TECHNICAL MEMORANDUM

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ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Mohsen Kourehdar, P.E., Washington State Department of Ecology

FROM: Lawrence D. Beard, P.E., L.G., and Christine Kimmel, L.G.

DATE: January 27, 2015

RE: GROUNDWATER QUALITY RESULTS
DRY SEASON 2014 LONG-TERM COMPLIANCE MONITORING
CASCADE POLE SITE, OLYMPIA, WASHINGTON

At the request of Mr. Don Bache of the Port of Olympia, we are providing the Washington State Department of Ecology (Ecology) with the results of the Dry Season sampling event conducted in September 2014, along with two focused verification sampling events conducted in June and October 2014. Groundwater sampling was conducted as part of the Long-Term Groundwater Compliance Monitoring (LTGCM) program for the Cascade Pole site in Olympia, Washington.

GROUNDWATER MONITORING

Groundwater elevation measurements were collected on September 23, 2014 (prior to sampling activities), and are presented in Table 1. All interior perimeter well groundwater elevations achieved the current short-term hydraulic control goals indentified for the site.

A total of 15 samples (14 wells and 1 quality assurance sample) were collected during the September 2014 groundwater sampling event. Samples were collected from the following well pairs: PZ-12 and PZ-13; LW-3 and PZ-17; LW-4R and PZ-18; and MW-02S and PZ-19. Samples were also collected from interior monitoring wells MW-01S, MW-01D, MW-02D, MW-05S, MW-05D, and CW-13. The locations of the sampled wells are shown on Figures 1 and 2.

In addition to the routine Dry Season sampling event (September 2014), two verification sampling events occurred since the *2013 Groundwater Monitoring Report* (Landau Associates 2014). In June 2014, a verification sample was collected from well LW-3 after evidence of surface water runoff into the well was observed due to an accidental removal of the well cap. The well was subsequently re-developed using aggressive purging methods and, once the suspended material was sufficiently removed from LW-3, an accurate depth-to-water was recorded and a groundwater sample was collected. The groundwater sample was submitted to Spectra Laboratories located in Tacoma, Washington and analyzed for the project constituent list. A verification sample was also collected from well PZ-17 in October 2014 based on elevated concentrations of total petroleum hydrocarbons (TPH) in the diesel and creosote ranges detected in samples collected during the routine September 2014 sampling event. The October verification sample was analyzed for diesel-, oil-, and creosote-range petroleum hydrocarbons (Method NWTPH-Dx).

Groundwater samples collected in September and October 2014 events were submitted to Analytical Resources Inc. (ARI) Laboratory located in Tukwila, Washington for analysis of polycyclic aromatic hydrocarbons (PAHs) using U.S. Environmental Protection Agency (EPA) Method 8270D, with selected ion monitoring (SIM); follow-up pentachlorophenal (PCP) analysis was conducted using EPA Method 8041 if PCP results from initial analyses using EPA Method 8270D(SIM) were nondetect at the higher reporting limit; gasoline-range petroleum hydrocarbons (TPH-G) using Method NWTPH-G; and TPH-D and TPH-O using Method NWTPH-Dx.

ANALYTICAL RESULTS

Analytical results for TPH-G and TPH-Dx were compared to Model Toxics Control Act (MTCA) Method A cleanup levels and the PCP and PAH results were compared to the MTCA Method B cleanup levels for protection of marine surface water. To evaluate the analytical data for the carcinogenic PAHs (cPAHs), the toxicity equivalency quotients (TEQ) of individual cPAHs were calculated and summed for comparison to the benzo(a)pyrene cleanup level using the methodology established in Washington Administrative Code (WAC) 173-340-708. To calculate the TEQ, the toxicity equivalency factor (TEF) for a given cPAH compound was multiplied by the compound concentration, or half the reporting limit for compounds that were not detected above the laboratory reporting limit, and the resulting values were summed. The analytical results for the Dry Season sampling event (September 2014) and the two focused verification sampling events (June and October 2014) are summarized in Table 2. Analytical data were reviewed for reliability using a data validation process. The results of the validation indicate that data is acceptable for monitoring purposes and no data was rejected. The laboratory reports are included in Attachment 1.

The June verification sampling conducted after well redevelopement activities at LW-3 indicated low level concentrations of naphthalene, 1-methylnapthalene, gasoline-range petroleum hydrocarbons (TPH-G), and diesel-range petroleum hydrocarbons (TPH-D); however, the concentrations were all below the respective cleanup screening levels and the well was found to be usable for continued groundwater monitoring purposes.

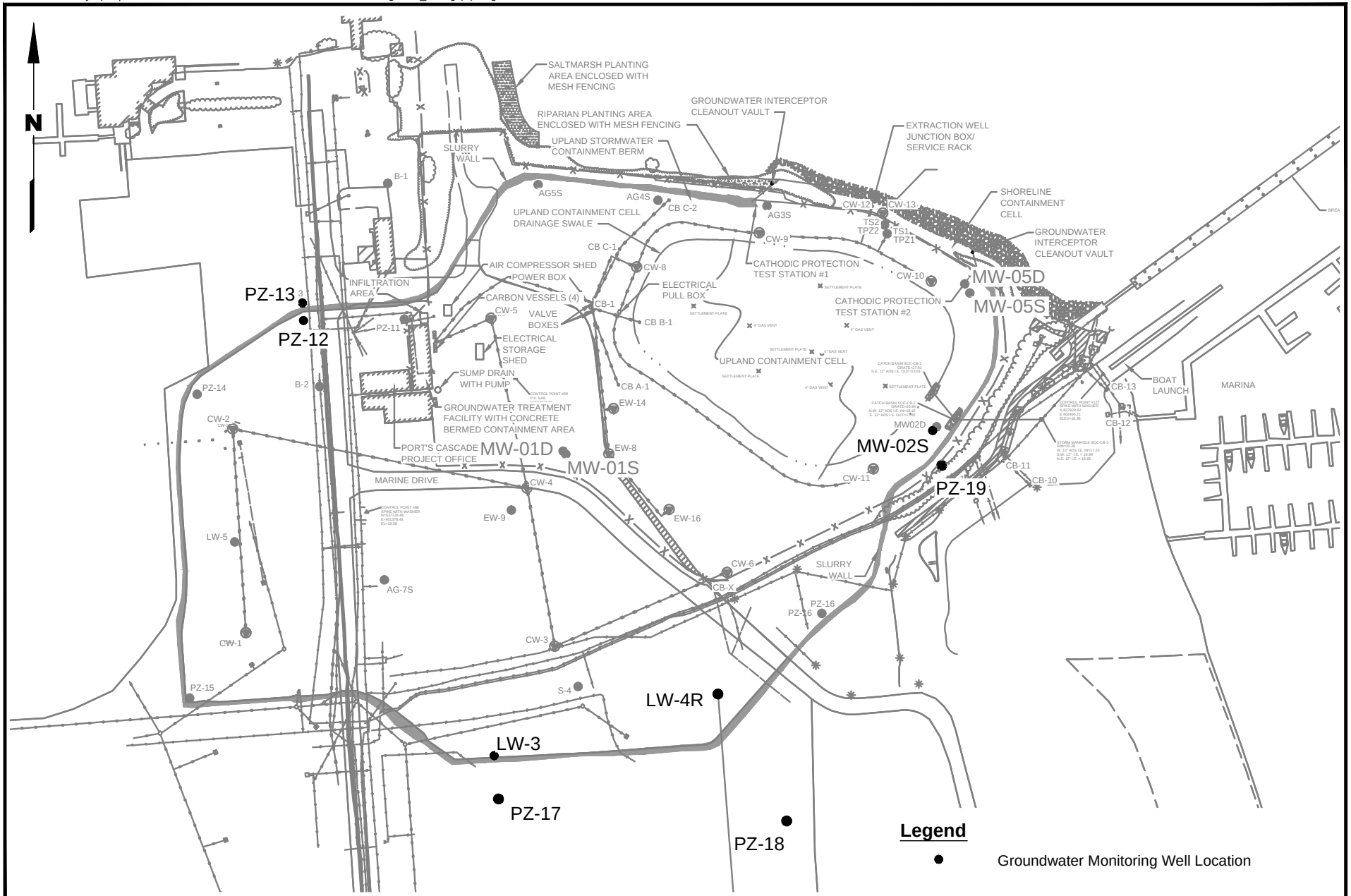
The September 2014 analytical results indicate shallow groundwater conditions outside of the slurry wall at PZ-18 and interior wells CW-13 and LW-4R were below the respective laboratory reporting limits. Low level concentrations were reported at interior wells PZ-12, LW-3, MW-01D, MW-02S, MW-02D, MW-05S, and MW-05D; however, the concentrations were below their respective cleanup screening levels. Low level naphthalene concentrations were reported at exterior wells PZ-13 (5.9 µg/L) and PZ-19 (3.8 µg/L) during the September event; however, these concentrations are well below the cleanup screening level (4,900 µg/L). Analytical results from shallow interior well MW-01S indicate the following compounds were reported at concentrations greater than the respective cleanup screening levels: TPH-G (52,000 µg/L), diesel-range petroleum hydrocarbons (11,000 µg/L), motor oil-range

