



November 28, 2016

Mr. Steve Teel
Site Manager/Hydrogeologist
Washington State Department of Ecology
Toxics Cleanup Program, Southwest Regional Office
P.O. Box 47775
Olympia, Washington 98504-7775

**Subject: Groundwater Monitoring Report, October 2016
CenturyLink Longview Facility
1305 Washington Way, Longview, Washington 98632**

Dear Mr. Teel:

This letter provides a summary of the groundwater sampling event conducted on October 13 and 14, 2016. Groundwater monitoring events are being conducted as a continuation of the Groundwater Monitoring Plan developed in 2008 under the Voluntary Cleanup Program. Groundwater monitoring was conducted in accordance with the Final Direct-Push Sampling Plan, dated March 2, 2015, and approved by Washington State Department of Ecology (Ecology).

Groundwater Levels

The depth to groundwater was measured using an electronic static water level indicator that was lowered into each well. Depth to groundwater was measured to the nearest hundredth of a foot from the top of the well casing. Static water levels ranged from 1.52 to 1.81 feet above mean sea level (amsl), and are summarized in the table below and shown on Figure 1. Groundwater levels were approximately 0.8 foot lower than observed in July 2016.

OCTOBER 13, 2016 GROUNDWATER ELEVATIONS

Location	Surveyed Top of Casing (ft amsl)	October 13, 2016 Depth to Water (ft)	October 13, 2016 Groundwater Elevation (ft amsl)
MW-01	15.64	13.83	1.81
MW-02	16.17	14.55	1.62
MW-03	15.02	13.33	1.69
MW-04	14.55	12.96	1.59
MW-05	14.75	13.23	1.52

Notes:

ft

Feet

ft amsl

Feet above mean sea level

Based on groundwater level data shown on Figure 1, the direction of groundwater flow appears to be toward the west, with a relatively flat gradient of approximately 0.0015 foot per foot. Historically, groundwater flow direction has ranged from west to northwest.

Tetra Tech Inc.

216 16th Street, Suite 1500, Denver, CO 80202
Tel 303.312.8800 Fax 303.295.2818 www.tetrattech.com

Groundwater Sampling from Permanent Monitoring Wells

Groundwater samples were obtained from all five permanent monitoring wells at the facility on October 13 and 14, 2016. After groundwater level measurements were documented, field personnel collected groundwater samples using a peristaltic pump. New dedicated tubing was used to collect the sample at each well. In accordance with the work plan, low-flow sampling procedures were used. Sampling flow rates ranged from 240 to 350 milliliters per minute for purging and groundwater sample collection.

A calibrated YSI 600 multi-probe water meter was used to measure field parameters during well purging, and before and after sampling. A HACH 2100Q meter was used to measure turbidity. Water quality parameters measured with the YSI 600 included pH, dissolved oxygen, oxidation-reduction potential, and specific conductance. Low-flow pumping continued until field parameters stabilized within acceptable parameter limits, before samples were collected. Attachment A includes the logs of field parameters measured during the low-flow sampling.

Groundwater Sample Analysis

Once obtained, groundwater samples were labeled in accordance with Tetra Tech, Inc. (Tetra Tech) standard operating procedures, placed in a cooler, and chilled to below 4 degrees Celsius. Samples were delivered directly to ALS Laboratories (ALS), located at 1317 S. 13th Avenue in Kelso, Washington. Samples were delivered following standard chain-of-custody protocol. Chain-of-custody forms are included with the laboratory data packages in Attachment B.

ALS analyzed the samples for total petroleum hydrocarbons-diesel (TPH-DRO) and total petroleum hydrocarbons-residual range organics (TPH-RRO) by Method Northwest Total Petroleum Hydrocarbons-Diesel Extended Range (Ecology 1997), without silica gel cleanup. ALS also analyzed the samples for polycyclic aromatic hydrocarbons (PAH) by modified U.S. Environmental Protection Agency Method 625-Selected Ion Monitoring. The samples were filtered with a 0.7-micron (μm) filter before analysis by the PAH method.

Groundwater Sample Analytical Results

Table 1 presents analyte concentrations for the sample analyses of permanent groundwater wells sampled during the October 2016 event. TPH-DRO was detected at low concentrations in samples from all five wells, ranging from 23 to 130 micrograms per liter ($\mu\text{g/L}$). These levels are below the Washington Model Toxic Control Act (MTCA) Method A cleanup level for groundwater of 500 $\mu\text{g/L}$.

TPH-RRO was detected in all five wells, ranging from 90 to 130 $\mu\text{g/L}$. Samples from all five wells were below the 500 $\mu\text{g/L}$ TPH-RRO MTCA Method A cleanup level for groundwater.

All the TPH-DRO and TPH-RRO detections carry a J qualifier that indicates that the concentration is estimated because the constituent was detected below the reporting limit, but above the method detection limit.

The laboratory method blank contained TPH-DRO at a concentration of 22 $\mu\text{g/L}$ with a J qualifier and TPH-RRO at 23 $\mu\text{g/L}$ with a J qualifier. These detections could be used to revise and lower the reported concentrations for some of the field samples, but such revisions would not significantly affect the results or change the conclusions in this report.

Low concentrations of PAHs were detected in all monitoring wells; Table 1 summarizes these results. There are no total PAH or compound-specific MTCA Method A cleanup levels for PAHs. The MTCA Method A cleanup level of 0.1 µg/L for PAHs is based on the benzo(a)pyrene toxic equivalent quotient (BaP TEQ). Table 1 also shows the BaP TEQ results, which are based on the individual PAH analytical results in Appendix B. None of the BaP TEQ constituents (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3cd)pyrene) were detected in the samples from MW-01 and MW-02. BaP TEQ concentrations were 0.00028 µg/L, 0.0004 µg/L and 0.00041 µg/L in MW-03, MW-04 and MW-5, respectively, below the MTCA Method A cleanup level of 0.1 µg/L.

Table 2 summarizes the historical results for DRO and RRO for each well. Table 3 summarizes the historical results for BaP TEQ for each well.

Conclusions and Recommendations

For the first sampling event of 2016, analytical results for samples from all five wells were below MTCA Method A cleanup level for BaP TEQ and TPH-RRO. Four of the wells were below the MTCA Method A cleanup level for TPH-DRO, but the sample from well MW-02 contained elevated concentrations of TPH that exceeded the MTCA Method A cleanup level.

During the second and third sampling event of 2016, analytical results for samples from all monitoring wells had concentrations of TPH-DRO, TPH-RRO, and BaP TEQ below MTCA Method A cleanup levels. MW-02 had the highest concentrations of TPH-DRO and TPH-RRO, however, the MTCA Method A cleanup levels were not exceeded.

Tetra Tech recommends that quarterly sampling continue at the five monitoring wells to demonstrate continued contaminant concentrations below MTCA Method A cleanup levels. The fourth quarterly sampling event for 2016 is scheduled for December.

If you have any questions or concerns, please contact me at (303) 312-8856 or david.berestka@tetratech.com.

Sincerely,



David Berestka, P.E.
Project Manager
Tetra Tech, Inc.



