TETRA TECH

January 16, 2017

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, December 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 December 8 and 9, 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 4.04 to 4.22 feet above mean sea level (amsl), and are summarized in the table below and shown on Figure 1. Groundwater levels were approximately 2.49 feet higher than observed in October 2016.

DECEMBER 9, 2016 GROUNDWATER ELEVATIONS

Location	Surveyed Top of Casing (ft amsl)	December 9, 2016 Depth to Water (ft)	December 9, 2016 Groundwater Elevation (ft amsl)
MW-01	15.64	11.44	4.20
MW-02	16.17	12.03	4.14
MW-03	15.02	10.80	4.22
MW-04	14.55	10.47	4.08
MW-05	14.75	10.71	4.04

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 0.0010 foot per foot. Historically, groundwater flow direction has ranged from west to northwest.

Tetra Tech, Inc.
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Tel 303.312.8800 Fax 303.295.2818 www.tetratech.com

Groundwater Sampling from Permanent Monitoring Wells

Groundwater samples were obtained from all five permanent monitoring wells at the facility on December 8 and 9, 2016; a duplicate sample was collected from well MW-03. 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 200 to 300 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 December 2016 event. TPH-DRO was detected at low concentrations in samples from all five wells, ranging from 37 to 120 micrograms per liter (µg/L). These levels are below the Washington Model Toxic Control Act (MTCA) Method A cleanup level for groundwater of 500 µg/L.

TPH-RRO was detected in all five wells, ranging from 110 to 180 µg/L. Samples from all five wells were below the 500 µg/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 18 µg/L with a J qualifier and TPH-RRO at 81 µg/L with a J qualifier. These detections could be used to revise and lower the reported concentrations for 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 the five monitoring wells.

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-DRO that exceeded the MTCA Method A cleanup level.

During the second, third and fourth sampling events 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 first quarterly sampling event for 2017 is scheduled for March.

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	12/08/2016	37 J	140 J	0.0028	<0.0043
MW-02	12/08/2016	120 J	180 J	0.070	<0.0043
MW-03	12/08/2016	63 J	130 J	0.029	<0.0043
MW-04	12/09/2016	70 J	110 J	4.7	<0.0043
MW-05	12/09/2016	67 J	110 J	1.1	<0.0043

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
	12/09/2016	Low Flow	37	120	63	70	67
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
	12/09/2016	Low Flow	140	180	130	110	110

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
	12/09/2016	Low Flow	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043
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
	12/09/2016	Low Flow	0.0028	0.007	0.029	4.67	1.1

