GROUNDWATER MONITORING TECHNICAL MEMORANDUM

AUGUST 2016 MONITORING EVENT

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

GeoEngineers
600 Stewart Street, Suite 1700
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
Telephone: 206.728.2674
Fax: 206.728.2732

Report date:	October 18, 2016
GeoEngineers file number:	0186-774-03
Client:	Greg Andrina, Puget Sound Energy 10885 NE 4th Street, PSE-9S, Bellevue, Washington 98004-5591
GeoEngineers project manager:	Nick Rohrbach
Sampling dates:	August 24, 2016
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 August 2016 ranged from 4.86 to 6.21 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 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 August 2016 groundwater elevations are slightly lower than the groundwater elevations observed in February 2015. The groundwater table beneath the property is relatively flat with no consistent gradient, as described above.
Groundwater chemical analysis:	The groundwater samples collected during the August 2016 monitoring events were analyzed for one or more of the following constituents: • 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 200.6/SW7470 (samples collected from wells MW-14 and MW-15); • Total and dissolved mercury by EPA Method 200.8/SW7470 (samples collected from wells MW-6, MW-10, MW-14 and MW-16).

Summary of groundwater chemical analytical results:

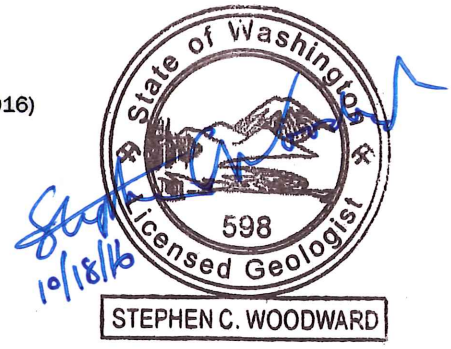
The analytical results are presented in Table 2. Benzo(a)anthracene and chrysene were the only constituents detected in any of the August 2016 groundwater samples. These two constituents were detected in MW-14 at concentrations only slightly greater than the practical quantification limit (PQL). The toxic equivalent concentration for all cPAHs in this sample (0.0087 µg/L) is less than the MTCA Method A cleanup level of 0.1 µg/L. No other 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, 2008-2016
Table 2. Groundwater Chemical Analytical Results, (August 2013, February 2015, and August 2016)
Figure 1. Vicinity Map
Figure 2. August 2016 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.

Nick E. Rohrbach
Senior Environmental Scientist

Stephen C. Woodward, LG
Principal

NER:SCW:leh:nld

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

2008-2016

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
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
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
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
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

Notes:

[1]MW-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.

[2]Water levels measured with an electronic water level indicator.

[3]Pre-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.

[4]Monitoring 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, and August 2016)

PSE Former Olympia MGP Site

Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level[1]	Location ID: MW-6 / Sample ID: MW-6-082613-W / Sample Date: 8/26/2013	Location ID: MW-6 / Sample ID: MW-6-022615-W / Sample Date: 2/26/2015	Location ID: MW-6 / Sample ID: MW-6-082416-W / Sample Date: 8/24/2016	Location ID: MW-10 / Sample ID: MW-10-082613-W / Sample Date: 8/26/2013	Location ID: MW-10 / Sample ID: MW-10-022615-W / Sample Date: 2/26/2015	Location ID: MW-10 / Sample ID: MW-10-082416-W / Sample Date: 8/24/2016	Location ID: MW-14 / Sample ID: MW-14-082613-W / Sample Date: 8/26/2013	Location ID: MW-14 / Sample ID: MW-14-022615-W / Sample Date: 2/26/2015	Location ID: MW-14 / Sample ID: MW-14-082416-W / Sample Date: 8/24/2016	Location ID: MW-14 (Dup)* / Sample ID: MW-DUP-052613-W / Sample Date: 8/26/2013	Location ID: MW-14 (Dup)* / Sample ID: MW-DUP-022615-W / Sample Date: 2/26/2015	Location ID: MW-14 (Dup)* / Sample ID: MW-DUP-082416-W / Sample Date: 8/24/2016	Location ID: MW-15 / Sample ID: MW-15-082613-W / Sample Date: 8/26/2013	Location ID: MW-15 / Sample ID: MW-15-022615-W / Sample Date: 2/26/2015	Location ID: MW-15 / Sample ID: MW-15-082416-W / Sample Date: 8/24/2016	Location ID: MW-16 / Sample ID: MW-16-082613-W / Sample Date: 8/26/2013	Location ID: MW-16 / Sample ID: MW-16-022615-W / Sample Date: 2/26/2015	Location ID: MW-16 / Sample ID: MW-16-082416-W / Sample Date: 8/24/2016
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	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	--	--	--	--	--	--	0.41 U	0.41 U	0.42 U	0.42 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	0.0097 U	0.0097 U	0.0094 U	**0.0094**	0.0095 U	0.0094 U	0.0095 U	**0.018**	0.0095 U	0.0094 U	**0.016**	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Chrysene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	**0.013**	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Benzo(b)fluoranthene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	0.0096 U	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Benzo(j,k)fluoranthene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	0.0096 U	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Benzo(a)pyrene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	0.0096 U	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Indeno(1,2,3-cd)pyrene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	0.0096 U	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Dibenzo(a,h)anthracene	µg/L	NE	0.0095 U	0.0097 U	0.0097 U	0.0094 U	0.0094 U	0.0095 U	0.0094 U	0.0095 U	0.0096 U	0.0095 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0096 U	0.0095 U	0.0095 U	0.0097 U
Total cPAHs TEC	µg/L	0.1	0.0072 UT	0.0073 UT	0.0073 UT	0.0071 UT	**0.0076 T**	0.0072 UT	0.0071 UT	0.0072 UT	**0.0087 T**	0.0072 UT	0.0071 UT	**0.0082 T**	0.0072 UT	0.0072 UT	0.0072 UT	0.0072 UT	0.0072 UT	0.0073 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	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	--	--	--	0.0005 U	0.0005 U	0.0005 U