Rob Tisdale, Ph.D.
Chemist and Program Manager
Tetra Tech, Inc.

cc: Ed Clement, Regional Environmental Health and Safety Manager, CenturyLink

Attachments:

- A Low-Flow Groundwater Sampling Parameter Forms
- B Laboratory Analytical Reports and Chain-of-Custody Records

ANALYTICAL RESULTS TABLES

TABLE 1
GROUNDWATER SAMPLE ANALYTICAL RESULTS
CENTURYLINK LONGVIEW, WASHINGTON FACILITY

Analyte		TPH-DRO	TPH-RRO	Total PAH	BaP TEQ
MTCA Method A Cleanup Level		500 (µg/L)	500 (µg/L)	NA	0.1 (µg/L)
Location	Date				
MW-01	10/13/2016	23 J	94 J	0.0083	<0.0026
MW-02	10/14/2016	130 J	130 J	0.034	<0.0026
MW-03	10/14/2016	39 J	98 J	0.016	0.00028
MW-04	10/13/2016	39 J	90 J	0.68	0.0004
MW-05	10/13/2016	48 J	100 J	2.8	0.00041

Notes:

All concentrations in micrograms per liter (µg/L)

For wells with duplicate samples, the highest value reported is shown for each constituent

BaP TEQ Benzo(a)Pyrene Toxic Equivalent Quotient

J Data qualifier indicating that the result is an estimated quantity below reporting limit

MTCA Model Toxics Control Act Method A for groundwater

NA Not applicable (no applicable MTCA standard)

PAH Polycyclic aromatic hydrocarbon

TPH-DRO Total petroleum hydrocarbons diesel range organics

TPH-RRO Total petroleum hydrocarbons residual range organics

< 0.01 Concentration is less than the method detection limit shown

TABLE 2
HISTORICAL GROUNDWATER SAMPLE RESULTS – DRO AND RRO
CENTURYLINK LONGVIEW, WASHINGTON FACILITY

Analyte	Date	Sampling Method	MW-01	MW-02	MW-03	MW-04	MW-05
TPH-DRO (MTCA Method A Cleanup Level = 500 µg/L)	3/25/1992	Bailer	82	112	<50	--	--
	12/16/2003	Bailer	<250	<250	<250	--	--
	8/10/2006	Bailer	<50	140	<50	--	--
	9/23/2008	Bailer	--	--	--	<50	140
	2/26/2010	Bailer	--	--	--	<25	100
	9/2/2011	Bailer	--	--	--	73	120
	2/26/2013	Bailer	--	--	--	1,700	<51
	6/3/2013	Bailer	<50	66	<50	210	<50
	12/5/2013	Bailer	97	72	47	1,500	100
	3/27/2014	Bailer	63	87	<250	550	47
	6/25/2014	Bailer	50	33	<260	1,100	<260
	9/10/2014	Bailer	240	90	36	790	48
	3/5/2015	Low Flow	22	82	20	20	27
	7/20/2015	Low Flow	22	77	21	24	30
	12/18/15	Low Flow	38	83	46	96	120
	3/31/16	Low Flow	41	1,500	58	30	30
	7/7/2016	Low Flow	24	330	22	34	21
	10/13/2016	Low Flow	23	130	39	39	48
TPH-RRO (MTCA Method A Cleanup Level = 500 µg/L)	3/25/1992	Bailer	<200	<200	<200	--	--
	8/10/2006	Bailer	<250	<250	<250	--	--
	9/23/2008	Bailer	--	--	--	<250	<250
	2/26/2010	Bailer	--	--	--	140	200
	9/2/2011	Bailer	--	--	--	350	210
	2/26/2013	Bailer	--	--	--	11,000	220
	6/3/2013	Bailer	150	<100	<100	1,600	<100
	12/5/2013	Bailer	440	120	120	11,000	170
	3/27/2014	Bailer	370	63	<500	3,900	190
	6/25/2014	Bailer	340	62	21	8,400	51
	9/10/2014	Bailer	1,500	140	120	6,600	82
	3/5/2015	Low Flow	43	70	37	48	53
	7/20/2015	Low Flow	52	71	49	52	42
	12/18/15	Low Flow	84	160	81	81	82
	3/31/16	Low Flow	83	340	110	54	53
	7/7/2016	Low Flow	44	140	41	33	34
	10/13/2016	Low Flow	94	130	98	90	100

Notes:

All concentrations in micrograms per liter (µg/L)
Bold values indicate exceedance of the MTCA Method A Cleanup Level
For wells with duplicate samples, the highest value reported is shown for each constituent
MTCA Model Toxics Control Act Method A for groundwater
TPH-DRO Total petroleum hydrocarbons diesel range organics
TPH-RRO Total petroleum hydrocarbons residual range organics
-- Not sampled
< 0.01 Concentration is less than the method detection limit shown

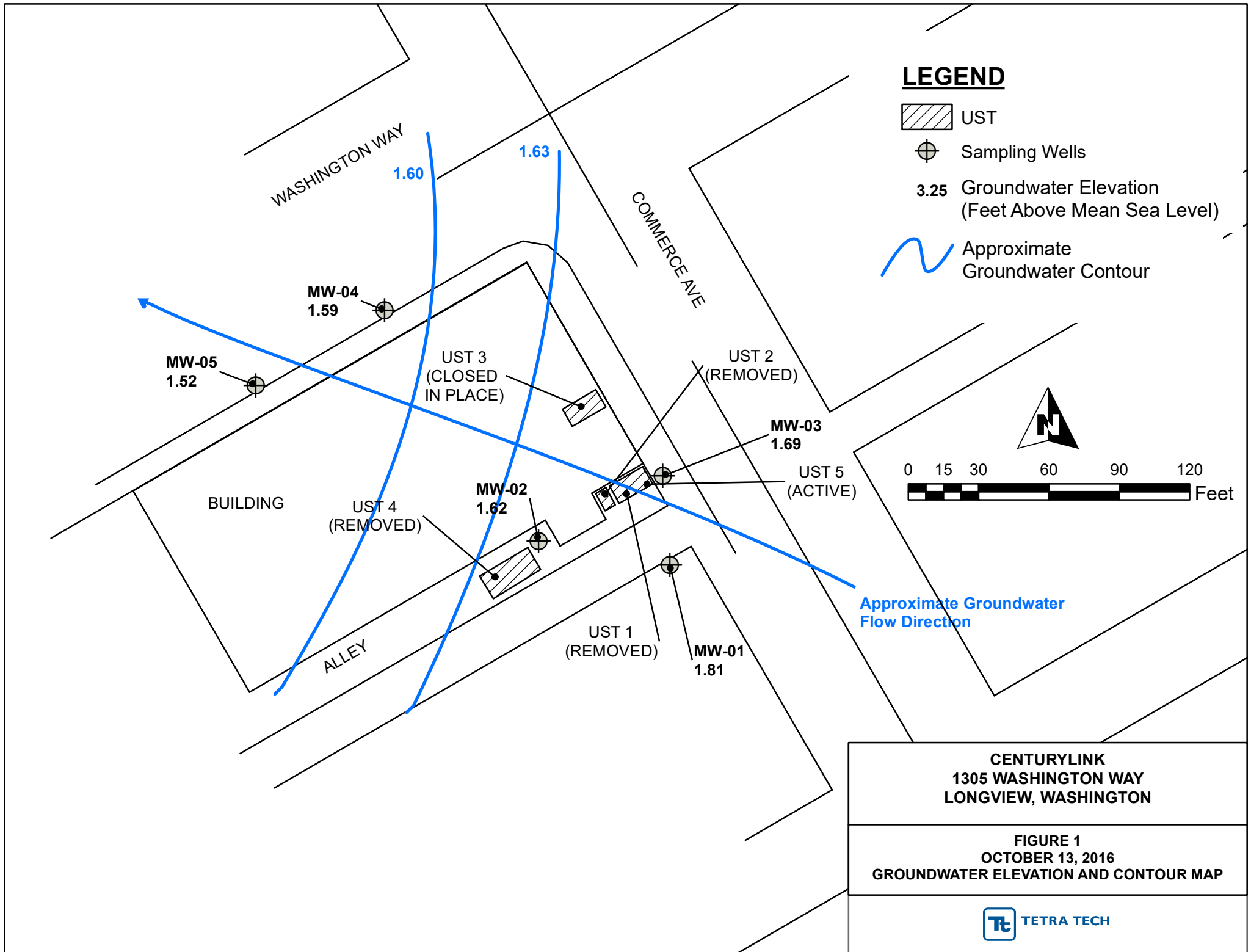
TABLE 3
HISTORICAL GROUNDWATER SAMPLE ANALYTICAL RESULTS –
BAP TEQ AND TOTAL PAH
CENTURYLINK LONGVIEW, WASHINGTON FACILITY