hydrocarbons (690 µg/L), and creosote-range hydrocarbons (59,000 µg/L), along with individual PAH compounds (PCP at 4,900 µg/L and naphthalene at 10,000 µg/L) and TEQ value for total cPAH (0.326 µg/L). Analytical results indicate concentrations above cleanup screening levels at exterior shallow well PZ-17 for motor oil-range hydrocarbons (640 µg/L) and above laboratory reporting limits for diesel-range hydrocarbons (110 µg/L) and creosote-range hydrocarbons (310 µg/L). The PZ-17 verification sample results (October 2014) indicate concentrations of these three analytes were not detected above the laboratory reporting limits.

NEXT SCHEDULED PLANNED ACTIVITIES

The next semiannual sampling event is planned for early 2015. The event will include the collection of groundwater quality samples from the following well pairs: PZ-12 and PZ-13, LW-3 and PZ-17, LW-4R and PZ-18, and MW-02S and PZ-19. Samples from interior shallow and deep wells MW-01S, MW-01D, MW-02S, MW-02D, MW-05S, MW-05D, and CW-13 will also be collected during the next semiannual event. Groundwater elevations will be collected from each of the selected wells monthly to evaluate the continued hydraulic control for the site. The potential for surface water migration at LW-3 will continue to be monitored on a monthly basis. If further signs of surface water effects are observed at this well, then the well may be considered for replacement.

The results of the Dry Season sampling event (September) and the two verification sampling events (June and October 2014), along with the pending Wet Season sampling event (early 2015) will be presented in an annual progress report that will summarize the LTGCM program.



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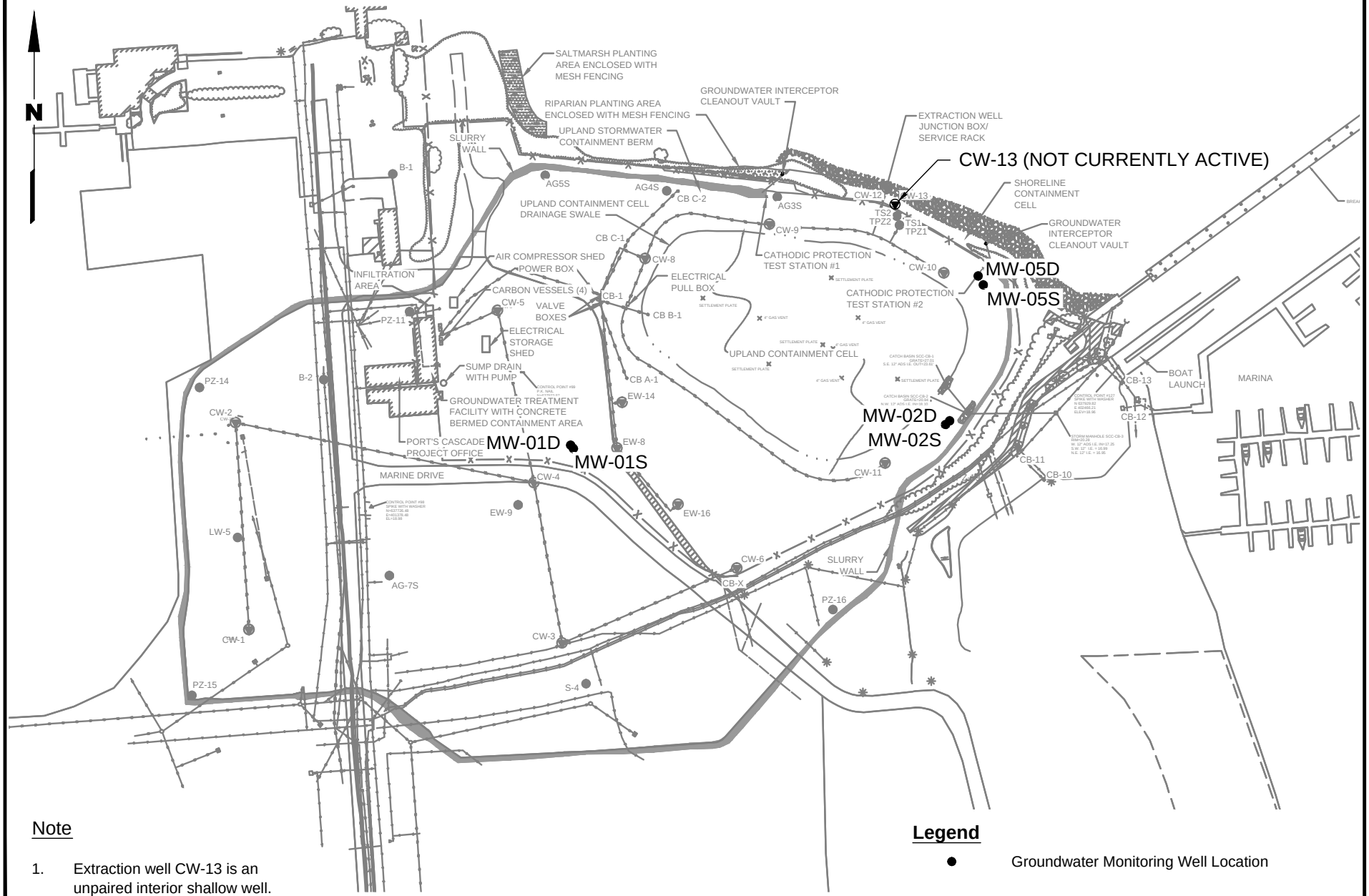
Port of Olympia
Olympia, Washington

Paired Shallow Groundwater Monitoring Network Well Locations

Figure 1



Note

1. Extraction well CW-13 is an unpaired interior shallow well.

Legend

● Groundwater Monitoring Well Location

0 200 400

Scale in Feet

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Port of Olympia
Olympia, Washington

Deep and Shallow Groundwater Monitoring Well Pairs

Figure 2

TABLE 1
GROUNDWATER ELEVATIONS
CASCADE POLE SITE
PORT OF OLYMPIA, WASHINGTON

Well Pair	Collection Date	Well ID	Depth to Groundwater (ft) (a)	Top of Well Casing Elevation (MLLW)		Groundwater Elevation (MLLW) (a)	Maximum Elevation Goal (b)	Goal Exceeded?
1	9/23/2014	PZ-13	7.32	19.50		12.18	--	
	9/23/2014	PZ-12	6.20	19.00		12.80	15.50	No
2	9/23/2014	PZ-17	9.38	20.48		11.10	--	
	9/23/2014	LW-3	6.71	19.83	(c)	13.12	15.50	No
3	9/23/2014	PZ-18	7.23	21.20		13.97	--	
	9/23/2014	LW-4R	6.65	22.02		15.37	15.50	No
4	9/23/2014	PZ-19	13.34	23.67		10.33	--	
	9/23/2014	MW-02S	17.69	31.96		14.27	15.50	No
5	9/23/2014	MW-02S	17.69	31.96	(d)(e)	14.27	--	
	9/23/2014	MW-02D	19.11	31.81	(d)(e)	12.70	--	
6	9/23/2014	MW-01S	8.25	21.64		13.39	--	
	9/23/2014	MW-01D	7.88	21.72	(f)	13.84	--	
7	9/23/2014	MW-05S	14.79	29.45	(d)	14.66	16.50	No
	9/23/2014	MW-05D	13.18	26.50	(d)	13.32	--	--

MLLW = Mean low low water.