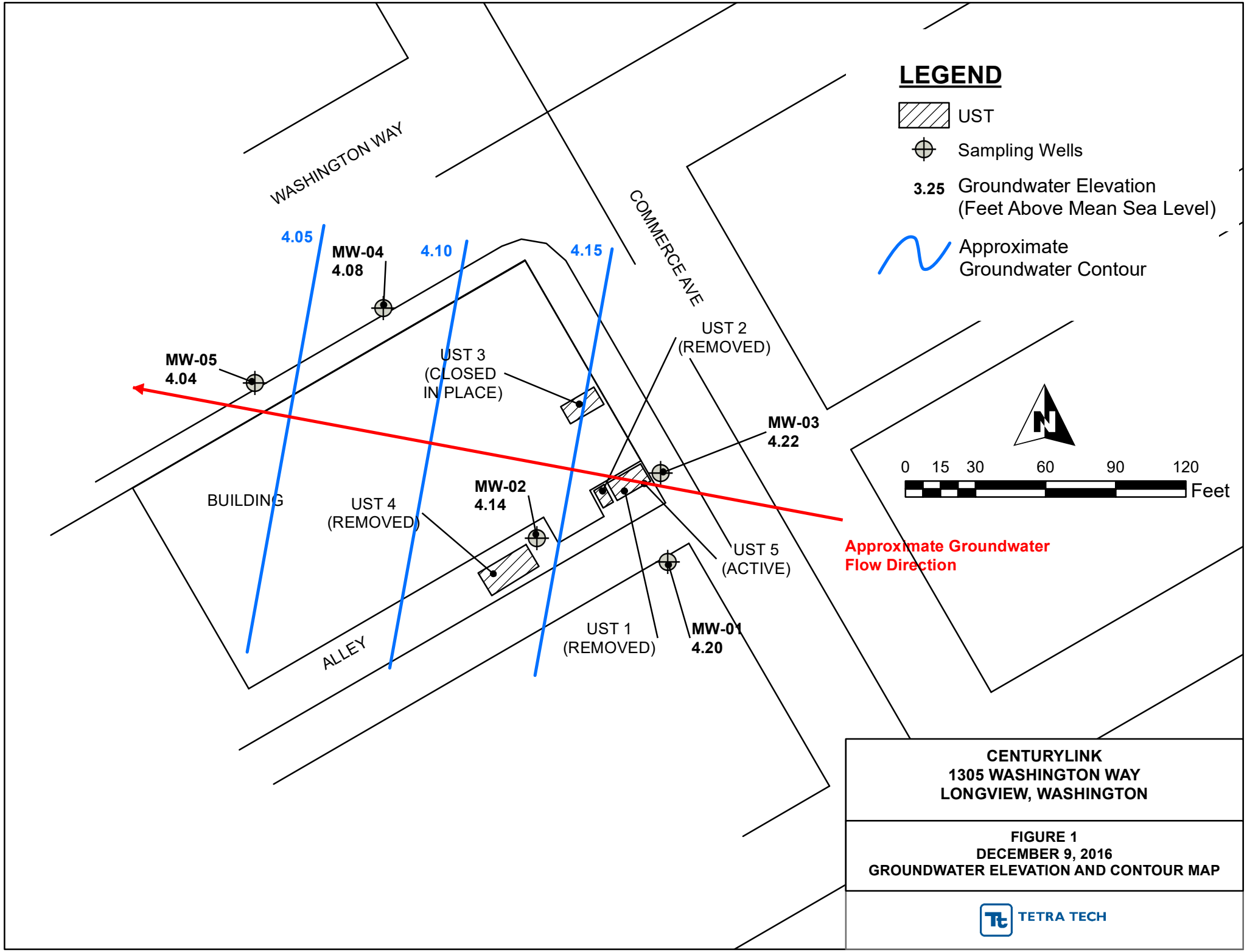
Notes:

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
DECEMBER 9, 2016
GROUNDWATER ELEVATION AND CONTOUR MAP

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ATTACHMENT A
LOW-FLOW GROUNDWATER SAMPLING PARAMETER FORMS

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 12/8/16

Well Name MW-1 | 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 _____ | Measured with _____

Sample Date _____ | Static Elevation 13.48 BTOC | 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 _____ 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		
1245	Purge			Start P									
1250	300	3.94	6.5	179.9	14.92	0.272							
1255	300	3.04	6.44	166.1	15.05	0.272	6.29						
1300	300	2.03	6.42	156.1	14.99	0.270	6.20						
1305	300	1.56	6.41	132.3	14.72	0.273	6.00	4.20					
1310	300	1.49	6.40	72.3	14.15	0.265	3.72						
1315	250	1.46	6.39	57.1	14.35	0.263	3.55						
1320	250	1.51	6.40	58.3	14.57	0.260	3.48						
Post 1330	250	1.61	6.37	42.7	14.29	0.252	3.21						

SAMPLE PARAMETERS

1320	250	1.51	6.40	58.3	14.57	0.260	3.48						

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

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 12/8/16

MW-2

Well Name _____

Project Century Link - Longview GW Sampling

Project No. _____

Well Location _____

Sample Date 12/8/16

Sampling Personnel MP + VP

Sample ID _____

Duplicate ID _____

Screen Interval _____

Station Elevation _____ GND ___ TOC _____

Static Water Level (from TOC) _____

Well Stick Up _____

Static Elevation 12.04' BTOC

Well Depth _____ MEAS ___ RPTD _____

Feet of Water _____

Gallons/Foot _____

Casing Volume _____

tubing at 15.5' BGS

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		
1125	300	Start		for	10							12.04	
1130	300	6.6	6.45	199	15.72	0.553	1.67						
1135	300	5.83	6.47	197.7	15.16	0.538	—						
1140	300	5.79	6.50	199.4	14.78	0.536	1.83						
1145	250	4.89	6.43	194.5	16.06	0.524	1.40						
1150	250	4.58	6.41	192.5	16.27	0.514	1.03						
1155	250	4.05	6.39	191.8	16.29	0.505	0.53						
1200	250	3.68	6.37	189.3	16.26	0.493	0.41						
1205	250	3.52	6.36	188.6	16.25	0.486	0.33						
1220	250	3.55	6.35	190.4	15.61	0.471	0.36						