Analyte	Date	Sampling Method	MW-01	MW-02	MW-03	MW-04	MW-05
BaP TEQ Unfiltered analysis (MTCA Method A Cleanup Level = 0.1 µg/L)	6/3/2013	Bailer	2.2	< 0.1	< 0.1	0.36	< 0.1
	12/5/2013	Bailer	0.20	0.027	0.074	1.4	0.0062
	3/27/2014	Bailer	0.37	0.080	0.049	0.27	0.073
	6/25/2014	Bailer	0.39	0.012	0.00033	0.40	0.0054
	9/10/2014	Bailer	0.14	0.090	0.0037	0.39	0.0051
BaP TEQ Filtered analysis (MTCA Method A Cleanup Level = 0.1 µg/L)	12/5/2013	Bailer	0.00033	--	0.00068	0.00084	--
	3/27/2014	Bailer	< 0.019	< 0.019	--	< 0.019	< 0.019
	6/25/2014	Bailer	< 0.020	--	--	< 0.200	--
	9/10/2014	Bailer	0.00030	0.00027	--	< 0.020	--
	3/5/2015	Low Flow	0.00074	0.00038	< 0.019	0.00044	0.00029
	7/20/2015	Low Flow	0.00029	< 0.020	< 0.021	< 0.021	< 0.021
	12/18/2015	Low Flow	0.0065	0.00029	< 0.019	0.00050	0.00039
	3/31/2016	Low Flow	0.00035	< 0.020	< 0.020	0.00026	< 0.020
	7/7/2016	Low Flow	< 0.020	< 0.020	0.00027	0.00035	< 0.020
	10/13/2016	Low Flow	<0.0026	<0.0026	0.00028	0.00040	0.00041
Total PAH Unfiltered analysis (No MTCA Method A Cleanup Level)	6/3/2013	Bailer	16	1.6	< 0.1	8.7	< 0.1
	12/5/2013	Bailer	1.7	0.83	0.85	16	2.4
	3/27/2014	Bailer	3.5	1.3	0.50	3.1	0.80
	6/25/2014	Bailer	3.9	2.3	0.12	4.8	0.37
	9/10/2014	Bailer	1.2	1.5	0.049	6.0	5.5
Total PAH Filtered analysis (No MTCA Method A Cleanup Level)	12/5/2013	Bailer	0.028	--	0.043	0.52	--
	3/27/2014	Bailer	0.018	0.21	--	0.080	0.064
	6/25/2014	Bailer	0.063	--	--	0.11	--
	9/10/2014	Bailer	0.012	0.041	--	0.42	--
	3/5/2015	Low Flow	0.046	0.58	0.013	0.24	0.26
	7/20/2015	Low Flow	0.0077	0.019	0.0056	0.29	0.15
	12/18/2015	Low Flow	0.039	1.9	< 0.019	9.7	8.5
	3/31/2016	Low Flow	0.0035	0.032	< 0.020	0.041	0.0092
	7/7/2016	Low Flow	< 0.020	0.019	0.0092	2.2	0.024
	10/13/2016	Low Flow	0.0083	0.034	0.016	0.68	2.8

Notes:

All concentrations in micrograms per liter (µg/L)
Bold values indicate exceedance of the MTCA Cleanup Level
 For wells with duplicate samples, the highest value reported is shown for each constituent
 BaP TEQ Benzo(a)Pyrene Toxic Equivalent Quotient
 MTCA Model Toxics Control Act Method A for groundwater
 PAH Polycyclic aromatic hydrocarbon
 -- Not analyzed
 < 0.01 Concentration is less than the method detection limit shown

FIGURE



CENTURYLINK
1305 WASHINGTON WAY
LONGVIEW, WASHINGTON

FIGURE 1
OCTOBER 13, 2016
GROUNDWATER ELEVATION AND CONTOUR MAP

ATTACHMENT A
LOW-FLOW GROUNDWATER SAMPLING PARAMETER FORMS

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1
Date 10/13/18

Well Name MV-1

Project Century Link - Longview GW Sampling

Project No. _____

Well Location _____

Sample Date _____

Sampling Personnel _____

Sample ID _____

Duplicate ID _____

Screen Interval _____

Station Elevation _____ GND _____ TOC _____

Static Water Level (from TOC) _____

Well Stick Up _____

Static Elevation 13.83'

Well Depth _____ MEAS _____ RPTD _____

Feet of Water _____

Gallons/Foot _____

Casing Volume _____

Immiscible Phases Present ☐ Yes ☐ No

Type _____

Measured with _____

PID Readings (background) _____

PID Reading (TOC) _____

Wells Installed by _____

Installation Date _____

Development Date(s) _____

FIELD CHEMISTRY CALIBRATIONS

Date/Time _____ Spec. Conductance: Standard _____ μ mhos/cm at 25 $^{\circ}$ C Reading _____ μ mhos/cm at _____ $^{\circ}$ C

pH: pH 4.00 - _____ at _____ $^{\circ}$ C pH 7.00 - _____ at _____ $^{\circ}$ C pH 10.00 - _____ at _____ $^{\circ}$ C Slope NA