(a) Below top of PVC well casing.
(b) Short-term hydraulic control goal is 15.5 ft along the majority of the cutoff wall alignment and 16.5 ft adjacent to Budd Inlet.
(c) Well LW-3 casing modified and re-surveyed January 2009. On 7/28/10, the well casing at LW-3 cut down 0.2 ft to make room for new well monument lid. Elevation was adjusted from 20.03 to 19.83.
(d) Wells MW-02S, MW-02D, MW-05S, and MW-05D were modified during construction activities and re-surveyed in February 2009.
(e) MW-02D and MW-02S inner north rim elevations were modified in September 2011.
(f) On 12/8/11, the inner well casing was cut down at MW-01D by 0.15 ft. The outer casing was cut down corresponding amount. New MW-01D measuring point elevation is 21.72 ft MLLW.

NOTE: Groundwater elevations determined by subtracting depth to groundwater below top of casing (ft) from top of well casing elevation (MLLW, ft).

TABLE 2
SUMMARY OF CURRENT ANALYTICAL RESULTS
GROUNDWATER COMPLIANCE MONITORING
CASCADE POLE SITE
PORT OF OLYMPIA, WASHINGTON

	Cleanup Screening Levels (a)	PZ-12 ZB62K 9/24/2014	PZ-13 ZB62L 9/24/2014	PZ-17 ZB62F 9/23/2014	PZ-17 ZF85A 10/16/2014	PZ-18 ZB62G 9/23/2014	PZ-19 ZB62O 9/24/2014	LW-3 2014060297 6/11/2014	LW-3 ZB62D 9/23/2014	LW-4R ZB62E 9/23/2014
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (µg/L)										
EPA Method SW8270D / SW8270D-SIM										
Naphthalene	4900	**2.7**	**5.9**	1.0 U	NA	1.0 U	**3.8**	**0.539**	1.0 U	1.0 U
2-Methylnaphthalene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Acenaphthylene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Acenaphthene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Dibenzofuran		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U		1.0 U	1.0 U
Fluorene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Pentachlorophenol	3	10 UJ	10 UJ	10 UJ	NA	10 UJ	10 UJ	0.100 U	10 UJ	10 UJ
Phenanthrene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Anthracene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Fluoranthene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Pyrene	2600	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
Benzo(a)Anthracene		0.10 U	0.10 U	0.11 U	NA	0.11 U	0.10 U	0.100 U	0.12 U	0.11 U
Chrysene		0.10 U	0.10 U	0.11 U	NA	0.11 U	0.10 U	0.100 U	0.12 U	0.11 U
Benzo(a)Pyrene		0.10 U	0.10 U	0.11 U	NA	0.11 U	0.10 U	0.100 U	0.12 U	0.11 U
Benzo(g,h,i)Perylene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U
1-Methylnaphthalene		1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	**0.168**	1.0 U	1.0 U
Total Benzofluoranthenes		0.10 U	0.10 U	0.11 U	NA	0.11 U	0.10 U	0.100 U	0.12 U	0.11 U
cPAH TEQ (b)	0.1 (c)	ND	ND	ND	NA	ND	ND	ND	ND	ND
cPAH TEQ (b) (Using 1/2 RL for ND)	0.1 (c)	0.071	0.071	0.078	NA	0.078	0.071	0.071	0.085	0.078
PENTACHLOROPHENOL (µg/L)										
EPA Method SW8041										
Pentachlorophenol	3	0.25 U	0.25 U	0.25 U	NA	0.25 U	0.25 U		0.25 U	0.25 U
PETROLEUM HYDROCARBONS										
Method NWTPH-G (µg/L)										
Gasoline	1,000	250 U	250 U	250 U	NA	250 U	250 U	**189**	250 U	250 U
Method NWTPH-Dx (µg/L)										
Diesel	500	100 U	100 U	**110**	100 U	100 U	100 U	**247**	100 U	100 U
Motor Oil	500	200 U	200 U	**640**	200 U	200 U	200 U	500 U	200 U	200 U
Creosote Oil	500	100 U	100 U	**310**	100 U	100 U	100 U		**270**	100 U

TABLE 2
SUMMARY OF CURRENT ANALYTICAL RESULTS
GROUNDWATER COMPLIANCE MONITORING
CASCADE POLE SITE
PORT OF OLYMPIA, WASHINGTON

	Cleanup Screening Levels (a)	MW-01S ZB62M 9/24/2014	MW-02S ZB62A 9/23/2014	MW-05S ZB62B 9/23/2014	Dup of MW-05S PZ-30 ZB62C 9/23/2014	MW-01D ZB62N 9/24/2014	MW-02D ZB62I 9/23/2014	MW-05D ZB62J 9/23/2014	CW-13 ZB62H 9/23/2014
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (µg/L)									
EPA Method SW8270D / SW8270D-SIM									
Naphthalene	4900	**10,000**	1.0 U	**1.7**	**1.4**	**1.9**	1.0 U	**1.1**	1.0 U
2-Methylnaphthalene		**550**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene		10 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.3**	1.0 U	1.0 U
Acenaphthene		**240**	**1.0**	**8.6**	**9.4**	1.0 U	**3.8**	**2.5**	1.0 U
Dibenzofuran		**71**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluorene		**66**	1.0 U	1.0 U	1.0 U	1.0 U	**1.0**	1.0 U	1.0 U
Pentachlorophenol	3	**4,900** J	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Phenanthrene		**68**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene		**17**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene		10 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	2600	10 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)Anthracene		**0.83**	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Chrysene		**0.82**	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)Pyrene		0.3 U	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(g,h,i)Perylene		10 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene		**450**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Benzofluoranthenes		**0.55**	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
cPAH TEQ (b)	0.1 (c)	**0.146**	ND	ND	ND	ND	ND	ND	ND
cPAH TEQ (b) (Using 1/2 RL for ND)	0.1 (c)	**0.326**	0.078	0.078	0.085	0.078	0.078	0.078	0.078
PENTACHLOROPHENOL (µg/L)									
EPA Method SW8041									
Pentachlorophenol	3	NA	**0.83**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
PETROLEUM HYDROCARBONS									
Method NWTPH-G (µg/L)									
Gasoline	1,000	**52, 000**	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Method NWTPH-Dx (µg/L)									
Diesel	500	**11,000**	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Motor Oil	500	**690**	200 U	200 U	200 U	**400**	200 U	200 U	200 U
Creosote Oil	500	**59,000**	100 U	**100**	**130**	**290**	**130**	100 U	100 U

µg/L = micrograms per liter
U = Indicates the compound was undetected at the given reporting limit.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
ND = Not Detected.
Bold indicates detected compound. Box indicates exceedance of screening levels.
Box indicates exceedance of screening level.
SIM = select ion monitoring

EPA = U.S. Environmental Protection Agency
MTCA = Model Toxics Control Act
RL = Reporting Limit
WAC = Washington Administrative Code
cPAH = carcinogenic polycyclic aromatic hydrocarbon
PCP = pentachlorophenol
NWTPH-Dx = total petroleum hydrocarbons diesel range
NWTPH-Gx = TPH gasoline range

(a) Groundwater screening levels are MTCA Method B for marine surface water for cPAHs and PCP; MTCA Method A for TPH-G/TPH-Dx.
(b) TEQ = toxicity equivalency factor as described in WAC 173-340-708 (8).
(c) cPAH cleanup screening levels based on practical quantitation limit (PQL) for individual cPAHs.