Post

SAMPLE PARAMETERS

1205													

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

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 12/8/10

MW-3

Well Name _____ 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 _____ Measured with _____

Sample Date _____ Static Elevation 10.81' BTOC PID Readings (background) _____

Sampling Personnel MP + VP Well Depth _____ MEAS ____ RPTD _____ PID Reading (TOC) _____

_____ Feet of Water _____ Wells Installed by _____

Sample ID _____ Gallons/Foot 15.51 at full Installation Date _____

Duplicate ID _____ Casing Volume _____ 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		
1425	300		Purge	Started									
1430	300	2.63	6.71	-20.3	14.89	0.235	—						
1435	300	1.27	6.58	4.7	15.04	0.248	3.35						
1440	300	0.82	6.57	10.3	14.96	0.250	3.13						
1445	300	0.88	6.54	17.0	15.04	0.252	2.03						
1450	300	0	6.52	19.7	15.08	0.254	3.55						
1455	200	1.68	6.52	20.2	15.01	0.253	1.29						
1500	200	1.84	6.51	23.0	15.00	0.255	1.22						
1505	200	1.06	6.49	27.9	14.98	0.255	2.70						
1510	200	1.11	6.49	26.1	15.00	0.255	1.02						
Post 1530	200	1.14	6.46	32.2	14.73	0.253	1.40						

SAMPLE PARAMETERS

1515	200	1.17	6.48	26.5	14.99	0.256	0.75						

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

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 12/9/16

MW-4

Well Name _____ 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 10.97' BTOC Measured with _____

Sample Date 12/9/16 Static Elevation _____ PID Readings (background) _____

Sampling Personnel MPT VP 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 _____ 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		
1250			Purge		Start								
1255		5.37	6.31	122.4	14.20	0.283	17.5						
1300		1.97	6.19	117.2	14.43	0.290	16.3						
1305		1.13	6.24	67.5	14.44	0.281	10.71						
1310		1.01	6.31	42.6	14.44	0.284	2.51						
1315		1.01	6.32	34.4	14.43	0.284	2.87						
1320		1.03	6.32	39.1	14.42	0.284	2.07						
1330		1.14	6.32	71.2	14.42	0.283	2.73						

SAMPLE PARAMETERS

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

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 12/9/16

MW-5

Well Name _____ Screen Interval _____

Project Century Link - Longview GW Sampling Station Elevation _____ GND ___ TOC _____ Immiscible Phases Present ☐ Yes ☐ No

Project No. _____ Static Water Level (from TOC) 10.71 Type _____

Well Location _____ Well Stick Up _____ Measured with _____

Sample Date 12/9/16 Static Elevation _____ 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 _____ 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		
1200				Purge		Started							
1205	200	3.35	6.21	196.5	14.93	0.272	—						
1210	200	1.83	6.26	155.1	14.89	0.271	3.82						
1215	200	1.80	6.26	134.7	14.90	0.270	3.21						
1220	200	1.78	6.26	118.2	14.73	0.270	2.83						
1225	200	1.82	6.25	112.3	14.84	0.270	2.73						
1230	200	1.80	6.25	110.9	14.86	0.271	2.54		Sample				
1240		1.95	6.25	90.7	15.19	0.273	2.36						

SAMPLE PARAMETERS

1230	200	1.80	6.25	110.9	14.86	0.271	2.54						

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

14493033449

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

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
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www.alsglobal.com

December 29, 2016

Analytical Report for Service Request No: K1614896

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

RE: CenturyLink Longview WA / 103P3080177

Dear Rob,

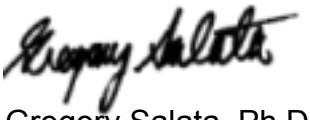
Enclosed are the results of the sample(s) submitted to our laboratory December 09, 2016
For your reference, these analyses have been assigned our service request number **K1614896.**

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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Table of Contents

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.pjlabs.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/bsdw/labservice.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/anlayte is offered by that state.