Dissolved Oxygen: D.O. Meter _____ mg/L at _____ $^{\circ}$ C PID: Calibration Gas _____ PPM _____ Span _____ Reading _____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. ($^{\circ}$ C)	Specific Conduct. (μ mhos/cm at $^{\circ}$ C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
15:30	240	4.02	6.41	124.5	14.45	0.22	140.29						
15:35	300	1.55	6.43	128	14.53	0.23	73.7						
15:40	300	0.78	6.43	131	14.58	0.23							
15:45	300	0.47	6.4	120	14.20	0.27	12.5						
15:50	300	0.48	6.4	118	14.20	0.26	27.3						
15:55	300	0.43	6.45	115	14.18	0.28	81.8						
16:00	300												
16:05	300	0.4	6.46	116	14.14	0.29	20.1						

SAMPLE PARAMETERS

16:00	16:00	300	0.4	6.45	117	14.15	20.8						
-------	-------	-----	-----	------	-----	-------	------	--	--	--	--	--	--

Condition of well: _____

Remarks: _____

FIELD EQUIPMENT

pH Meter _____ Serial Number _____

Spec. Cond. Meter _____ Serial Number _____

Pump _____ Serial Number _____

Water Level Meter _____ Serial Number _____

D.O. Meter _____ Serial Number _____

Filter Apparatus _____ Filters _____

Temperature Measure _____

Interface Probe _____ Serial Number _____

PID/OVA _____ Serial Number _____

Field Chemistry Calibrations

Fractions _____

Number of Bottles _____

Sample Depth _____

Field Notebook _____

Sample Method _____

Discharge Water Containerized ☒ Yes ☐ No

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1
Date 10/14/16

MW-2

Well Name _____
Project Century Link - Longview GW Sampling
Project No. _____
Well Location _____
Sample Date 10/14/16
Sampling Personnel _____
Sample ID _____
Duplicate ID _____

Screen Interval _____
Station Elevation _____ **GND** _____ **TOC** _____
Static Water Level (from TOC) _____
Well Stick Up _____
Static Elevation 14.51
Well Depth _____ **MEAS** _____ **RPTD** _____
Feet of Water _____
Gallons/Foot _____
Casing Volume _____

Immiscible Phases Present ☐ Yes ☐ No
Type _____
Measured with _____
PID Readings (background) _____
PID Reading (TOC) _____
Wells Installed by _____
Installation Date _____
Development Date(s) _____

FIELD CHEMISTRY CALIBRATIONS

Date/Time _____ **Spec. Conductance: Standard** _____ **µmhos/cm at 25°C** **Reading** _____ **µmhos/cm at** _____ **°C**
pH: pH 4.00 - _____ **at** _____ **°C** **pH 7.00 -** _____ **at** _____ **°C** **pH 10.00 -** _____ **at** _____ **°C** **Slope** NA
Dissolved Oxygen: D.O. Meter _____ **mg/L at** _____ **°C** **PID: Calibration Gas** _____ **PPM** _____ **Span** _____ **Reading** _____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (°C)	Specific Conduct. (µmhos/cm at °C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
10:55	350	4.35	6.4	115	15.8	0.309	2.43						
11:00	350	4.33	6.3	119	15.8	0.308	1.22						
11:05	350	2.58	6.3	124	15.8	0.309	0.24						
11:10	350	2.04	6.3	128	15.7	0.309	0.22						
11:15	350	1.80	6.3	130	15.7	0.310	0.19						
11:20	350	1.70	6.3	130	15.6	0.310	0.19						
11:25	350	1.50	6.2	130	15.6	0.309	0.22						
11:30	350	1.6	6.2	129	15.6	0.309	0.21						

SAMPLE PARAMETERS

11:30	350	1.53	6.3	129	15.6	0.309	0.18						
-------	-----	------	-----	-----	------	-------	------	--	--	--	--	--	--

Condition of well: _____

Remarks: _____

FIELD EQUIPMENT

pH Meter _____ **Serial Number** _____
Spec. Cond. Meter _____ **Serial Number** _____
Pump _____ **Serial Number** _____
Water Level Meter _____ **Serial Number** _____
D.O. Meter _____ **Serial Number** _____
Filter Apparatus _____ **Filters** _____
Temperature Measure _____
Interface Probe _____ **Serial Number** _____
PID/OVA _____ **Serial Number** _____

Field Chemistry Calibrations

Fractions _____
Number of Bottles _____
Sample Depth _____
Field Notebook _____
Sample Method _____
Discharge Water Containerized ☒ Yes ☐ No

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Well Name MW-3

Project Century Link - Longview GW Sampling

Project No. _____

Well Location _____

Sample Date 10/14/16

Sampling Personnel MP UP

Sample ID _____

Duplicate ID _____

Screen Interval _____

Station Elevation _____ GND _____ TOC _____

Static Water Level (from TOC) _____

Well Stick Up _____

Static Elevation 13.27' BTG

Well Depth _____

Feet of Water _____

Gallons/Foot _____

Casing Volume 40 in, at 15.5'

Immiscible Phases Present ☐ Yes ☐ No

Type _____

Measured with _____

PID Readings (background) _____

PID Reading (TOC) _____

Wells Installed by _____

Installation Date _____

Development Date(s) _____

FIELD CHEMISTRY CALIBRATIONS

Date/Time _____

pH: pH 4.00 - _____ at _____ °C

Dissolved Oxygen: D.O. Meter _____ mg/L at _____ °C

Spec. Conductance: Standard _____

pH 7.00 - _____ at _____ °C

PID: Calibration Gas _____ PPM _____ Span _____

µmhos/cm at 25 °C Reading _____ µmhos/cm at _____ °C

pH 10.00 - _____ at _____ °C Slope NA

Reading _____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (°C)	Specific Conductance (µmhos/cm at °C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
9:45	350	1.55	6.3	117	14.7	0.270	1.49						
9:50	350	0.72	6.5	62.7	14.5	0.268	1.49						
9:55	350	0.67	6.5	76.8	14.5	0.268	1.49						
10:00	350	0.55	6.4	71.9	14.4	0.267	1.40						
10:05	350	0.49	6.4	69.4	14.5	0.267	1.44						
10:10	350	0.48	6.4	69.1	14.6	0.267	1.18						
10:15	350	0.45	6.4	70.1	14.7	0.267	0.66						
10:30	350	0.61	6.4	64.5	14.6	0.267	0.92						

SAMPLE PARAMETERS

Condition of well: _____

Remarks: _____

FIELD EQUIPMENT

pH Meter _____

Spec. Cond. Meter _____

Pump _____

Water Level Meter _____

D.O. Meter _____

Filter Apparatus _____

Temperature Measure _____

Interface Probe _____

PID/OVA _____

Serial Number _____

Serial Number _____

Serial Number _____

Serial Number _____

Serial Number _____

Filters _____

Serial Number _____

Serial Number _____

Serial Number _____

Field Chemistry Calibrations

Fractions _____

Number of Bottles _____

Sample Depth _____

Field Notebook _____

Sample Method _____

Discharge Water Containerized ☒ Yes ☐ No

MICROPURGING GROUNDWATER
SAMPLING DATA SHEETPage 1 of 1
Date 10/13

Well Name MW-4 Screen Interval _____
Project Century Link - Longview GW Sampling Station Elevation _____ GND _____ TOC _____ Immiscible Phases Present ☐ Yes ☐ No
Project No. _____ Static Water Level (from TOC) _____ Type _____
Well Location _____ Well Stick Up 12.46' Measured with _____
Sample Date _____ Static Elevation 12.46' PID Readings (background) _____
Sampling Personnel _____ Well Depth _____ MEAS _____ RPTD _____ PID Reading (TOC) _____
Feet of Water _____ Wells Installed by _____
Sample ID _____ Gallons/Foot _____ Installation Date _____
Duplicate ID _____ Casing Volume _____ Development Date(s) _____