ATTACHMENT 1

Laboratory Reports

SPECTRA Laboratories
2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

7/1/2014

Port of Olympia
Chris Kimmel
915 Washington St. N.E.
Olympia, WA 98501

Project:	Cascade Pole
Client ID:	LW-3-20140611
Sample Matrix:	Water
Date Sampled:	6/11/2014
Date Received:	6/12/2014
Spectra Project:	2014060297
Spectra Number:	1

Analyte	Results	Units	Method
Diesel**	247**	µg/L	NWTPH-D
Oil	<500	µg/L	NWTPH-D
Gasoline*	189	µg/L	NWTPH-G
1-Methylnaphthalene--SIM	0.168	µg/L	SW846 8270D-SIM
2-Methylnaphthalene--SIM	<0.100	µg/L	SW846 8270D-SIM
Acenaphthene--SIM	<0.100	µg/L	SW846 8270D-SIM
Acenaphthylene--SIM	<0.100	µg/L	SW846 8270D-SIM
Anthracene--SIM	<0.100	µg/L	SW846 8270D-SIM
Benzo(a)Anthracene--SIM	<0.100	µg/L	SW846 8270D-SIM
Benzo(a)Pyrene--SIM	<0.100	µg/L	SW846 8270D-SIM
Benzo(b)Fluoranthene--SIM	<0.100	µg/L	SW846 8270D-SIM
Benzo(ghi)Perylene--SIM	<0.100	µg/L	SW846 8270D-SIM
Benzo(k)Fluoranthene--SIM	<0.100	µg/L	SW846 8270D-SIM
Chrysene--SIM	<0.100	µg/L	SW846 8270D-SIM
Dibenz(a,h)Anthracene--SIM	<0.100	µg/L	SW846 8270D-SIM
Fluoranthene--SIM	<0.100	µg/L	SW846 8270D-SIM
Fluorene--SIM	<0.100	µg/L	SW846 8270D-SIM
Indeno(1,2,3-cd)Pyrene--SIM	<0.100	µg/L	SW846 8270D-SIM
Naphthalene--SIM	0.539	µg/L	SW846 8270D-SIM
Pentachlorophenol--SIM	<0.100	µg/L	SW846 8270D-SIM
Phenanthrene--SIM	<0.100	µg/L	SW846 8270D-SIM
Pyrene--SIM	<0.100	µg/L	SW846 8270D-SIM

Surrogate	Recovery	Method
p-Terphenyl	131	NWTPH-D
Toluene-d8	110	NWTPH-G
Nitrobenzene-d6--SIM	96	SW846 8270D-SIM
p-Terphenyl-d14--SIM	90	SW846 8270D-SIM
4-Bromofluorobenzene	125	NWTPH-G
2-Fluorobiphenyl--SIM	69	SW846 8270D-SIM
2,4,6-Tribromophenol--SIM	83	SW846 8270D-SIM

*Gasoline-range organics do not appear to be true gasoline, but rather two distinct compounds: Toluene and Indane.

**Sample contains one distinct peak within the diesel range. GC Mass Spec analysis indicates the presense of retene, CAS# 483-65-8.

Pentachlorophenol result of <0.100 confirmed by Method SW 846-8041.

Sample analyzed by Method 8270-D in both scan and SIM modes for PAH's and Pentachlorophenol, as requested, to provide broad calibration range and lowest reporting limits.

SPECTRA LABORATORIES

Steve Hibbs, Laboratory Manager

SPECTRA Laboratories
2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

June 27, 2014

Port of Olympia
915 Washington St. N.E.
Olympia, WA 98501

Spectra Project #	2014060297
Sample Spiked:	Method Blank
Date Extracted:	6/17/2014
Date Analyzed:	6/18/2014
Units:	ug/L
Applies to Spectra #'s:	#1

GCMS Semi-Volatile Organic Analysis Method 625/8270
Blank Spike (LCS) Results

Compound	Sample Conc.	Spike Added	MS Conc.	MS %Rec
Phenol	<2.50	75	52.6	70
2-Chlorophenol	<2.50	75	46.9	63
1,4-Dichlorobenzene	<2.50	50	25.0	50
N-Nitroso-Di-N-Propylamine	<2.50	50	41.3	83
1,2,4-Trichlorobenzene	<2.50	50	27.0	54
4-Chloro-3-Methylphenol	<2.50	75	62.3	83
Acenaphthene	<1.00	50	31.2	62
2,4-Dinitrotoluene	<2.50	50	30.5	61
4-Nitrophenol	<2.50	75	63.6	85
Pentachlorophenol	<2.50	75	51.5	69
Pyrene	<1.00	50	37.7	75

Surrogates	MS%Rec
2-Fluorophenol	72
Phenol-d5	86
Nitrobenzene-d5	96
2-Fluorobiphenyl	69
2,4,6-Tribromophenol	83
p-Terphenyl-d14	90

Steven G. Hibbs
Laboratory Manager

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2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

June 27, 2014

Port of Olympia
915 Washington St. N.E.
Olympia, WA 98501

Project: Cascade Pole
Sample matrix: Water
Spectra Project: 2014060297
Method 625/8270-SIM

Date Extracted: 06/17/14
Date Analyzed: 06/19/14
Applies to Samples: 1
< = less than

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS QUALITY CONTROL RESULTS

	Method Blank
Compound	Blank Result, ug/L
Naphthalene	<0.10
2-Methylnaphthalene	<0.10
1-Methylnaphthalene	<0.10
Acenaphthylene	<0.10
Acenaphthene	<0.10
Fluorene	<0.10
Phenanthrene	<0.10
Anthracene	<0.10
Fluoranthene	<0.10
Pyrene	<0.10
Benzo(a)Anthracene	<0.10
Chrysene	<0.10
Benzo(b)Fluoranthene	<0.10
Benzo(k)Fluoranthene	<0.10
Benzo(a)Pyrene	<0.10
Indeno(1,2,3-cd)Pyrene	<0.10
Dibenzo(a,h)Anthracene	<0.10
Benzo(g,h,i)Perylene	<0.10
Pentachlorophenol	<0.10
SURROGATE RECOVERIES	%Rec
Nitrobenzene-d5	100
2-Fluorobiphenyl	65
p-Terphenyl-d14	95
2,4,6-Tribromophenol	84

Steven G. Hibbs
Laboratory Manager

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
(253) 272-4850 Fax (253) 572-9838
www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS:
Run all samples for PCP using 8270. If result = ND, then and only then run PCP by 8041.

Return Samples: Y (N)

Page 1 of 1

CHAIN OF CUSTODY

SPECTRA PROJECT # 20140600291

STANDARD [X] RUSH [ ]

CLIENT: Port of Olympia ADDRESS: ADDRESS CHANGE [ ]

PROJECT: Cascade Pole

CONTACT: Chris Kimmel

SAMPLED BY: Siena Mott

PHONE: FAX:

e-MAIL: ckimmel@landaainc.com Prefer FAX or e-MAIL [X]

PURCHASE ORDER #

	SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	NUMBER OF CONTAINERS	HYDROCARBONS: NWTPH-HCID	BTEX	BTEX/NWTPH-G	NWTPH-G	NWTPH-Dx	1664 SGT-HEM (TPH)	1664 HEM (FOG)	ORGANICS: 8260/624 VOA	8260 CHLOR SOLVENTS	8270-625 SEMI VOA	8270 PAH/PNA	8082/608 PCB	cPAH SIM	METALS: TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	OTHER: PH 9040/9045	TX/TOX/EOX	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)	PCP (8270)	PCP (8041)
1	LW3-20140611	6/11/14	1903	H2O	5				X	X						X		X											X	X
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														

LAB USE ONLY

Shipped Via: US Mail UPS Fed Ex Courier (Client)

(Cooler) Shipping Container: Box Envelope None

Tracking # —

Custody Seals: Y N Intact: Y N

Cooler Temp. 9.3 Sample Temp. 9.2

	SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
RELINQUISHED BY	Siena Mott	Siena Mott	LAI	6/12/14	820
RECEIVED BY	Randa Rass	Randa Rass	Spectra	6/12/14	0825
RELINQUISHED BY					
RECEIVED BY					

Payment Terms: Net 30 days. Past due accounts subject to 1 1/2% per month interest. Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co., WA venue. *Spectra Laboratories, LLC*

Analytical Resources, Incorporated
Analytical Chemists and Consultants

October 8, 2014

Chris Kimmel
Landau Associates, Inc.
130 2nd Avenue S.
Edmonds, WA 98020

RE: Project: Port of Olympia, 21039.110.111
ARI Job No: ZB62

Dear Chris:

Please find enclosed the original Chain-of-Custody record (COC), sample receipt documentation, and final results for the project referenced above. Analytical Resources, Inc. accepted fifteen water samples and a trip blank in good condition on September 24, 2014.

