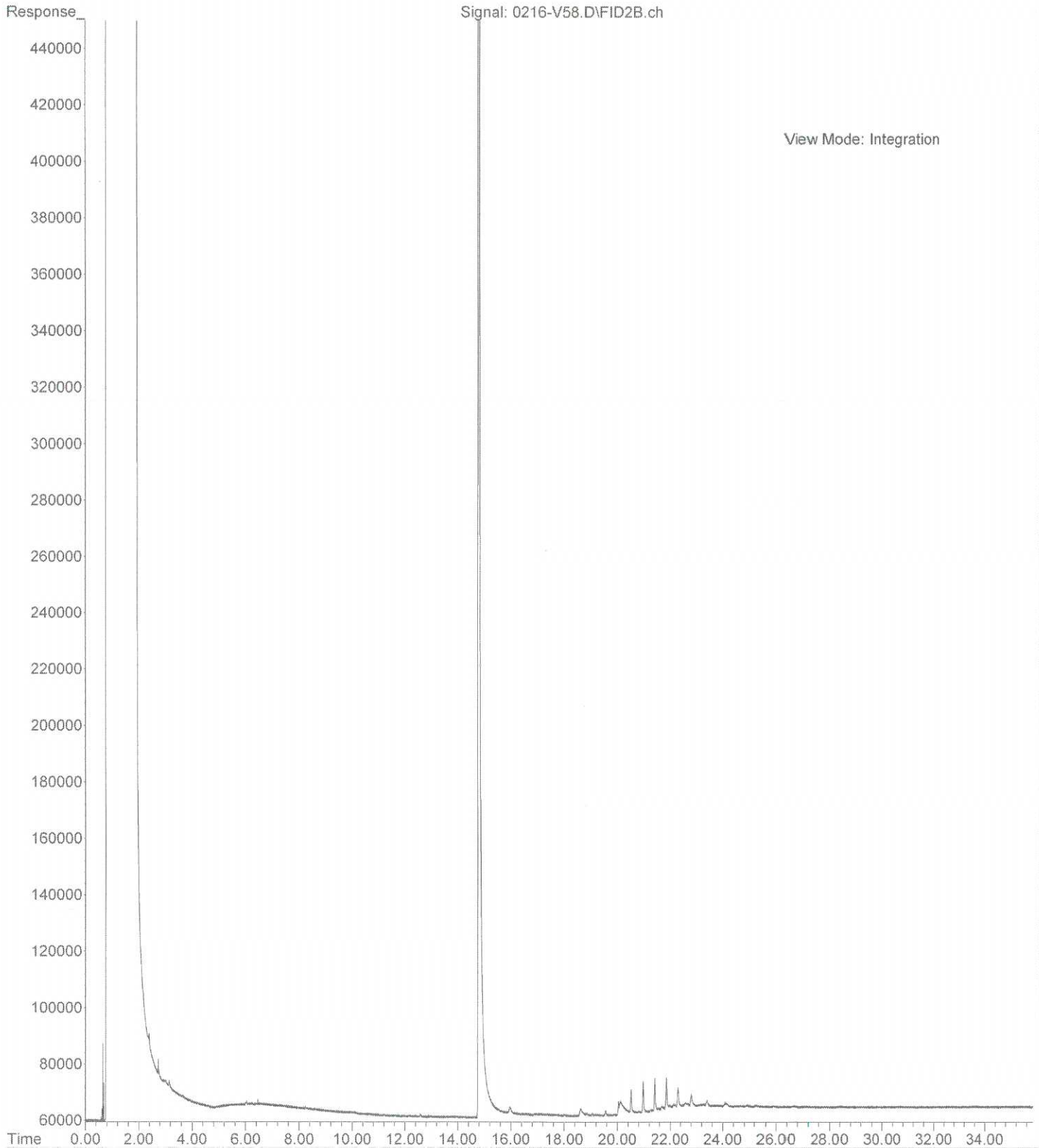
1 - Discuss issue in Case Narrative

3 - Client contacted to discuss problem

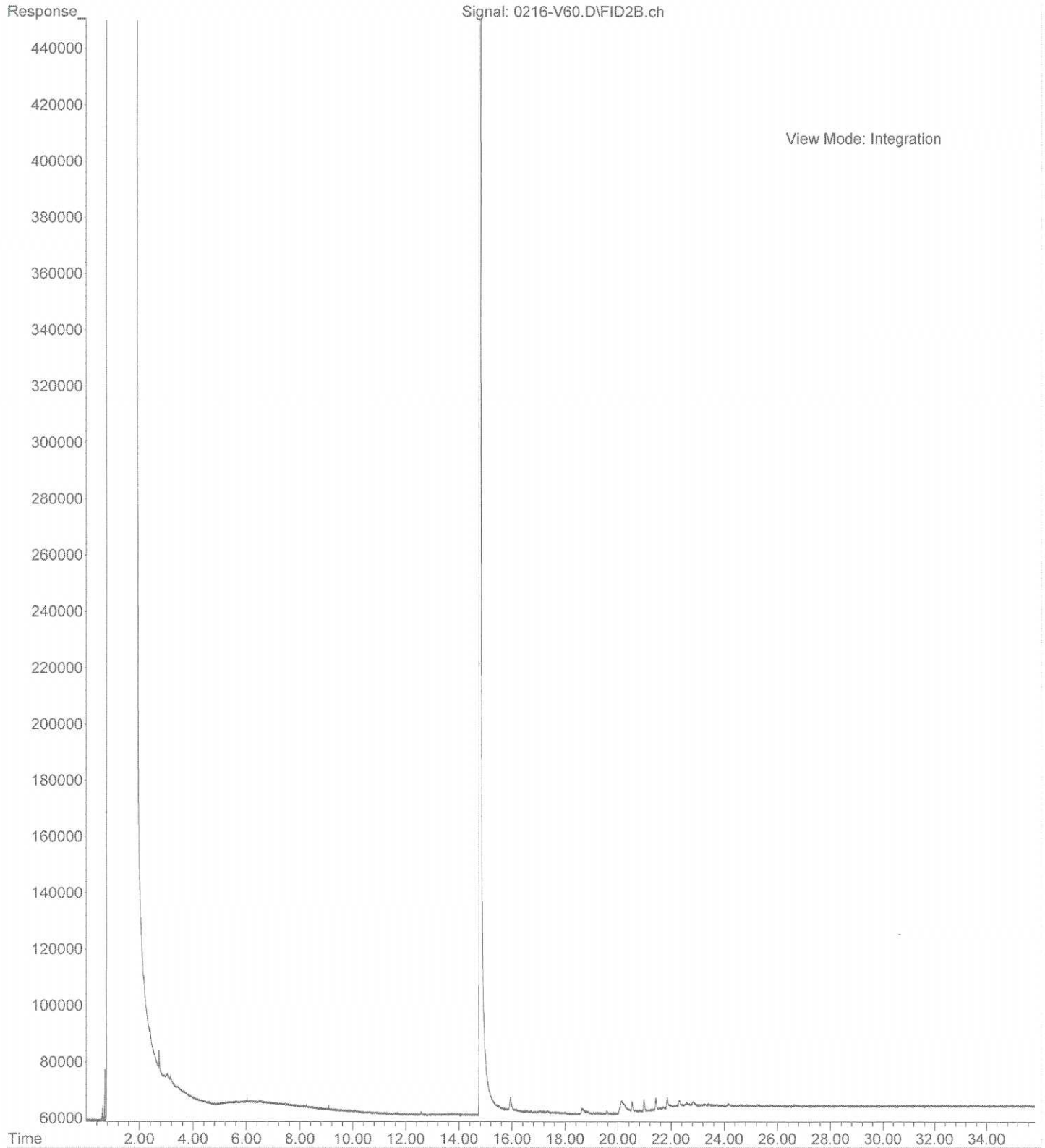
2 - Process Sample As-is

4 - Sample cannot be analyzed or client does not wish to proceed

File :X:\DIESELS\VIGO\DATA\V180216.SEC\0216-V58.D
Operator : JT
Acquired : 16 Feb 2018 14:32 using AcqMethod V171020F.M
Instrument : Vigo
Sample Name: 02-160-04
Misc Info :
Vial Number: 58



File :X:\DIESELS\VIGO\DATA\V180216.SEC\0216-V60.D
Operator : JT
Acquired : 16 Feb 2018 15:52 using AcqMethod V171020F.M
Instrument : Vigo
Sample Name: 02-160-05
Misc Info :
Vial Number: 60



File :X:\DIESELS\VIGO\DATA\V180216.SEC\0216-V63.D
Operator : JT
Acquired : 16 Feb 2018 18:33 using AcqMethod V171020F.M
Instrument : Vigo
Sample Name: 02-160-06
Misc Info :
Vial Number: 63