FIELD CHEMISTRY CALIBRATIONS

Date/Time _____ Spec. Conductance: Standard _____ $\mu\text{mhos/cm}$ at 25°C Reading _____ $\mu\text{mhos/cm}$ at _____ °C
pH: pH 4.00 - _____ at _____ °C pH 7.00 - _____ at _____ °C pH 10.00 - _____ at _____ °C Slope NA
Dissolved Oxygen: D.O. Meter _____ mg/L at _____ °C PID: Calibration Gas _____ PPM _____ Span _____ Reading _____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (°C)	Specific Conduct. ($\mu\text{mhos/cm}$ at °C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
1355	250	1.48	6.21	163.3	13.92	0.208	2.86						
1400	250	0.75	6.24	114.0	13.79	0.203	1.07						
1405	250	0.56	6.20	82.2	13.75	0.209	0.81						
1410	250	0.51	6.21	76.0	13.74	0.210	0.50						
1415	250	0.4	6.21	69.2	13.74	0.210	0.50						
1420	250	0.41	6.21	65.0	13.74	0.211	0.45						
1440	250	0.50	6.28	53.1	13.73	0.212	0.86						

SAMPLE PARAMETERS

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Condition of well: _____

Remarks: _____

FIELD EQUIPMENT

pH Meter _____	Serial Number _____	Field Chemistry Calibrations
Spec. Cond. Meter _____	Serial Number _____	Fractions _____
Pump _____	Serial Number _____	
Water Level Meter _____	Serial Number _____	Number of Bottles _____
D.O. Meter _____	Serial Number _____	Sample Depth _____
Filter Apparatus _____	Filters _____	Field Notebook _____
Temperature Measure _____		Sample Method _____
Interface Probe _____	Serial Number _____	
PID/OVA _____	Serial Number _____	Discharge Water Containerized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1
Date 10/13/10

Well Name MW-5

Screen Interval 13.23' BTOC

Project Century Link - Longview GW Sampling

Station Elevation _____ GND _____ TOC _____ Immiscible Phases Present ☐ Yes ☐ No

Project No. _____

Static Water Level (from TOC) _____ Type _____

Well Location _____

Well Stick Up _____ Measured with _____

Sample Date 10/13/10

Static Elevation _____ PID Readings (background) _____

Sampling Personnel MT/JP

Well Depth _____ MEAS _____ RPTD _____ PID Reading (TOC) _____

Feet of Water _____ Wells Installed by _____

Sample ID _____

Gallons/Foot _____ Installation Date _____

Duplicate ID _____

Casing Volume _____ Development Date(s) _____

FIELD CHEMISTRY CALIBRATIONS

Date/Time _____ Spec. Conductance: Standard _____ $\mu\text{mhos/cm}$ at 25°C Reading _____ $\mu\text{mhos/cm}$ at _____ °C

pH: pH 4.00 - _____ at _____ °C pH 7.00 - _____ at _____ °C pH 10.00 - _____ at _____ °C Slope NA

Dissolved Oxygen: D.O. Meter _____ mg/L at _____ °C PID: Calibration Gas _____ PPM _____ Span _____ Reading _____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (°C)	Specific Conduct. ($\mu\text{mhos/cm}$ at °C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
1230	275	0.7	5.70	225	14.8	0.260	2.73						
1235	275	0.64	5.73	224	14.84	0.259	1.57						
1240	275	0.51	5.75	224	14.84	0.258	1.42						
1245	275	0.5	5.76	222	14.85	0.258	0.72						
1250	275	0.52	5.78	218.7	14.85	0.258	0.85						
1255	275	0.52	5.79	216	14.85	0.258	0.61						
1300	275	0.51	5.81	212.0	14.85	0.258	0.40						
1325	275	0.71	5.88	203	14.78	0.258	0.35						

SAMPLE PARAMETERS

1305	275	0.53	5.81	210.8	14.84	0.258	0.41						
------	-----	------	------	-------	-------	-------	------	--	--	--	--	--	--

Condition of well: _____

Remarks: _____

FIELD EQUIPMENT

pH Meter _____ Serial Number _____

Spec. Cond. Meter _____ Serial Number _____

Pump _____ Serial Number _____

Water Level Meter _____ Serial Number _____

D.O. Meter _____ Serial Number _____

Filter Apparatus _____ Filters _____

Temperature Measure _____

Interface Probe _____ Serial Number _____

PID/OVA _____ Serial Number _____

Field Chemistry Calibrations

Fractions _____

Number of Bottles _____

Sample Depth _____

Field Notebook _____

Sample Method _____

Discharge Water Containerized ☒ Yes ☐ No

ATTACHMENT B
LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY RECORDS
OCTOBER 2016 SAMPLING EVENT



ALS Environmental
ALS Group USA, Corp
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November 03, 2016

Analytical Report for Service Request No: K1612470

Rob Tisdale
Tetra Tech EM, Incorporated
216 16th St , Suite 1500
Denver, CO 80202

RE: CenturyLink Longview WA / 103P3080177

Dear Rob,

Enclosed are the results of the sample(s) submitted to our laboratory October 14, 2016
For your reference, these analyses have been assigned our service request number **K1612470**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at gregory.salata@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Gregory Salata, Ph.D.
Senior Project
Manager



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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS ENVIRONMENTAL

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/ 103P3080177
Sample Matrix: Water

Service Request No.: K1612470
Date Received: 10/14/16

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt

Two water samples were received for analysis at ALS Environmental on 10/14/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Diesel Range Organics by Method NWTPH-Dx

Calibration Verification Exceptions:

The upper control criterion was exceeded for Diesel Range Organics (DRO) in Continuing Calibration Verification (CCV) KWG1609756-2. The field samples analyzed in this sequence did not contain the analyte in question above the method reporting limit (MRL). Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Relative Percent Difference Exceptions:

The Relative Percent Difference (RPD) criterion for the replicate analysis of Diesel Range Organics (DRO) and Residual Range Organics (RRO) in Batch QC was not applicable because the analytes concentrations were not significantly greater than the Method Reporting Limit (MRL). Analytical values derived from measurements close to the detection limit are not subject to the same accuracy and precision criteria as results derived from measurements higher on the calibration range for the method.

No other anomalies associated with the analysis of these samples were observed.

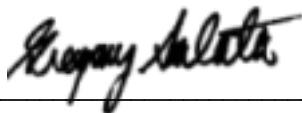
Polynuclear Aromatic Hydrocarbons by EPA Method 8270

Sample Notes and Discussion:

Per the client instructions, the samples were filtered prior to extraction and silica gel cleanup was not performed on these samples.