The samples were analyzed for NWTPH-Gx, NWTPH-Dx, cPAHs by method SW8270 SIM, PAHs by method SW8270, and pentachlorophenol on select samples by method SW8041, as requested on the COC.

Please refer to the Case Narrative for details regarding requested analyses.

An electronic copy of this report and all associated ARI raw data will be kept on file with ARI. Should you have any questions or problems, please feel free to contact me at any time.

Sincerely,
ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
-For-
Kelly Bottem
Client Services Manager
(206) 695-6211

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

LANDAU ASSOCIATES

☐ Seattle/Edmonds (425) 778-0907
☒ Tacoma (253) 926-2493
☐ Spokane (509) 327-9737
☐ Portland (503) 542-1080
☐ _____

Chain-of-Custody Record

Date 9/24/14
Page 1 of 1

Project Name Port of Olympia Project No. 21039.110.111
Project Location/Event Cascade Pole, Dry Season
Sampler's Name Sierra Mott, Ben Lee
Project Contact Chris Kimmel
Send Results To Chris Kimmel, Anne Halvorsen

Turnaround Time
☒ Standard
☐ Accelerated
☐ _____

Sample I.D.	Date	Time	Matrix	No. of Containers	TPH-Gx	NWTPH-Dx+ creosote	PAHs (8270)	cPAHs SIM	PCP (8270)	PCP (8041)	Observations/Comments
MW-025-20140923	9/23/14	1311	H2O	10	X	X	X	X	X	X	
MW-065-20140923		1135		10	X	X	X	X	X	X	
PZ-30-20140923		1141		10	X	X	X	X	X	X	
LW-3-20140923		1731		10	X	X	X	X	X	X	
LW-4R-20140923		1617		10	X	X	X	X	X	X	
PZ-17-20140923		1720		10	X	X	X	X	X	X	
PZ-18-20140923		1422		10	X	X	X	X	X	X	
CW-13-20140923		1123		10	X	X	X	X	X	X	
MW-020-20140923		1415		10	X	X	X	X	X	X	
MW-050-20140923		1231		10	X	X	X	X	X	X	
PZ-12-20140924	9/24/14	1003		10	X	X	X	X	X	X	
PZ-13-20140924		1030		10	X	X	X	X	X	X	
MW-015-20140924		1113		10	X	X	X	X	X	X	
MW-010-20140924		1136		10	X	X	X	X	X	X	
Trip Blanks	9/9/14	—		4	X						
PZ-19-20140924	9/24/14	924	H2O	10	X	X	X	X	X	X	

Testing Parameters

Observations/Comments

X Allow water samples to settle, collect aliquot from clear portion

X NWTPH-Dx - run acid wash/silica gel cleanup

___ run samples standardized to _____ product

___ Analyze for EPH if no specific product identified

VOC/BTEX/VPH (soil):
___ non-preserved
___ preserved w/methanol
___ preserved w/sodium bisulfate
___ Freeze upon receipt

___ Dissolved metal water samples field filtered

Other Run all samples for PCP using 8270. If results = ND, then and only then run PCP by 8041

Special Shipment/Handling or Storage Requirements: Cooler with ice

Method of Shipment: Drop off

Relinquished by	Received by	Relinquished by	Received by
Signature: Sierra Mott	Signature:	Signature:	Signature:
Printed Name: Sierra Mott	Printed Name: Tony Ter Streeter	Printed Name:	Printed Name:
Company: Landau Associates	Company: ARI	Company:	Company:
Date: 9/24/14 Time: 1352	Date: 9-24-14 Time: 1352	Date: Time:	Date: Time:

WHITE COPY - Project File YELLOW COPY - Laboratory PINK COPY - Client Representative Rev 8/09

20000 : 29927

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Landau

COC No(s): _____ NA

Assigned ARI Job No: ZB62

Project Name: Port of Olympia

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2 0-6.0 °C for chemistry): 3.2 4.3 5.4 3.6 1.3 3.5 2.9 3.0

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90875954

Cooler Accepted by: TB Date: 9-24-14 Time: 1352

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA	9-9-14	

Was Sample Split by ARI: NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TB Date: 9-24-14 Time: 1415

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

PZ18 25m

TB 4pB

By: TB Date: 9-24-14

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: 21039.110.111
ARI Job No.: ZB62
October 8, 2014

Sample Receipt

Please find enclosed the original *Chain of Custody (COC)* record and analytical results for the project referenced above. Analytical Resources, Inc. accepted fifteen water samples and a trip blank in good condition on February 20, 2014. The samples were received at cooler temperatures between 2.0 and 5.3°C. Please see the *Cooler Receipt Form* for further details. Per Landau Associates, select samples were allowed to settle and sample volume was collected from the clear portion.

The following tests were performed on selected samples, as requested on the *Chain of Custody*.

Semivolatile Organics by method 8270D Water

The samples were extracted on 9/30/14. The samples were analyzed on 10/2/14 and 10/3/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recovery of 2,4,6-Tribromophenol fell outside the control limits low for sample **MW-05D-20140923**. All other percent recoveries were within control limits. No corrective action was taken.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations (CCALs) on 10/2/14 and 10/3/14 fell outside the 20% control limit low for Pentachlorophenol. All detected results for this compound have been flagged with a "Q" qualifier. No further corrective action was taken.

SIM cPAHs by method 8270-SIM Water

The samples were extracted on 9/26/14. The extracts were analyzed on 9/30/14 and 10/1/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations were within control limits.

Case Narrative

Project: 21039.110.111
ARI Job No.: ZB62
October 8, 2014

PCP Only by method 8041

The samples were extracted on 9/27/14 and analyzed on 10/6/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations were within control limits.

NWTPH-Dx

The samples were extracted on 9/26/14 and analyzed on 10/3/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations were within control limits.

NWTPH-Gx

The samples were analyzed on 10/2/14, 10/3/14, and 10/6/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations were within control limits.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZB62
Client: Landau Associates, Inc.
Project Event: 21039.110.111
Project Name: Port of Olympia

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-02S-20140923	ZB62A	14-19783	Water	09/23/14 13:11	09/24/14 13:52
2.	MW-05S-20140923	ZB62B	14-19784	Water	09/23/14 11:35	09/24/14 13:52
3.	PZ-30-20140923	ZB62C	14-19785	Water	09/23/14 11:41	09/24/14 13:52
4.	LW-3-20140923	ZB62D	14-19786	Water	09/23/14 17:31	09/24/14 13:52
5.	LW-4R-20140923	ZB62E	14-19787	Water	09/23/14 16:17	09/24/14 13:52
6.	PZ-17-20140923	ZB62F	14-19788	Water	09/23/14 17:20	09/24/14 13:52
7.	PZ-18-20140923	ZB62G	14-19789	Water	09/23/14 14:22	09/24/14 13:52
8.	CW-13-20140923	ZB62H	14-19790	Water	09/23/14 11:23	09/24/14 13:52
9.	MW-02D-20140923	ZB62I	14-19791	Water	09/23/14 14:15	09/24/14 13:52
10.	MW-05D-20140923	ZB62J	14-19792	Water	09/23/14 12:31	09/24/14 13:52
11.	PZ-12-20140924	ZB62K	14-19793	Water	09/24/14 10:03	09/24/14 13:52
12.	PZ-13-20140924	ZB62L	14-19794	Water	09/24/14 10:30	09/24/14 13:52
13.	MW-01S-20140924	ZB62M	14-19795	Water	09/24/14 11:13	09/24/14 13:52
14.	MW-01D-20140924	ZB62N	14-19796	Water	09/24/14 11:36	09/24/14 13:52
15.	PZ-19-20140924	ZB62O	14-19797	Water	09/24/14 09:24	09/24/14 13:52
16.	Trip Blanks	ZB62P	14-19798	Water	09/23/14	09/24/14 13:52