Notes:

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

[2]Groundwater 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 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.

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

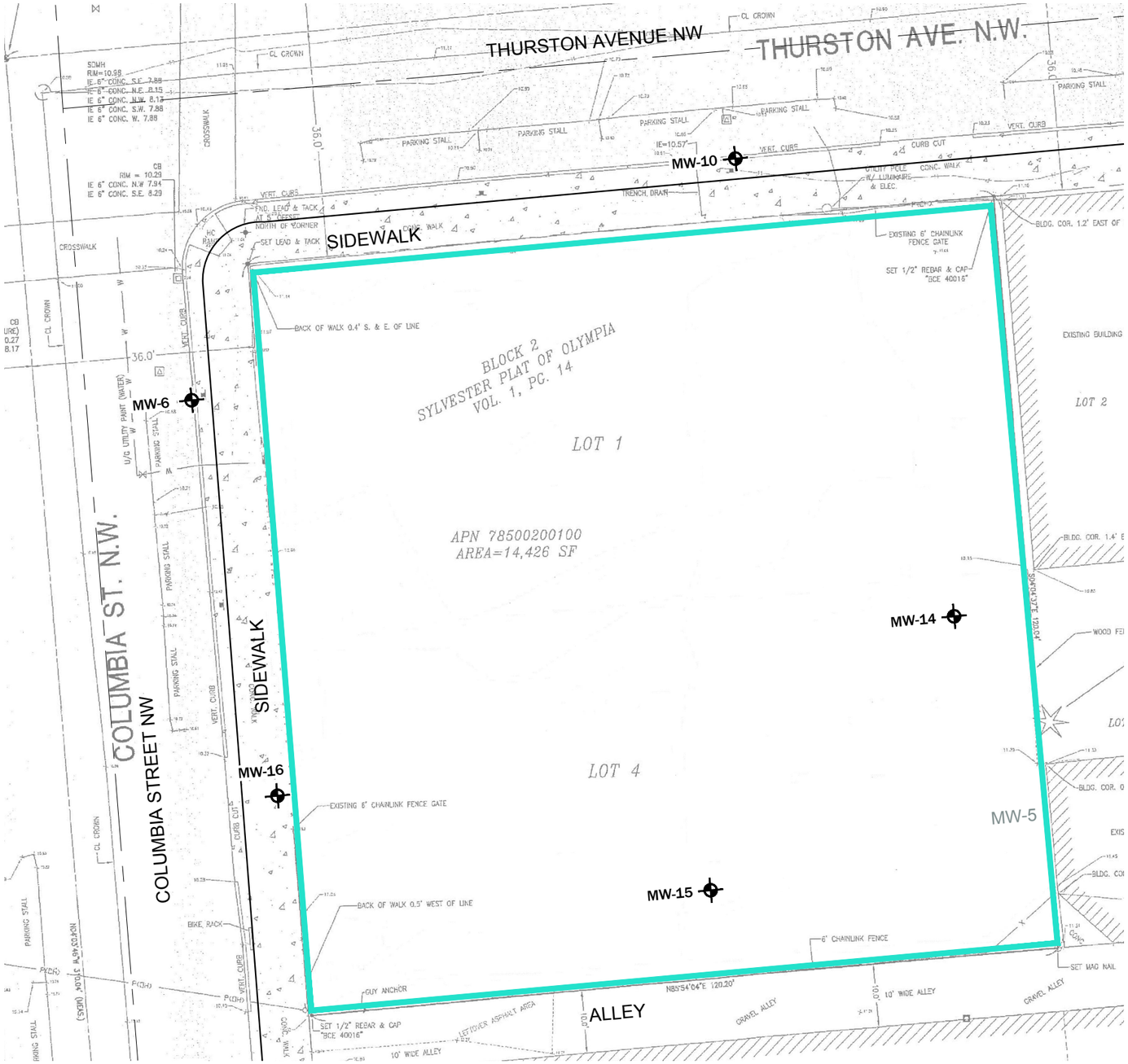
Vicinity Map

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 1

Office: SEA Path: \\sea\projects\0\0186774\GIS\0186774GIS\018677400_F1_VM.mxd Map Revised: 14 October 2011 amanza



Legend

- Property boundary
- Existing Building
- Existing fence
- MW-10 Compliance monitoring well

N
W E
S

20 0 20
Feet

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. cannot 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

Data Source:
Background from Barghausen Consulting Engineers, dated 3/28/2012.

August 2016 Ground Water Compliance Monitoring Locations

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 2

P:\0\0186774\03\CAD\CMP\0186774O3_T600_F2_GW_Monitoring_Locations.dwg TAB:F2 Date Exported: 09/21/16 - 16:45 by cvanslyke

GeoEngineers

Plaza 600 Building, 600 Stewart Street, Suite 1700, Seattle, Washington 98101, Telephone: 206.728.2674 www.geoengineers.com

Memorandum

To:	Puget Sound Energy
From:	GeoEngineers, Inc.
Date:	September 9, 2016
File:	0186-774-03
Subject:	Data Validation Report Columbia Street Manufactured Gas Plant Property August 2016 Groundwater Samples

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 August 2016 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 2008) and Inorganic Superfund Data Review (USEPA 2010) (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 (QA)/quality control (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 (MS)/Matrix Spike Duplicates (MSD)
- Laboratory Control Samples (LCS)/Laboratory Control Sample Duplicates (LCSD)
- 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