Case Narrative

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

ALS ENVIRONMENTAL

Client:	Tetra Tech EM, Incorporated	**Service Request No.:**	K1614896
Project:	CenturyLink Longview WA/ 103P3080177	**Date Received:**	12/09/16
Sample Matrix:	Water		

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 12/09/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

Diesel Range Organics by Method NWTPH-Dx

Calibration Verification Exceptions:
The upper control criterion was exceeded for o-Terphenyl and n-Triacontane in Continuing Calibration Verification (CCV) KWG1611552-2. The field samples analyzed in this sequence did not contain the analytes Diesel Range and Residual Range organics 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.

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

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

Polynuclear Aromatic Hydrocarbons by EPA Method 8270

Sample Notes and Discussion:
The result reported for Phenanthrene 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

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

Chain of Custody

ADDRESS 1317 South 13th Ave., Kelso, WA 98626
PHONE 1 360 577 7222 FAX 1 360 636 1068
Columbia Analytical Services, Inc.
Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: K1614896

Project Manager:	David Berestka			**Bill to:**	Vanessa Pineda		
Client Name:	Tetra Tech			**Company:**	Tetra Tech		
Address:	216 16th Street			**Address:**	216 16th Street Suite 1500		
City, State ZIP:	Denver, CO 80202			**City, State ZIP:**	Denver, CO 80202		
Email:	David.Berestka@tetratech.com	**Phone:**	303-312-8856	**Email:**	vanessa.pineda@tetratech.com	**Phone**	303-312-8812
Project Name:	CenturyLink Longview WA						
Project Number:	103P3080177						
P.O. Number:							
Sampler's Name:	Mike Pavarini/Vanessa Pineda						

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present				
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice		
Cooler Custody Seals:	Yes	No	N/A	Total Containers:		
Sample Custody Seals:	Yes	No	N/A			

REQUESTED ANALYSIS

TAT

- [X] Routine
- [ ] Same Day ***
- [ ] Next Day ***
- [ ] 3 Day
- [ ] 6 Day

*** Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers	NWTPHDx diesel and motor oil (no silica gel cleanup)	PAH 625 SIM (filtered-no silica gel cleanup)	Comments
MW-4	GW	12/9/16	~~1230~~ 1320		3	1	2	
MW-5	GW	12/9/16	1230		3	1	2	

Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, V, Zn, Zr
Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
Vanessa Pineda		12/9/16 1350	C. Snyder		12-9-16 13:50

ALS

PC Greg

Cooler Receipt and Preservation Form

Client Tetra Tech Service Request *K16* 14896

Received: 12-9-16 Opened: 12-9-16 By: es Unloaded: 12-9-16 By: es

1. Samples were received via? *Mail* *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 NA	Tracking Number NA	Filed
0.4	0.4	3.9	3.9	0	370			—

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. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
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: _____

Page ____ *of* ____

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

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/09/2016
Sample Matrix:	Water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	MW-4	**Units:**	ug/L
Lab Code:	K1614896-001	**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)	**70**	J	270	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**110**	J	530	20	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	82	50-150	12/28/16	Acceptable
n-Triacontane	89	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/09/2016
Sample Matrix:	Water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	MW-5	**Units:**	ug/L
Lab Code:	K1614896-002	**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)	**67**	J	280	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**110**	J	550	21	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	93	50-150	12/28/16	Acceptable
n-Triacontane	97	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Diesel and Residual Range Organics

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1611157-3	**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)	**18**	J	250	11	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**81**	J	500	19	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	81	50-150	12/28/16	Acceptable
n-Triacontane	87	50-150	12/28/16	Acceptable

Comments:

Client: Tetra Tech EM, Incorporated **Service Request:** K1614896
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C **Units:** Percent
Analysis Method: NWTPH-Dx **Level:** Low

Sample Name	Lab Code	Sur1	Sur2
MW-4	K1614896-001	82	89
MW-5	K1614896-002	93	97
Method Blank	KWG1611157-3	81	87
Lab Control Sample	KWG1611157-1	101	107
Duplicate Lab Control Sample	KWG1611157-2	97	100

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.