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-02S-20140923
SAMPLE

Lab Sample ID: ZB62A
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 19:25
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	**Acenaphthene**	**1.0**	**1.0**
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	57.6%
2,4,6-Tribromophenol	67.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-05S-20140923
SAMPLE

Lab Sample ID: ZB62B
LIMS ID: 14-19784
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 19:59
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**1.7**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	**Acenaphthene**	**1.0**	**8.6**
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	61.6%
d14-p-Terphenyl	57.2%
2,4,6-Tribromophenol	64.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: PZ-30-20140923
SAMPLE

Lab Sample ID: ZB62C
LIMS ID: 14-19785
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 20:32
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**1.4**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	**Acenaphthene**	**1.0**	**9.4**
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	65.6%
d14-p-Terphenyl	63.2%
2,4,6-Tribromophenol	72.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: LW-3-20140923
SAMPLE

Lab Sample ID: ZB62D
LIMS ID: 14-19786
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 21:06
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	68.0%
d14-p-Terphenyl	56.4%
2,4,6-Tribromophenol	83.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: LW-4R-20140923
SAMPLE

Lab Sample ID: ZB62E
LIMS ID: 14-19787
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 21:40
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	61.6%
d14-p-Terphenyl	54.4%
2,4,6-Tribromophenol	67.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-17-20140923
SAMPLE

Lab Sample ID: ZB62F
LIMS ID: 14-19788
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 22:14
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	66.8%
d14-p-Terphenyl	74.4%
2,4,6-Tribromophenol	69.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-18-20140923
SAMPLE

Lab Sample ID: ZB62G
LIMS ID: 14-19789
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 22:47
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	67.6%
2,4,6-Tribromophenol	72.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: CW-13-20140923
SAMPLE

Lab Sample ID: ZB62H
LIMS ID: 14-19790
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 23:21
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	54.4%
d14-p-Terphenyl	54.4%
2,4,6-Tribromophenol	63.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-02D-20140923
SAMPLE

Lab Sample ID: ZB62I
LIMS ID: 14-19791
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 12:47
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	**Acenaphthylene**	**1.0**	**2.3**
83-32-9	**Acenaphthene**	**1.0**	**3.8**
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	**Fluorene**	**1.0**	**1.0**
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	**Carbazole**	**1.0**	**4.0**
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	55.6%
d14-p-Terphenyl	68.8%
2,4,6-Tribromophenol	62.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-05D-20140923
SAMPLE

Lab Sample ID: ZB62J
LIMS ID: 14-19792
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 13:22
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**1.1**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	**Acenaphthene**	**1.0**	**2.5**
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	54.4%
d14-p-Terphenyl	73.6%
2,4,6-Tribromophenol	46.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-12-20140924
SAMPLE

Lab Sample ID: ZB62K
LIMS ID: 14-19793
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 13:56
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**2.7**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	55.2%
d14-p-Terphenyl	55.6%
2,4,6-Tribromophenol	59.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-13-20140924
SAMPLE

Lab Sample ID: ZB62L
LIMS ID: 14-19794
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 14:31
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**5.9**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	70.4%
2,4,6-Tribromophenol	54.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-01S-20140924
SAMPLE

Lab Sample ID: ZB62M
LIMS ID: 14-19795
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 16:13
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 10.0

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**10**	**3,100 ES**
91-57-6	**2-Methylnaphthalene**	**10**	**550**
208-96-8	Acenaphthylene	10	< 10 U
83-32-9	**Acenaphthene**	**10**	**240**
132-64-9	**Dibenzofuran**	**10**	**71**
86-73-7	**Fluorene**	**10**	**66**
87-86-5	**Pentachlorophenol**	**100**	**6,000 ESQ**
85-01-8	**Phenanthrene**	**10**	**68**
86-74-8	**Carbazole**	**10**	**100**
120-12-7	**Anthracene**	**10**	**17**
206-44-0	Fluoranthene	10	< 10 U
129-00-0	Pyrene	10	< 10 U
56-55-3	Benzo(a)anthracene	10	< 10 U
218-01-9	Chrysene	10	< 10 U
50-32-8	Benzo(a)pyrene	10	< 10 U
193-39-5	Indeno(1,2,3-cd)pyrene	10	< 10 U
53-70-3	Dibenz(a,h)anthracene	10	< 10 U
191-24-2	Benzo(g,h,i)perylene	10	< 10 U
90-12-0	**1-Methylnaphthalene**	**10**	**450**
TOTBFA	Total Benzofluoranthenes	20	< 20 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	55.6%
2,4,6-Tribromophenol	74.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-01S-20140924
DILUTION

Lab Sample ID: ZB62M
LIMS ID: 14-19795
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 16:54
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 100

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**100**	**8,200 E**
91-57-6	**2-Methylnaphthalene**	**100**	**600**
208-96-8	Acenaphthylene	100	< 100 U
83-32-9	**Acenaphthene**	**100**	**240**
132-64-9	Dibenzofuran	100	< 100 U
86-73-7	Fluorene	100	< 100 U
87-86-5	**Pentachlorophenol**	**1,000**	**4,900 Q**
85-01-8	Phenanthrene	100	< 100 U
86-74-8	**Carbazole**	**100**	**110**
120-12-7	Anthracene	100	< 100 U
206-44-0	Fluoranthene	100	< 100 U
129-00-0	Pyrene	100	< 100 U
56-55-3	Benzo(a)anthracene	100	< 100 U
218-01-9	Chrysene	100	< 100 U
50-32-8	Benzo(a)pyrene	100	< 100 U
193-39-5	Indeno(1,2,3-cd)pyrene	100	< 100 U
53-70-3	Dibenz(a,h)anthracene	100	< 100 U
191-24-2	Benzo(g,h,i)perylene	100	< 100 U
90-12-0	**1-Methylnaphthalene**	**100**	**480**
TOTBFA	Total Benzofluoranthenes	200	< 200 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	D
d14-p-Terphenyl	D
2,4,6-Tribromophenol	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-01S-20140924
DILUTION2

Lab Sample ID: ZB62M
LIMS ID: 14-19795
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 17:28
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 300

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**300**	**10,000**
91-57-6	**2-Methylnaphthalene**	**300**	**640**
208-96-8	Acenaphthylene	300	< 300 U
83-32-9	Acenaphthene	300	< 300 U
132-64-9	Dibenzofuran	300	< 300 U
86-73-7	Fluorene	300	< 300 U
87-86-5	**Pentachlorophenol**	**3,000**	**5,300 Q**
85-01-8	Phenanthrene	300	< 300 U
86-74-8	Carbazole	300	< 300 U
120-12-7	Anthracene	300	< 300 U
206-44-0	Fluoranthene	300	< 300 U
129-00-0	Pyrene	300	< 300 U
56-55-3	Benzo(a)anthracene	300	< 300 U
218-01-9	Chrysene	300	< 300 U
50-32-8	Benzo(a)pyrene	300	< 300 U
193-39-5	Indeno(1,2,3-cd)pyrene	300	< 300 U
53-70-3	Dibenz(a,h)anthracene	300	< 300 U
191-24-2	Benzo(g,h,i)perylene	300	< 300 U
90-12-0	**1-Methylnaphthalene**	**300**	**510**
TOTBFA	Total Benzofluoranthenes	600	< 600 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	D
d14-p-Terphenyl	D
2,4,6-Tribromophenol	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MW-01D-20140924
SAMPLE

Lab Sample ID: ZB62N
LIMS ID: 14-19796
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 15:05
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**1.9**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery	
2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	76.8%
2,4,6-Tribromophenol	68.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-19-20140924
SAMPLE