1608-323	MW-6-082416-W, MW-10-082416-W, MW-14-082416-W, MW-Dup-082416-W, MW-15-082416-W, MW-16-082416-W, Trip Blank-082416

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 SW8260C
- Polycyclic Aromatic Hydrocarbons (PAHs) by Method SW8270D-SIM
- Total Metals by Methods EPA200.8 and EPA7470A
- Dissolved Metals by Methods EPA200.8 and EPA7470A

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 within the appropriate temperatures of between 2 and 6 degrees Celsius, with the exception noted below:

SDG 1608-323: One sample cooler temperature was recorded at the laboratory at 1 degree Celsius. It was determined through professional judgment that since the samples were not frozen, this temperature 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 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. MSD analyses are generally performed for organic analyses as a precision check and analyzed in the same sequence as a MS. 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 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 greater 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 1608-323: One field duplicate sample pair, MW-14-082416-W and MW-Dup-082416-W, 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). “Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,” EPA-540-R-08-01. June 2008.

U.S. Environmental Protection Agency (USEPA). “Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review,” EPA-540-R-10-011. January 2010.

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

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

September 2, 2016

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

Re: Analytical Data for Project 0186-774-03
Laboratory Reference No. 1608-323

Dear Nick:

Enclosed are the analytical results and associated quality control data for samples submitted on August 25, 2016.