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Extracted:**	12/13/2016
Sample Matrix:	Water	**Date Analyzed:**	12/28/2016

Lab Control Spike/Duplicate Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method:	EPA 3510C	**Units:**	ug/L
Analysis Method:	NWTPH-Dx	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1611157

	Lab Control Sample KWG1611157-1 Lab Control Spike			Duplicate Lab Control Sample KWG1611157-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Diesel Range Organics (DRO)	2570	3200	80	3270	3200	102	46-140	24	30
Residual Range Organics (RRO)	1590	1600	100	1970	1600	123	45-159	21	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.

Polynuclear Aromatic Hydrocarbons

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

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/09/2016
Sample Matrix:	Water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	MW-4	**Units:**	ug/L
Lab Code:	K1614896-001	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**2.8**		0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	**0.0079**	J	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	**0.097**		0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	**0.028**		0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	**0.91**		0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	**0.14**		0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	**0.24**		0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	**0.077**		0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	**0.17**		0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	**0.19**		0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	**0.0032**	J	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	79	42-131	12/21/16	Acceptable
Fluoranthene-d10	91	42-133	12/21/16	Acceptable
Terphenyl-d14	85	32-129	12/21/16	Acceptable

† Analyte Comments

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/09/2016
Sample Matrix:	Water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	MW-5	**Units:**	ug/L
Lab Code:	K1614896-002	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.66**		0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	**0.0054**	J	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	**0.0059**	J	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	**0.22**		0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	**0.012**	J	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	**0.0058**	JX	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	**0.055**		0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	**0.0085**	J	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	**0.082**		0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	**0.057**		0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	85	42-131	12/21/16	Acceptable
Fluoranthene-d10	100	42-133	12/21/16	Acceptable
Terphenyl-d14	92	32-129	12/21/16	Acceptable

† Analyte Comments

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614896
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Polynuclear Aromatic Hydrocarbons

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1611245-3	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	ND	U	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	ND	U	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	82	42-131	12/21/16	Acceptable
Fluoranthene-d10	92	42-133	12/21/16	Acceptable
Terphenyl-d14	88	32-129	12/21/16	Acceptable

† Analyte Comments

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

Comments:

QA/QC Report

Client: Tetra Tech EM, Incorporated **Service Request:** K1614896
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Water

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
MW-4	K1614896-001	79	91	85
MW-5	K1614896-002	85	100	92
Method Blank	KWG1611245-3	82	92	88
Lab Control Sample	KWG1611245-1	83	100	88
Duplicate Lab Control Sample	KWG1611245-2	80	96	85

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.

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

Service Request: K1614896
Date Extracted: 12/15/2016
Date Analyzed: 12/21/2016

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

Extraction Method: EPA 3520C
Analysis Method: 8270D SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1611245

	Lab Control Sample KWG1611245-1 Lab Control Spike			Duplicate Lab Control Sample KWG1611245-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Naphthalene	2.25	2.50	90	2.18	2.50	87	52-115	3	30
2-Methylnaphthalene	2.15	2.50	86	2.06	2.50	82	48-120	4	30
1-Methylnaphthalene	2.13	2.50	85	2.05	2.50	82	47-119	4	30
Acenaphthylene	2.34	2.50	94	2.28	2.50	91	58-124	3	30
Acenaphthene	2.27	2.50	91	2.20	2.50	88	63-121	3	30
Fluorene	2.30	2.50	92	2.25	2.50	90	68-121	2	30
Phenanthrene	2.38	2.50	95	2.32	2.50	93	64-126	3	30
Anthracene	2.11	2.50	85	2.03	2.50	81	68-127	4	30
Carbazole	2.58	2.50	103	2.51	2.50	100	68-135	3	30
Fluoranthene	2.56	2.50	102	2.50	2.50	100	70-127	2	30
Pyrene	2.43	2.50	97	2.38	2.50	95	72-127	2	30
Benz(a)anthracene	2.38	2.50	95	2.32	2.50	93	74-124	2	30
Chrysene	2.45	2.50	98	2.42	2.50	97	74-132	2	30
Benzo(b)fluoranthene	2.53	2.50	101	2.51	2.50	101	73-136	1	30
Benzo(k)fluoranthene	2.46	2.50	98	2.43	2.50	97	74-134	1	30
Benzo(a)pyrene	2.30	2.50	92	2.26	2.50	90	75-131	2	30
Indeno(1,2,3-cd)pyrene	2.66	2.50	106	2.60	2.50	104	63-136	2	30
Dibenz(a,h)anthracene	2.38	2.50	95	2.34	2.50	94	59-135	2	30
Benzo(g,h,i)perylene	2.40	2.50	96	2.40	2.50	96	63-127	0	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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December 29, 2016