Lab Sample ID: ZB620
LIMS ID: 14-19797
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/30/14
Date Analyzed: 10/03/14 15:39
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**1.0**	**3.8**
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	52.8%
d14-p-Terphenyl	73.2%
2,4,6-Tribromophenol	58.9%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Client ID	FBP	TPH	TBP	TOT OUT
MB-093014	58.8%	76.8%	57.1%	0
LCS-093014	73.6%	78.8%	83.2%	0
LCSD-093014	69.6%	77.2%	80.0%	0
MW-02S-20140923	65.2%	57.6%	67.5%	0
MW-05S-20140923	61.6%	57.2%	64.3%	0
PZ-30-20140923	65.6%	63.2%	72.8%	0
LW-3-20140923	68.0%	56.4%	83.7%	0
LW-4R-20140923	61.6%	54.4%	67.7%	0
PZ-17-20140923	66.8%	74.4%	69.3%	0
PZ-18-20140923	63.2%	67.6%	72.3%	0
CW-13-20140923	54.4%	54.4%	63.2%	0
MW-02D-20140923	55.6%	68.8%	62.9%	0
MW-05D-20140923	54.4%	73.6%	46.1%*	1
PZ-12-20140924	55.2%	55.6%	59.5%	0
PZ-13-20140924	63.2%	70.4%	54.7%	0
MW-01S-20140924	65.2%	55.6%	74.9%	0
MW-01S-20140924 DL	D	D	D	0
MW-01S-20140924 RE	D	D	D	0
MW-01D-20140924	70.0%	76.8%	68.5%	0
PZ-19-20140924	52.8%	73.2%	58.9%	0

	LCS/MB LIMITS	QC LIMITS
(FBP) = 2-Fluorobiphenyl	(33-120)	(33-120)
(TPH) = d14-p-Terphenyl	(28-130)	(28-130)
(TBP) = 2,4,6-Tribromophenol	(52-131)	(52-131)

Prep Method: SW3520C
Log Number Range: 14-19783 to 14-19797

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
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Sample ID: LCS-093014
LCS/LCSD

Lab Sample ID: LCS-093014
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted LCS/LCSD: 09/30/14

Date Analyzed LCS: 10/02/14 13:10
LCSD: 10/02/14 13:44
Instrument/Analyst LCS: NT6/JZ
LCSD: NT6/JZ
GPC Cleanup: NO

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	20.1	25.0	80.4%	20.2	25.0	80.8%	0.5%
2-Methylnaphthalene	14.4	25.0	57.6%	13.7	25.0	54.8%	5.0%
Acenaphthylene	20.7	25.0	82.8%	21.4	25.0	85.6%	3.3%
Acenaphthene	22.3	25.0	89.2%	21.3	25.0	85.2%	4.6%
Dibenzofuran	16.3	25.0	65.2%	15.2	25.0	60.8%	7.0%
Fluorene	22.6	25.0	90.4%	22.1	25.0	88.4%	2.2%
Pentachlorophenol	61.4 Q	75.0	81.9%	68.6 Q	75.0	91.5%	11.1%
Phenanthrene	24.0	25.0	96.0%	24.5	25.0	98.0%	2.1%
Carbazole	25.4	25.0	102%	24.0	25.0	96.0%	5.7%
Anthracene	22.0	25.0	88.0%	24.0	25.0	96.0%	8.7%
Fluoranthene	22.6	25.0	90.4%	26.2	25.0	105%	14.8%
Pyrene	21.9	25.0	87.6%	22.3	25.0	89.2%	1.8%
Benzo(a)anthracene	24.2	25.0	96.8%	23.7	25.0	94.8%	2.1%
Chrysene	23.2	25.0	92.8%	23.7	25.0	94.8%	2.1%
Benzo(a)pyrene	26.2	25.0	105%	25.7	25.0	103%	1.9%
Indeno(1,2,3-cd)pyrene	24.4	25.0	97.6%	21.6	25.0	86.4%	12.2%
Dibenz(a,h)anthracene	26.5	25.0	106%	23.0	25.0	92.0%	14.1%
Benzo(g,h,i)perylene	21.0	25.0	84.0%	19.5	25.0	78.0%	7.4%
1-Methylnaphthalene	21.6	25.0	86.4%	21.4	25.0	85.6%	0.9%
Total Benzofluoranthenes	53.8	50.0	108%	52.5	50.0	105%	2.4%

Semivolatile Surrogate Recovery

	LCS	LCSD
2-Fluorobiphenyl	73.6%	69.6%
d14-p-Terphenyl	78.8%	77.2%
2,4,6-Tribromophenol	83.2%	80.0%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
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Sample ID: MB-093014
METHOD BLANK

Lab Sample ID: MB-093014
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/06/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: NA
Date Received: NA

Date Extracted: 09/30/14
Date Analyzed: 10/02/14 12:36
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

2-Fluorobiphenyl	58.8%
d14-p-Terphenyl	76.8%
2,4,6-Tribromophenol	57.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
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Sample ID: MW-02S-20140923
SAMPLE

Lab Sample ID: ZB62A
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 18:02
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	63.0%
d14-Dibenzo(a,h)anthracene	32.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: MW-05S-20140923
SAMPLE

Lab Sample ID: ZB62B
LIMS ID: 14-19784
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 18:29
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	61.7%
d14-Dibenzo(a,h)anthracene	52.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: PZ-30-20140923
SAMPLE

Lab Sample ID: ZB62C
LIMS ID: 14-19785
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 18:57
Instrument/Analyst: NT8/JZ

Sample Amount: 420 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.12	< 0.12 U
218-01-9	Chrysene	0.12	< 0.12 U
50-32-8	Benzo(a)pyrene	0.12	< 0.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.12	< 0.12 U
53-70-3	Dibenz(a,h)anthracene	0.12	< 0.12 U
TOTBFA	Total Benzofluoranthenes	0.12	< 0.12 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	63.7%
d14-Dibenzo(a,h)anthracene	63.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
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Sample ID: LW-3-20140923
SAMPLE

Lab Sample ID: ZB62D
LIMS ID: 14-19786
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 19:25
Instrument/Analyst: NT8/JZ

Sample Amount: 400 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.12	< 0.12 U
218-01-9	Chrysene	0.12	< 0.12 U
50-32-8	Benzo(a)pyrene	0.12	< 0.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.12	< 0.12 U
53-70-3	Dibenz(a,h)anthracene	0.12	< 0.12 U
TOTBFA	Total Benzofluoranthenes	0.12	< 0.12 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	69.7%
d14-Dibenzo(a,h)anthracene	27.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
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Sample ID: LW-4R-20140923
SAMPLE

Lab Sample ID: ZB62E
LIMS ID: 14-19787
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 19:53
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	68.7%
d14-Dibenzo(a,h)anthracene	64.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
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Sample ID: PZ-17-20140923
SAMPLE

Lab Sample ID: ZB62F
LIMS ID: 14-19788
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 20:21
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	61.3%
d14-Dibenzo(a,h)anthracene	78.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: PZ-18-20140923
SAMPLE

Lab Sample ID: ZB62G
LIMS ID: 14-19789
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 20:49
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	67.3%
d14-Dibenzo(a,h)anthracene	64.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: CW-13-20140923
SAMPLE

Lab Sample ID: ZB62H
LIMS ID: 14-19790
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 21:17
Instrument/Analyst: NT8/JZ

Sample Amount: 460 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	62.7%
d14-Dibenzo(a,h)anthracene	73.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-02D-20140923
SAMPLE

Lab Sample ID: ZB62I
LIMS ID: 14-19791
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 21:45
Instrument/Analyst: NT8/JZ

Sample Amount: 450 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	61.7%
d14-Dibenzo(a,h)anthracene	74.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-05D-20140923
SAMPLE

Lab Sample ID: ZB62J
LIMS ID: 14-19792
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 22:13
Instrument/Analyst: NT8/JZ

Sample Amount: 460 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	65.7%
d14-Dibenzo(a,h)anthracene	79.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: PZ-12-20140924
SAMPLE

Lab Sample ID: ZB62K
LIMS ID: 14-19793
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 22:41
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	66.7%
d14-Dibenzo(a,h)anthracene	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: PZ-13-20140924
SAMPLE

Lab Sample ID: ZB62L
LIMS ID: 14-19794
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 23:09
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	62.0%
d14-Dibenzo(a,h)anthracene	65.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-01S-20140924
SAMPLE

Lab Sample ID: ZB62M
LIMS ID: 14-19795
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 23:36
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00