No anomalies associated with the analysis of these samples were observed.

Approved by _____





Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K 1612470



Bill to:	Vanessa Pineda		
Company:	Tetra Tech		
Address:	216 16th Street Suite 1500		
City, State ZIP:	Denver, CO 80202		
Email:	vanessa.pineda@tetrattech.com	Phone	303-312-8812

Environmental www.caslab.com ■ www.alsglobal.com

PC Greg

Cooler Receipt and Preservation Form

Client Tetra Tech Service Request K16 12470Received: 10/14/16 Opened: 10/14/16 By: UU Unloaded: 10/14/16 By: UU

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____
- If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
<u>11.9</u>	<u>11.9</u>	<u>7.9</u>	<u>7.9</u>	<u>0.0</u>	<u>308</u>	<u>NA</u>		<u>NA</u>	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Were samples received in good condition (temperature, unbroken)? NA Y N
If applicable, tissue samples were received: Frozen Partially Thawed Thawed
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? NA Y N
Indicate major discrepancies in the table on page 2.
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? NA Y N
Indicate in the table below.
11. Were VOA vials received without headspace? NA Y N
Indicate in the table below.
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: Insufficient time for the samples to chill completely.



Diesel and Residual Range Organics

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: 10/14/2016
Date Received: 10/14/2016

Diesel and Residual Range Organics

Sample Name: MW-3 **Units:** ug/L
Lab Code: K1612470-001 **Basis:** NA
Extraction Method: EPA 3510C **Level:** Low
Analysis Method: NWTPH-Dx

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	39	J	270	12	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	98	J	530	20	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	81	50-150	10/25/16	Acceptable
n-Triacontane	79	50-150	10/25/16	Acceptable

Comments: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: 10/14/2016
Date Received: 10/14/2016

Diesel and Residual Range Organics

Sample Name: MW-2
Lab Code: K1612470-002
Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	130	J	260	12	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	130	J	520	20	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	80	50-150	10/25/16	Acceptable
n-Triacontane	77	50-150	10/25/16	Acceptable

Comments: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank
Lab Code: KWG1609544-4
Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	22	J	250	11	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	91	J	500	19	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	76	50-150	10/25/16	Acceptable
n-Triacontane	80	50-150	10/25/16	Acceptable

Comments: _____

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
MW-3	K1612470-001	81	79
MW-2	K1612470-002	80	77
Batch QC	K1612569-001	83	86
Batch QC	K1612571-001	81	84
Batch QCDUP	KWG1609544-1	83	85
Batch QCDUP	KWG1609544-2	82	87
Method Blank	KWG1609544-4	76	80
Lab Control Sample	KWG1609544-3	81	83

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl	50-150
Sur2 = n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Extracted: 10/20/2016
Date Analyzed: 10/26/2016

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K1612571-001
Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG1609544-1 Duplicate Sample		Relative Percent Difference	RPD Limit
				Result	Average		
Diesel Range Organics (DRO)	260	12	150	120	130	26 #	30
Residual Range Organics (RRO)	520	20	950	660	800	37 #	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Extracted: 10/20/2016
Date Analyzed: 10/26/2016

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K1612569-001
Extraction Method: EPA 3510C
Analysis Method: NWTPEH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG1609544-2 Duplicate Sample		Relative Percent Difference	RPD Limit
				Result	Average		
Diesel Range Organics (DRO)	260	12	66	48	57	32 #	30
Residual Range Organics (RRO)	520	20	180	110	140	43 #	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Extracted: 10/20/2016
Date Analyzed: 10/25/2016

Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Lab Control Sample
 KWG1609544-3
 Lab Control Spike

Analyte Name	Result	Spike Amount	%Rec	%Rec Limits
Diesel Range Organics (DRO)	2340	3200	73	46-140
Residual Range Organics (RRO)	1550	1600	97	45-159

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



Polynuclear Aromatic Hydrocarbons

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: 10/14/2016
Date Received: 10/14/2016

Polynuclear Aromatic Hydrocarbons

Sample Name: MW-3
Lab Code: K1612470-001
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.0064	J	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.019	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.019	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	0.0069	J	0.019	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	ND	U	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	ND	U	0.019	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	ND	U	0.019	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	ND	U	0.019	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	ND	U	0.019	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	ND	U	0.019	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	0.0028	J	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.019	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.019	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.019	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.019	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.019	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	75	42-131	10/25/16	Acceptable
Fluoranthene-d10	93	42-133	10/25/16	Acceptable
Terphenyl-d14	93	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: 10/14/2016
Date Received: 10/14/2016

Polynuclear Aromatic Hydrocarbons

Sample Name: MW-2
Lab Code: K1612470-002
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.019	0.0038	1	10/20/16	10/27/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.019	0.0023	1	10/20/16	10/27/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.019	0.0035	1	10/20/16	10/27/16	KWG1609551	
Acenaphthylene	ND	U	0.019	0.0034	1	10/20/16	10/27/16	KWG1609551	
Acenaphthene	ND	U	0.019	0.0044	1	10/20/16	10/27/16	KWG1609551	
Fluorene	ND	U	0.019	0.0038	1	10/20/16	10/27/16	KWG1609551	
Phenanthrene	ND	U	0.019	0.0050	1	10/20/16	10/27/16	KWG1609551	
Anthracene	0.0082	J	0.019	0.0036	1	10/20/16	10/27/16	KWG1609551	
Carbazole	ND	U	0.019	0.0045	1	10/20/16	10/27/16	KWG1609551	
Fluoranthene	ND	U	0.019	0.010	1	10/20/16	10/27/16	KWG1609551	
Pyrene	0.026		0.019	0.0053	1	10/20/16	10/27/16	KWG1609551	
Benz(a)anthracene	ND	U	0.019	0.0026	1	10/20/16	10/27/16	KWG1609551	
Chrysene	ND	U	0.019	0.0034	1	10/20/16	10/27/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.019	0.0041	1	10/20/16	10/27/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.019	0.0030	1	10/20/16	10/27/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.019	0.0043	1	10/20/16	10/27/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.019	0.0026	1	10/20/16	10/27/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.019	0.0025	1	10/20/16	10/27/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.019	0.0029	1	10/20/16	10/27/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	77	42-131	10/27/16	Acceptable
Fluoranthene-d10	93	42-133	10/27/16	Acceptable
Terphenyl-d14	89	32-129	10/27/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG1609551-3
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	ND	U	0.020	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	ND	U	0.020	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	ND	U	0.020	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	ND	U	0.020	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	ND	U	0.020	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	ND	U	0.020	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	ND	U	0.020	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	ND	U	0.020	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	ND	U	0.020	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.020	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	81	42-131	10/25/16	Acceptable
Fluoranthene-d10	92	42-133	10/25/16	Acceptable
Terphenyl-d14	93	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>	<u>Sur3</u>
MW-3	K1612470-001	75	93	93
MW-2	K1612470-002	77	93	89
Method Blank	KWG1609551-3	81	92	93
Lab Control Sample	KWG1609551-1	83	96	89
Duplicate Lab Control Sample	KWG1609551-2	80	91	86