Analytical Report for Service Request No: K1614871

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 December 09, 2016
For your reference, these analyses have been assigned our service request number **K1614871.**

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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Table of Contents

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.pjlabs.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/bsdw/labservice.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/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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ALS ENVIRONMENTAL

Client:	Tetra Tech EM, Incorporated	**Service Request No.:**	K1614871
Project:	CenturyLink Longview WA/ 103P3080177	**Date Received:**	12/09/16
Sample Matrix:	Ground Water		

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

Four ground water samples were received for analysis at ALS Environmental on 12/09/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

Diesel Range Organics by Method NWTPH-Dx

Calibration Verification Exceptions:
The upper control criterion was exceeded for o-Terphenyl and n-Triacontane in Continuing Calibration Verification (CCV) KWG1611552-2. The field samples analyzed in this sequence did not contain the analytes Diesel Range and Residual Range organics 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.

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

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

Polynuclear Aromatic Hydrocarbons by EPA Method 8270

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

Approved by_____

Chain of Custody

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Chain of Custody

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Columbia Analytical Services, Inc.
Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: K16,14871

Project Manager:	David Berestka			**Bill to:**	Vanessa Pineda		
Client Name:	Tetra Tech			**Company:**	Tetra Tech		
Address:	216 16th Street			**Address:**	216 16th Street Suite 1500		
City, State ZIP:	Denver, CO 80202			**City, State ZIP:**	Denver, CO 80202		
Email:	David.Berestka@tetratech.com	**Phone:**	303-312-8856	**Email:**	vanessa.pineda@tetratech.com	**Phone**	303-312-8812
Project Name:	CenturyLink Longview WA						
Project Number:	103P3080177						
P.O. Number:							
Sampler's Name:	Mike Pavarini/Vanessa Pineda						

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present			
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice	
Cooler Custody Seals:	Yes	No	N/A	Total Containers:	
Sample Custody Seals:	Yes	No	N/A		

REQUESTED ANALYSIS

TAT

- [X] Routine
- [ ] Same Day ***
- [ ] Next Day ***
- [ ] 3 Day
- [ ] 6 Day

*** Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers	NWTPHDx diesel and motor oil (no silica gel cleanup)	PAH 625 SIM (filtered-no silica gel cleanup)	Comments
MW-1	GW	12/8/16	1320		3	1	2	
MW-2	GW	12/8/16	1205		3	1	2	
MW-3	GW	12/8/16	1515		3	1	2	
DUP-120816	GW	12/8/16	0000		3	1	2	

Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, V, Zn, Zr
Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
Vanessa Pineda		12/8/16 1600	CODY GRAVES		12/8/16 1600

PC GS

Cooler Receipt and Preservation Form

Client Tetra Tech Service Request K16 14871

Received: 12/8/16 Opened: 12/8/16 By: CG Unloaded: 12-9-16 By: ES

1. Samples were received via? *Mail* *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 (NA)	Tracking Number (NA)	Filed
0.7	0.8	4.9	5.0	+0.1	3419			

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. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
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: _____

Page ____ *of* ____

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

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K1614871-001	**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)	**37**	J	260	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**140**	J	520	20	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	87	50-150	12/28/16	Acceptable
n-Triacontane	92	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	MW-2	**Units:**	ug/L
Lab Code:	K1614871-002	**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)	**120**	J	270	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**180**	J	530	20	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	93	50-150	12/28/16	Acceptable
n-Triacontane	98	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	MW-3	**Units:**	ug/L
Lab Code:	K1614871-003	**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)	**52**	J	270	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**120**	J	530	20	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	70	50-150	12/28/16	Acceptable
n-Triacontane	72	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Diesel and Residual Range Organics