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,

David Baumeister
Project Manager

Enclosures

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

Case Narrative

Samples were collected on August 24, 2016 and received by the laboratory on August 25, 2016. 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: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-6-082416-W	08-323-01	Water	8-24-16	8-25-16	
MW-16-082416-W	08-323-02	Water	8-24-16	8-25-16	
MW-10-082416-W	08-323-03	Water	8-24-16	8-25-16	
MW-14-082416-W	08-323-04	Water	8-24-16	8-25-16	
MW-15-082416-W	08-323-05	Water	8-24-16	8-25-16	
MW-Dup-082416-W	08-323-06	Water	8-24-16	8-25-16	
Trip Blank-082416	08-323-07	Water	8-24-16	8-25-16	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-14-082416-W**					
Laboratory ID:	08-323-04					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	8-26-16	8-26-16	
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*83*	*50-150*				
Client ID:	**MW-15-082416-W**					
Laboratory ID:	08-323-05					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	8-26-16	8-26-16	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-Dup-082416-W**					
Laboratory ID:	08-323-06					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	8-31-16	8-31-16	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-10-082416-W**					
Laboratory ID:	08-323-03					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*117*	*71-131*				
Toluene-d8	*99*	*80-127*				
4-Bromofluorobenzene	*95*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-14-082416-W**					
Laboratory ID:	08-323-04					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*115*	*71-131*				
Toluene-d8	*98*	*80-127*				
4-Bromofluorobenzene	*93*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-15-082416-W**					
Laboratory ID:	08-323-05					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*119*	*71-131*				
Toluene-d8	*97*	*80-127*				
4-Bromofluorobenzene	*96*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-Dup-082416-W**					
Laboratory ID:	08-323-06					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*120*	*71-131*				
Toluene-d8	*97*	*80-127*				
4-Bromofluorobenzene	*97*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank-082416**					
Laboratory ID:	08-323-07					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*117*	*71-131*				
Toluene-d8	*99*	*80-127*				
4-Bromofluorobenzene	*94*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-082416-W**					
Laboratory ID:	08-323-01					
Benzo[a]anthracene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*64*	*33 - 117*				
Pyrene-d10	*77*	*35 - 140*				
Terphenyl-d14	*114*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-16-082416-W**					
Laboratory ID:	08-323-02					
Benzo[a]anthracene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0097	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*53*	*33 - 117*				
Pyrene-d10	*67*	*35 - 140*				
Terphenyl-d14	*74*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-10-082416-W**					
Laboratory ID:	08-323-03					
Benzo[a]anthracene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0095	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*71*	*33 - 117*				
Pyrene-d10	*75*	*35 - 140*				
Terphenyl-d14	*92*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-14-082416-W**					
Laboratory ID:	08-323-04					
Benzo[a]anthracene	**0.018**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**0.013**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*68*	*33 - 117*				
Pyrene-d10	*78*	*35 - 140*				
Terphenyl-d14	*101*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-15-082416-W**					
Laboratory ID:	08-323-05					
Benzo[a]anthracene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0096	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*63*	*33 - 117*				
Pyrene-d10	*73*	*35 - 140*				
Terphenyl-d14	*99*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-Dup-082416-W**					
Laboratory ID:	08-323-06					
Benzo[a]anthracene	**0.016**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.0094	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*47*	*33 - 117*				
Pyrene-d10	*54*	*35 - 140*				
Terphenyl-d14	*76*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-323-01					
Client ID:	**MW-6-082416-W**					
Mercury	**ND**	0.50	7470A	9-2-16	9-2-16	
Lab ID:	08-323-02					
Client ID:	**MW-16-082416-W**					
Mercury	**ND**	0.50	7470A	9-2-16	9-2-16	
Lab ID:	08-323-03					
Client ID:	**MW-10-082416-W**					
Mercury	**ND**	0.50	7470A	9-2-16	9-2-16	
Lab ID:	08-323-04					
Client ID:	**MW-14-082416-W**					
Lead	**ND**	1.1	200.8	9-2-16	9-2-16	
Mercury	**ND**	0.50	7470A	9-2-16	9-2-16	
Lab ID:	08-323-05					
Client ID:	**MW-15-082416-W**					
Lead	**ND**	1.1	200.8	9-2-16	9-2-16	
Lab ID:	08-323-06					
Client ID:	**MW-Dup-082416-W**					
Lead	**ND**	1.1	200.8	9-2-16	9-2-16	
Mercury	**ND**	0.50	7470A	9-2-16	9-2-16	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-323-01					
Client ID:	**MW-6-082416-W**					
Mercury	**ND**	0.50	7470A		9-2-16	
Lab ID:	08-323-02					
Client ID:	**MW-16-082416-W**					
Mercury	**ND**	0.50	7470A		9-2-16	
Lab ID:	08-323-03					
Client ID:	**MW-10-082416-W**					
Mercury	**ND**	0.50	7470A		9-2-16	
Lab ID:	08-323-04					
Client ID:	**MW-14-082416-W**					
Lead	**ND**	1.0	200.8		9-1-16	
Mercury	**ND**	0.50	7470A		9-2-16	
Lab ID:	08-323-05					
Client ID:	**MW-15-082416-W**					
Lead	**ND**	1.0	200.8		9-1-16	
Lab ID:	08-323-06					
Client ID:	**MW-Dup-082416-W**					
Lead	**ND**	1.0	200.8		9-1-16	
Mercury	**ND**	0.50	7470A		9-2-16	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	8-26-16	8-26-16	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*78*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-267-01										
	ORIG	DUP									
Diesel Range Organics	**0.638**	**0.560**	NA	NA		NA		NA	13	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*86*	*91*	*50-150*			