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	42-131
Sur2 = Fluoranthene-d10	42-133
Sur3 = Terphenyl-d14	32-129

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612470
Date Extracted: 10/20/2016
Date Analyzed: 10/25/2016

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609551

Analyte Name	Lab Control Sample KWG1609551-1 Lab Control Spike			Duplicate Lab Control Sample KWG1609551-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
Naphthalene	2.46	2.50	98	2.47	2.50	99	52-115	1	30
2-Methylnaphthalene	2.26	2.50	90	2.29	2.50	91	48-120	1	30
1-Methylnaphthalene	2.23	2.50	89	2.25	2.50	90	47-119	1	30
Acenaphthylene	2.57	2.50	103	2.57	2.50	103	58-124	0	30
Acenaphthene	2.48	2.50	99	2.51	2.50	100	63-121	1	30
Fluorene	2.47	2.50	99	2.49	2.50	99	68-121	0	30
Phenanthrene	2.52	2.50	101	2.55	2.50	102	64-126	1	30
Anthracene	2.24	2.50	90	2.29	2.50	92	68-127	2	30
Carbazole	2.66	2.50	106	2.69	2.50	108	68-135	1	30
Fluoranthene	2.52	2.50	101	2.53	2.50	101	70-127	0	30
Pyrene	2.49	2.50	100	2.52	2.50	101	72-127	1	30
Benz(a)anthracene	2.48	2.50	99	2.49	2.50	99	74-124	0	30
Chrysene	2.64	2.50	106	2.66	2.50	106	74-132	1	30
Benzo(b)fluoranthene	2.69	2.50	108	2.75	2.50	110	73-136	2	30
Benzo(k)fluoranthene	2.68	2.50	107	2.75	2.50	110	74-134	3	30
Benzo(a)pyrene	2.38	2.50	95	2.43	2.50	97	75-131	2	30
Indeno(1,2,3-cd)pyrene	2.18	2.50	87	2.30	2.50	92	63-136	6	30
Dibenz(a,h)anthracene	2.33	2.50	93	2.28	2.50	91	59-135	2	30
Benzo(g,h,i)perylene	2.24	2.50	90	2.32	2.50	93	63-127	3	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



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November 03, 2016

Analytical Report for Service Request No: K1612416

Rob Tisdale
Tetra Tech EM, Incorporated
216 16th St , Suite 1500
Denver, CO 80202

RE: Century Link Longview WA / 103P3080177

Dear Rob,

Enclosed are the results of the sample(s) submitted to our laboratory October 13, 2016
For your reference, these analyses have been assigned our service request number **K1612416**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at gregory.salata@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Gregory Salata, Ph.D.
Senior Project
Manager



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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
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ALS ENVIRONMENTAL

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/ 103P3080177
Sample Matrix: Ground Water

Service Request No.: K1612416
Date Received: 10/13/16

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt

Three ground water samples were received for analysis at ALS Environmental on 10/13/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Diesel Range Organics by Method NWTPH-Dx

Calibration Verification Exceptions:

The upper control criterion was exceeded for Diesel Range Organics (DRO) in Continuing Calibration Verification (CCV) KWG1609756-2. The field samples analyzed in this sequence did not contain the analyte in question above the method reporting limit (MRL). Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Relative Percent Difference Exceptions:

The Relative Percent Difference (RPD) criterion for the replicate analysis of Diesel Range Organics (DRO) and Residual Range Organics (RRO) in Batch QC was not applicable because the analytes concentrations were not significantly greater than the Method Reporting Limit (MRL). Analytical values derived from measurements close to the detection limit are not subject to the same accuracy and precision criteria as results derived from measurements higher on the calibration range for the method.

No other anomalies associated with the analysis of these samples were observed.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270

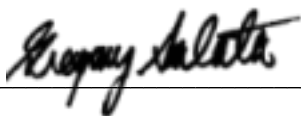
Sample Notes and Discussion:

Per the client instructions, the samples were filtered prior to extraction and silica gel cleanup was not performed on these samples.

The result reported for Fluorene in sample MW-5 may contain a slight bias. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected sample. The result was flagged with "X" to indicate the issue.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____





Chain of Custody

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Part of the ALS Group A Campbell Brothers Limited Company

K16 12416

References

Revised: 7/17/2015

PC GS

Cooler Receipt and Preservation Form

Client Tetra Tech Service Request K16 12416
 Received: 10-13-16 Opened: 10-13-16 By: ES Unloaded: 10-13-16 By: ES

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? _____
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
2.1	2.1	2.7	2.7	0	298	NA		NA	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves _____
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____



Diesel and Residual Range Organics

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Diesel and Residual Range Organics

Sample Name: MW-5
Lab Code: K1612416-001
Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	48	J	260	12	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	100	J	520	20	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	79	50-150	10/25/16	Acceptable
n-Triacontane	81	50-150	10/25/16	Acceptable

Comments: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Diesel and Residual Range Organics

Sample Name: MW-4
Lab Code: K1612416-002
Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	39	J	260	12	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	90	J	520	20	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	86	50-150	10/25/16	Acceptable
n-Triacontane	85	50-150	10/25/16	Acceptable

Comments: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Diesel and Residual Range Organics

Sample Name: MW-1 **Units:** ug/L
Lab Code: K1612416-003 **Basis:** NA
Extraction Method: EPA 3510C **Level:** Low
Analysis Method: NWTPH-Dx

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	23	J	260	12	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	94	J	520	20	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	74	50-150	10/25/16	Acceptable
n-Triacontane	72	50-150	10/25/16	Acceptable

Comments: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank **Units:** ug/L
Lab Code: KWG1609544-4 **Basis:** NA
Extraction Method: EPA 3510C **Level:** Low
Analysis Method: NWTPH-Dx

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	22	J	250	11	1	10/20/16	10/25/16	KWG1609544	*
Residual Range Organics (RRO)	91	J	500	19	1	10/20/16	10/25/16	KWG1609544	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	76	50-150	10/25/16	Acceptable
n-Triacontane	80	50-150	10/25/16	Acceptable

Comments: _____

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416

**Surrogate Recovery Summary
Diesel and Residual Range Organics**

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
MW-5	K1612416-001	79	81
MW-4	K1612416-002	86	85
MW-1	K1612416-003	74	72
Batch QC	K1612569-001	83	86
Batch QC	K1612571-001	81	84
Batch QCDUP	KWG1609544-1	83	85
Batch QCDUP	KWG1609544-2	82	87
Method Blank	KWG1609544-4	76	80
Lab Control Sample	KWG1609544-3	81	83

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl	50-150
Sur2 = n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Extracted: 10/20/2016
Date Analyzed: 10/26/2016

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K1612571-001
Extraction Method: EPA 3510C
Analysis Method: NWTTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG1609544-1 Duplicate Sample		Relative Percent Difference	RPD Limit
				Result	Average		
Diesel Range Organics (DRO)	260	12	150	120	130	26 #	30
Residual Range Organics (RRO)	520	20	950	660	800	37 #	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Extracted: 10/20/2016
Date Analyzed: 10/26/2016