Sample Name:	DUP-120816	**Units:**	ug/L
Lab Code:	K1614871-004	**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)	**63**	J	270	12	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**130**	J	530	20	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	91	50-150	12/28/16	Acceptable
n-Triacontane	100	50-150	12/28/16	Acceptable

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Diesel and Residual Range Organics

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1611157-3	**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)	**18**	J	250	11	1	12/13/16	12/28/16	KWG1611157	
Residual Range Organics (RRO)	**81**	J	500	19	1	12/13/16	12/28/16	KWG1611157	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	81	50-150	12/28/16	Acceptable
n-Triacontane	87	50-150	12/28/16	Acceptable

Comments:

Client: Tetra Tech EM, Incorporated **Service Request:** K1614871
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Ground water

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C **Units:** Percent
Analysis Method: NWTPH-Dx **Level:** Low

Sample Name	Lab Code	Sur1	Sur2
MW-1	K1614871-001	87	92
MW-2	K1614871-002	93	98
MW-3	K1614871-003	70	72
DUP-120816	K1614871-004	91	100
Method Blank	KWG1611157-3	81	87
Lab Control Sample	KWG1611157-1	101	107
Duplicate Lab Control Sample	KWG1611157-2	97	100

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.

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Extracted:**	12/13/2016
Sample Matrix:	Water	**Date Analyzed:**	12/28/2016

Lab Control Spike/Duplicate Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method:	EPA 3510C	**Units:**	ug/L
Analysis Method:	NWTPH-Dx	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1611157

	Lab Control Sample KWG1611157-1 Lab Control Spike			Duplicate Lab Control Sample KWG1611157-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Diesel Range Organics (DRO)	2570	3200	80	3270	3200	102	46-140	24	30
Residual Range Organics (RRO)	1590	1600	100	1970	1600	123	45-159	21	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.

Polynuclear Aromatic Hydrocarbons

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

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K1614871-001	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	ND	U	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	ND	U	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	**0.0028**	J	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	79	42-131	12/21/16	Acceptable
Fluoranthene-d10	94	42-133	12/21/16	Acceptable
Terphenyl-d14	88	32-129	12/21/16	Acceptable

† **Analyte Comments**

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	MW-2	**Units:**	ug/L
Lab Code:	K1614871-002	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	**0.0070**	J	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	ND	U	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	74	42-131	12/21/16	Acceptable
Fluoranthene-d10	91	42-133	12/21/16	Acceptable
Terphenyl-d14	87	32-129	12/21/16	Acceptable

† **Analyte Comments**

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	MW-3	**Units:**	ug/L
Lab Code:	K1614871-003	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.014**	J	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	ND	U	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	**0.012**	J	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	**0.0032**	J	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	79	42-131	12/21/16	Acceptable
Fluoranthene-d10	92	42-133	12/21/16	Acceptable
Terphenyl-d14	86	32-129	12/21/16	Acceptable

† **Analyte Comments**

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	12/08/2016
Sample Matrix:	Ground water	**Date Received:**	12/09/2016

Polynuclear Aromatic Hydrocarbons

Sample Name:	DUP-120816	**Units:**	ug/L
Lab Code:	K1614871-004	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.014**	J	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	ND	U	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	ND	U	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	**0.0027**	J	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	81	42-131	12/21/16	Acceptable
Fluoranthene-d10	95	42-133	12/21/16	Acceptable
Terphenyl-d14	89	32-129	12/21/16	Acceptable

† **Analyte Comments**

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

Comments:

Analytical Results

Client:	Tetra Tech EM, Incorporated	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Polynuclear Aromatic Hydrocarbons