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0826F-V1	100	106	-6.0	+/-15%
CCV0826F-V2	100	94.6	5.4	+/-15%
CCV0826R-V1	100	95.2	4.8	+/-15%
CCV0826R-V2	100	106	-6.0	+/-15%
CCV0826R-T2	100	105	-4.9	+/-15%
CCV0826R-T3	100	103	-2.7	+/-15%

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0831W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	8-31-16	9-1-16	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	8-31-16	9-1-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*88*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-364-01										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	X1
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	X1
Surrogate:											
o-Terphenyl						*114*	*118*	*50-150*			

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0831F-T1	100	96.2	3.8	+/-15%
CCV0831F-T2	100	94.9	5.1	+/-15%
CCV0831R-V2	100	99.4	0.6	+/-15%
CCV0831R-V3	100	103	-3.3	+/-15%
CCV0901F-V1	100	104	-3.9	+/-15%
CCV0901F-V2	100	106	-6.1	+/-15%

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE by EPA 8260C
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0826W1					
Benzene	ND	0.20	EPA 8260C	8-26-16	8-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*71-131*				
Toluene-d8	*93*	*80-127*				
4-Bromofluorobenzene	*88*	*80-125*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

BENZENE by EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0826W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**10.8**	**9.89**	10.0	10.0	108	99	75-121	9	15	
Surrogate:										
Dibromofluoromethane					*99*	*109*	*71-131*			
Toluene-d8					*97*	*95*	*80-127*			
4-Bromofluorobenzene					*92*	*93*	*80-125*			

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

cPAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0828W1					
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Chrysene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	8-28-16	8-29-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*54*	*33 - 117*				
Pyrene-d10	*72*	*35 - 140*				
Terphenyl-d14	*88*	*33 - 117*				

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

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:	08-323-02										
	MS	MSD	MS	MSD		MS	MSD				
Benzo[a]anthracene	**0.411**	**0.431**	0.488	0.483	ND	84	89	58 - 132	5	26	
Chrysene	**0.367**	**0.389**	0.488	0.483	ND	75	81	63 - 113	6	25	
Benzo[b]fluoranthene	**0.474**	**0.377**	0.488	0.483	ND	97	78	56 - 124	23	27	
Benzo(j,k)fluoranthene	**0.468**	**0.390**	0.488	0.483	ND	96	81	62 - 121	18	31	
Benzo[a]pyrene	**0.455**	**0.417**	0.488	0.483	ND	93	86	50 - 131	9	25	
Indeno(1,2,3-c,d)pyrene	**0.519**	**0.439**	0.488	0.483	ND	106	91	60 - 120	17	26	
Dibenz[a,h]anthracene	**0.518**	**0.424**	0.488	0.483	ND	106	88	61 - 115	20	26	
Surrogate:											
2-Fluorobiphenyl						*56*	*64*	*33 - 117*			
Pyrene-d10						*62*	*69*	*35 - 140*			
Terphenyl-d14						*88*	*86*	*33 - 117*			

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-2-16
Date Analyzed:	9-2-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0902WM1

Analyte	Method	Result	PQL
Lead	200.8	**ND**	1.1

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-2-16
Date Analyzed:	9-2-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0902W1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.50

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 9-2-16
Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-06

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	1.1	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Extracted: 9-2-16
Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.50	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 9-2-16
Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-06

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	222	**230**	104	**232**	105	1	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL

Date Extracted: 9-2-16
Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	12.5	**12.7**	101	**12.4**	99	2	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppb)	Calc. Value	Percent Difference	Control Limits
Lead	ICV090216X	50.0	49.0	2.0	+/- 10%
Mercury	ICV090216Y	5.00	5.34	-6.8	+/- 10%
Lead	CCV1090216X	40.0	40.0	0	+/- 10%
Mercury	CCV1090216Y	5.00	5.35	-7.0	+/- 20%
Lead	CCV1090216X	20.0	19.8	1.0	+/- 10%
Lead	CCV2090216X	40.0	39.7	0.75	+/- 10%
Mercury	CCV2090216Y	5.00	5.38	-7.6	+/- 20%
Lead	CCV2090216X	20.0	19.7	1.5	+/- 10%
Mercury	CCV3090216Y	5.00	5.44	-8.8	+/- 20%
Mercury	CCV4090216Y	5.00	5.45	-9.0	+/- 20%
Mercury	CCV5090216Y	5.00	5.48	-9.6	+/- 20%

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0901D1

Analyte	Method	Result	PQL
Lead	200.8	**ND**	1.0

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0826F1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.50

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-06

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	1.0	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.50	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-06

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	200	**185**	93	**191**	96	3	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL

Date Analyzed: 9-2-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-323-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	12.5	**12.5**	100	**12.1**	97	4	

Date of Report: September 2, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-323
Project: 0186-774-03

DISSOLVED METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppb)	Calc. Value	Percent Difference	Control Limits
Lead	ICV090116X	50.0	48.5	3.0	+/- 10%
Mercury	ICV090216Y	5.00	5.34	-6.8	+/- 10%
Lead	CCV1090116X	40.0	38.5	3.8	+/- 10%
Mercury	CCV1090216Y	5.00	5.35	-7.0	+/- 20%
Lead	CCV1090116X	20.0	19.4	3.0	+/- 10%
Lead	CCV2090116X	40.0	38.5	3.8	+/- 10%
Mercury	CCV2090216Y	5.00	5.38	-7.6	+/- 20%
Lead	CCV2090116X	20.0	19.4	3.0	+/- 10%
Lead	CCV3090116X	40.0	38.7	3.2	+/- 10%
Mercury	CCV3090216Y	5.00	5.44	-8.8	+/- 20%
Lead	CCV3090116X	20.0	19.6	2.0	+/- 10%

OnSite Environmental Inc.

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-napthalene) 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

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 08-323

Company: GEI
Project Number: 0186-774-03
Project Name: COLUMBIA ST MGP SITE
Project Manager: NICK ROHRBACH
Sampled by: BRANDON BRAYFIELD

Turnaround Request (in working days)
(Check One)
☐ Same Day ☒ 1 Day (#4,5 Dx, Benzene only)
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C (BENZENE ONLY)	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level) (CPAHS ONLY)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	TOTAL DISSOLVED Hg (7470)	TOTAL DISSOLVED Pb			% Moisture
1	MW-6-082416-W	8/24/16	1030	W	4									X									X				
2	MW-16-082416-W		0925		13									X									X				
3	MW-10-082416-W		1115		7					X				X									X				
4	MW-14-082416-W		1225		9				X	X				X									X	X			
5	MW-15-082416-W		1335		9				X	X				X										X			
6	MW-DUP-082416-W		0800		9				X	X				X									X	X			
7	TRIP BLANK-082416	↓	—	↓	3					X																	

	Signature	Company	Date	Time
Relinquished		GRONWIN EERS	8/24/16	0840
Received	Diane Galati	SPEEDY	8-25-16	10:00
Relinquished	Diane Galati	SPEEDY	8-25-16	11:30
Received		ORC	8/25/16	1130
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
* ANALYSIS OF NWTPH-DX AND BENZENE RUSH FOR MW-14 AND MW-15. IF DETECT OCCUR, CONTACT NICK R. IMMEDIATELY. BASED ON DETECT LEVELS, DX AND BENZENE MAY BE ANALYZED IN MW-16.
MW16 → EXTRA VOLUME FOR MS/MSD.

Data Package: Standard ☐ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: GET

Client Project Name/Number: 0186-774-03

OnSite Project Number: 08-323

Initiated by: MV

Date Initiated: 8/25/16

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 1.4.4.0	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

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

3.0 Sample Verification

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

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

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