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K1612569-001
Extraction Method: EPA 3510C
Analysis Method: NWTTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG1609544-2 Duplicate Sample		Relative Percent Difference	RPD Limit
				Result	Average		
Diesel Range Organics (DRO)	260	12	66	48	57	32 #	30
Residual Range Organics (RRO)	520	20	180	110	140	43 #	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Extracted: 10/20/2016
Date Analyzed: 10/25/2016

Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609544

Lab Control Sample
KWG1609544-3
Lab Control Spike

Analyte Name	Result	Spike Amount	%Rec	%Rec Limits
Diesel Range Organics (DRO)	2340	3200	73	46-140
Residual Range Organics (RRO)	1550	1600	97	45-159

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



Polynuclear Aromatic Hydrocarbons

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Polynuclear Aromatic Hydrocarbons

Sample Name: MW-5
Lab Code: K1612416-001
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.14		0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	0.095		0.019	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	0.38		0.019	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	0.018	J	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	1.8		0.019	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	0.059	X	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	0.0061	J	0.019	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	0.084		0.019	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	0.18		0.019	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	0.025		0.019	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	0.025		0.019	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	0.0041	J	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.019	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.019	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.019	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.019	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.019	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	81	42-131	10/25/16	Acceptable
Fluoranthene-d10	91	42-133	10/25/16	Acceptable
Terphenyl-d14	91	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Polynuclear Aromatic Hydrocarbons

Sample Name: MW-4
Lab Code: K1612416-002
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.0073	J	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.019	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.019	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	0.0082	J	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	0.34		0.019	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	0.040		0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	ND	U	0.019	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	0.026		0.019	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	0.15		0.019	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	ND	U	0.019	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	0.10		0.019	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	0.0040	J	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.019	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.019	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.019	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.019	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.019	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	80	42-131	10/25/16	Acceptable
Fluoranthene-d10	91	42-133	10/25/16	Acceptable
Terphenyl-d14	89	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416
Date Collected: 10/13/2016
Date Received: 10/13/2016

Polynuclear Aromatic Hydrocarbons

Sample Name: MW-1
Lab Code: K1612416-003
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.019	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.019	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	0.0083	J	0.019	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	ND	U	0.019	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	ND	U	0.019	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	ND	U	0.019	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	ND	U	0.019	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	ND	U	0.019	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	ND	U	0.019	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	ND	U	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.019	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.019	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.019	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.019	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.019	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.019	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.019	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	87	42-131	10/25/16	Acceptable
Fluoranthene-d10	105	42-133	10/25/16	Acceptable
Terphenyl-d14	104	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Analytical Results

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG1609551-3
Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	10/20/16	10/25/16	KWG1609551	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	10/20/16	10/25/16	KWG1609551	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	10/20/16	10/25/16	KWG1609551	
Acenaphthylene	ND	U	0.020	0.0034	1	10/20/16	10/25/16	KWG1609551	
Acenaphthene	ND	U	0.020	0.0044	1	10/20/16	10/25/16	KWG1609551	
Fluorene	ND	U	0.020	0.0038	1	10/20/16	10/25/16	KWG1609551	
Phenanthrene	ND	U	0.020	0.0050	1	10/20/16	10/25/16	KWG1609551	
Anthracene	ND	U	0.020	0.0036	1	10/20/16	10/25/16	KWG1609551	
Carbazole	ND	U	0.020	0.0045	1	10/20/16	10/25/16	KWG1609551	
Fluoranthene	ND	U	0.020	0.010	1	10/20/16	10/25/16	KWG1609551	
Pyrene	ND	U	0.020	0.0053	1	10/20/16	10/25/16	KWG1609551	
Benz(a)anthracene	ND	U	0.020	0.0026	1	10/20/16	10/25/16	KWG1609551	
Chrysene	ND	U	0.020	0.0034	1	10/20/16	10/25/16	KWG1609551	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	10/20/16	10/25/16	KWG1609551	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	10/20/16	10/25/16	KWG1609551	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	10/20/16	10/25/16	KWG1609551	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	10/20/16	10/25/16	KWG1609551	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	10/20/16	10/25/16	KWG1609551	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	10/20/16	10/25/16	KWG1609551	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	81	42-131	10/25/16	Acceptable
Fluoranthene-d10	92	42-133	10/25/16	Acceptable
Terphenyl-d14	93	32-129	10/25/16	Acceptable

† Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments:

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Ground water

Service Request: K1612416

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>	<u>Sur3</u>
MW-5	K1612416-001	81	91	91
MW-4	K1612416-002	80	91	89
MW-1	K1612416-003	87	105	104
Method Blank	KWG1609551-3	81	92	93
Lab Control Sample	KWG1609551-1	83	96	89
Duplicate Lab Control Sample	KWG1609551-2	80	91	86

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	42-131
Sur2 = Fluoranthene-d10	42-133
Sur3 = Terphenyl-d14	32-129

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Tetra Tech EM, Incorporated
Project: Century Link Longview WA/103P3080177
Sample Matrix: Water

Service Request: K1612416
Date Extracted: 10/20/2016
Date Analyzed: 10/25/2016

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 625 SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1609551

Analyte Name	Lab Control Sample KWG1609551-1 Lab Control Spike			Duplicate Lab Control Sample KWG1609551-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
Naphthalene	2.46	2.50	98	2.47	2.50	99	52-115	1	30
2-Methylnaphthalene	2.26	2.50	90	2.29	2.50	91	48-120	1	30
1-Methylnaphthalene	2.23	2.50	89	2.25	2.50	90	47-119	1	30
Acenaphthylene	2.57	2.50	103	2.57	2.50	103	58-124	0	30
Acenaphthene	2.48	2.50	99	2.51	2.50	100	63-121	1	30
Fluorene	2.47	2.50	99	2.49	2.50	99	68-121	0	30
Phenanthrene	2.52	2.50	101	2.55	2.50	102	64-126	1	30
Anthracene	2.24	2.50	90	2.29	2.50	92	68-127	2	30
Carbazole	2.66	2.50	106	2.69	2.50	108	68-135	1	30
Fluoranthene	2.52	2.50	101	2.53	2.50	101	70-127	0	30
Pyrene	2.49	2.50	100	2.52	2.50	101	72-127	1	30
Benz(a)anthracene	2.48	2.50	99	2.49	2.50	99	74-124	0	30
Chrysene	2.64	2.50	106	2.66	2.50	106	74-132	1	30
Benzo(b)fluoranthene	2.69	2.50	108	2.75	2.50	110	73-136	2	30
Benzo(k)fluoranthene	2.68	2.50	107	2.75	2.50	110	74-134	3	30
Benzo(a)pyrene	2.38	2.50	95	2.43	2.50	97	75-131	2	30
Indeno(1,2,3-cd)pyrene	2.18	2.50	87	2.30	2.50	92	63-136	6	30
Dibenz(a,h)anthracene	2.33	2.50	93	2.28	2.50	91	59-135	2	30
Benzo(g,h,i)perylene	2.24	2.50	90	2.32	2.50	93	63-127	3	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.