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1611245-3	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
2-Methylnaphthalene	ND	U	0.020	0.0023	1	12/15/16	12/21/16	KWG1611245	
1-Methylnaphthalene	ND	U	0.020	0.0035	1	12/15/16	12/21/16	KWG1611245	
Acenaphthylene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Acenaphthene	ND	U	0.020	0.0044	1	12/15/16	12/21/16	KWG1611245	
Fluorene	ND	U	0.020	0.0038	1	12/15/16	12/21/16	KWG1611245	
Phenanthrene	ND	U	0.020	0.0050	1	12/15/16	12/21/16	KWG1611245	
Anthracene	ND	U	0.020	0.0036	1	12/15/16	12/21/16	KWG1611245	
Carbazole	ND	U	0.020	0.0045	1	12/15/16	12/21/16	KWG1611245	
Fluoranthene	ND	U	0.020	0.010	1	12/15/16	12/21/16	KWG1611245	
Pyrene	ND	U	0.020	0.0053	1	12/15/16	12/21/16	KWG1611245	
Benz(a)anthracene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Chrysene	ND	U	0.020	0.0034	1	12/15/16	12/21/16	KWG1611245	
Benzo(b)fluoranthene†	ND	U	0.020	0.0041	1	12/15/16	12/21/16	KWG1611245	
Benzo(k)fluoranthene	ND	U	0.020	0.0030	1	12/15/16	12/21/16	KWG1611245	
Benzo(a)pyrene	ND	U	0.020	0.0043	1	12/15/16	12/21/16	KWG1611245	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0026	1	12/15/16	12/21/16	KWG1611245	
Dibenz(a,h)anthracene	ND	U	0.020	0.0025	1	12/15/16	12/21/16	KWG1611245	
Benzo(g,h,i)perylene	ND	U	0.020	0.0029	1	12/15/16	12/21/16	KWG1611245	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	82	42-131	12/21/16	Acceptable
Fluoranthene-d10	92	42-133	12/21/16	Acceptable
Terphenyl-d14	88	32-129	12/21/16	Acceptable

† Analyte Comments

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

Comments:

Client: Tetra Tech EM, Incorporated **Service Request:** K1614871
Project: CenturyLink Longview WA/103P3080177
Sample Matrix: Ground water

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
MW-1	K1614871-001	79	94	88
MW-2	K1614871-002	74	91	87
MW-3	K1614871-003	79	92	86
DUP-120816	K1614871-004	81	95	89
Method Blank	KWG1611245-3	82	92	88
Lab Control Sample	KWG1611245-1	83	100	88
Duplicate Lab Control Sample	KWG1611245-2	80	96	85

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	**Service Request:**	K1614871
Project:	CenturyLink Longview WA/103P3080177	**Date Extracted:**	12/15/2016
Sample Matrix:	Water	**Date Analyzed:**	12/21/2016

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

Extraction Method:	EPA 3520C	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1611245

	Lab Control Sample KWG1611245-1 Lab Control Spike			Duplicate Lab Control Sample KWG1611245-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Naphthalene	2.25	2.50	90	2.18	2.50	87	52-115	3	30
2-Methylnaphthalene	2.15	2.50	86	2.06	2.50	82	48-120	4	30
1-Methylnaphthalene	2.13	2.50	85	2.05	2.50	82	47-119	4	30
Acenaphthylene	2.34	2.50	94	2.28	2.50	91	58-124	3	30
Acenaphthene	2.27	2.50	91	2.20	2.50	88	63-121	3	30
Fluorene	2.30	2.50	92	2.25	2.50	90	68-121	2	30
Phenanthrene	2.38	2.50	95	2.32	2.50	93	64-126	3	30
Anthracene	2.11	2.50	85	2.03	2.50	81	68-127	4	30
Carbazole	2.58	2.50	103	2.51	2.50	100	68-135	3	30
Fluoranthene	2.56	2.50	102	2.50	2.50	100	70-127	2	30
Pyrene	2.43	2.50	97	2.38	2.50	95	72-127	2	30
Benz(a)anthracene	2.38	2.50	95	2.32	2.50	93	74-124	2	30
Chrysene	2.45	2.50	98	2.42	2.50	97	74-132	2	30
Benzo(b)fluoranthene	2.53	2.50	101	2.51	2.50	101	73-136	1	30
Benzo(k)fluoranthene	2.46	2.50	98	2.43	2.50	97	74-134	1	30
Benzo(a)pyrene	2.30	2.50	92	2.26	2.50	90	75-131	2	30
Indeno(1,2,3-cd)pyrene	2.66	2.50	106	2.60	2.50	104	63-136	2	30
Dibenz(a,h)anthracene	2.38	2.50	95	2.34	2.50	94	59-135	2	30
Benzo(g,h,i)perylene	2.40	2.50	96	2.40	2.50	96	63-127	0	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.