CAS Number	Analyte	LOQ	Result
56-55-3	**Benzo(a)anthracene**	**0.30**	**0.83**
218-01-9	**Chrysene**	**0.30**	**0.82**
50-32-8	Benzo(a)pyrene	0.30	< 0.30 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.30	< 0.30 U
53-70-3	Dibenz(a,h)anthracene	0.30	< 0.30 U
TOTBFA	**Total Benzofluoranthenes**	**0.30**	**0.55**

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	39.0%
d14-Dibenzo(a,h)anthracene	27.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-01D-20140924
SAMPLE

Lab Sample ID: ZB62N
LIMS ID: 14-19796
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 10/01/14 00:04
Instrument/Analyst: NT8/JZ

Sample Amount: 460 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.11	< 0.11 U
218-01-9	Chrysene	0.11	< 0.11 U
50-32-8	Benzo(a)pyrene	0.11	< 0.11 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	< 0.11 U
53-70-3	Dibenz(a,h)anthracene	0.11	< 0.11 U
TOTBFA	Total Benzofluoranthenes	0.11	< 0.11 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	69.7%
d14-Dibenzo(a,h)anthracene	68.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: PZ-19-20140924
SAMPLE

Lab Sample ID: ZB620
LIMS ID: 14-19797
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/26/14
Date Analyzed: 10/01/14 00:32
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	72.0%
d14-Dibenzo(a,h)anthracene	82.3%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Client ID	MNP	DBA	TOT OUT
MB-092614	62.7%	92.3%	0
LCS-092614	67.3%	87.3%	0
LCSD-092614	68.3%	84.0%	0
MW-02S-20140923	63.0%	32.7%	0
MW-05S-20140923	61.7%	52.3%	0
PZ-30-20140923	63.7%	63.7%	0
LW-3-20140923	69.7%	27.3%	0
LW-4R-20140923	68.7%	64.3%	0
PZ-17-20140923	61.3%	78.0%	0
PZ-18-20140923	67.3%	64.0%	0
CW-13-20140923	62.7%	73.7%	0
MW-02D-20140923	61.7%	74.3%	0
MW-05D-20140923	65.7%	79.3%	0
PZ-12-20140924	66.7%	74.0%	0
PZ-13-20140924	62.0%	65.7%	0
MW-01S-20140924	39.0%	27.0%	0
MW-01D-20140924	69.7%	68.0%	0
PZ-19-20140924	72.0%	82.3%	0

	LCS/MB LIMITS	QC LIMITS
(MNP) = d10-2-Methylnaphthalene	(31-120)	(31-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(10-125)	(10-125)

Prep Method: SW3520C
Log Number Range: 14-19783 to 14-19797

FORM-II SIM SW8270

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

Sample ID: LCS-092614
LAB CONTROL SAMPLE

Lab Sample ID: LCS-092614
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 09/26/14
Date Analyzed LCS: 09/30/14 16:10
LCSD: 09/30/14 16:38
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzo(a)anthracene	2.76	3.00	92.0%	2.77	3.00	92.3%	0.4%
Chrysene	2.74	3.00	91.3%	2.72	3.00	90.7%	0.7%
Benzo(a)pyrene	2.51	3.00	83.7%	2.68	3.00	89.3%	6.6%
Indeno(1,2,3-cd)pyrene	2.79	3.00	93.0%	2.89	3.00	96.3%	3.5%
Dibenz(a,h)anthracene	2.73	3.00	91.0%	2.80	3.00	93.3%	2.5%
Total Benzofluoranthenes	8.87	9.00	98.6%	8.94	9.00	99.3%	0.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-2-Methylnaphthalene	67.3%	68.3%
d14-Dibenzo(a,h)anthracene	87.3%	84.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MB-092614
METHOD BLANK

Lab Sample ID: MB-092614
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/01/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: NA
Date Received: NA

Date Extracted: 09/26/14
Date Analyzed: 09/30/14 15:42
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	62.7%
d14-Dibenzo(a,h)anthracene	92.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
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Sample ID: MW-02S-20140923
SAMPLE

Lab Sample ID: ZB62A
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 15:04
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	0.83

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	81.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MW-05S-20140923
SAMPLE

Lab Sample ID: ZB62B
LIMS ID: 14-19784
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 15:40
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	87.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
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Sample ID: PZ-30-20140923
SAMPLE

Lab Sample ID: ZB62C
LIMS ID: 14-19785
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 16:15
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	80.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: LW-3-20140923
SAMPLE

Lab Sample ID: ZB62D
LIMS ID: 14-19786
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 16:51
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	85.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
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Sample ID: LW-4R-20140923
SAMPLE

Lab Sample ID: ZB62E
LIMS ID: 14-19787
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 17:26
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	76.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: PZ-17-20140923
SAMPLE

Lab Sample ID: ZB62F
LIMS ID: 14-19788
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 18:01
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	84.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: PZ-18-20140923
SAMPLE

Lab Sample ID: ZB62G
LIMS ID: 14-19789
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 18:37
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	87.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: CW-13-20140923
SAMPLE

Lab Sample ID: ZB62H
LIMS ID: 14-19790
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 19:12
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	83.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MW-02D-20140923
SAMPLE

Lab Sample ID: ZB62I
LIMS ID: 14-19791
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 19:48
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	91.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MW-05D-20140923
SAMPLE

Lab Sample ID: ZB62J
LIMS ID: 14-19792
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 20:23
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	82.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: PZ-12-20140924
SAMPLE

Lab Sample ID: ZB62K
LIMS ID: 14-19793
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 21:34
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	87.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: PZ-13-20140924
SAMPLE

Lab Sample ID: ZB62L
LIMS ID: 14-19794
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 22:09
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	88.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MW-01D-20140924
SAMPLE

Lab Sample ID: ZB62N
LIMS ID: 14-19796
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 22:45
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery

2,4,6-Tribromophenol	83.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: PZ-19-20140924
SAMPLE

Lab Sample ID: ZB62O
LIMS ID: 14-19797
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/24/14
Date Received: 09/24/14

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 23:20
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	82.4%

ANALYTICAL RESOURCES INCORPORATED

SW8041 CHLOROPHENOLICS SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Client ID	TBP	TOT OUT
MB-092714	50.4%	0
LCS-092714	80.8%	0
LCSD-092714	86.0%	0
MW-02S-20140923	81.2%	0
MW-05S-20140923	87.2%	0
PZ-30-20140923	80.8%	0
LW-3-20140923	85.2%	0
LW-4R-20140923	76.0%	0
PZ-17-20140923	84.4%	0
PZ-18-20140923	87.6%	0
CW-13-20140923	83.6%	0
MW-02D-20140923	91.2%	0
MW-05D-20140923	82.0%	0
PZ-12-20140924	87.6%	0
PZ-13-20140924	88.0%	0
MW-01D-20140924	83.2%	0
PZ-19-20140924	82.4%	0

	QC LIMITS
(TBP) = 2,4,6-Tribromophenol	(26-120)

Prep Method: SW3510C
Log Number Range: 14-19783 to 14-19797

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Page 1 of 1

Sample ID: LCS-092714
LCS/LCSD

Lab Sample ID: LCS-092714
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: 09/23/14
Date Received: 09/24/14

Date Extracted LCS/LCSD: 09/27/14
Date Analyzed LCS: 10/06/14 13:53
LCSD: 10/06/14 14:29
Instrument/Analyst LCS: ECD8/YZ
LCSD: ECD8/YZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 50 mL
LCSD: 50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Pentachlorophenol	1.14	2.50	45.6%	1.26	2.50	50.4%	10.0%

Chlorophenols Surrogate Recovery

	LCS	LCSD
2,4,6-Tribromophenol	80.8%	86.0%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCP by GC/ECD Method SW8041
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MB-092714
METHOD BLANK

Lab Sample ID: MB-092714
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111
Date Sampled: NA
Date Received: NA

Date Extracted: 09/27/14
Date Analyzed: 10/06/14 13:18
Instrument/Analyst: ECD8/YZ

Sample Amount: 500 mL
Final Extract Volume: 50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
87-86-5	Pentachlorophenol	0.25	< 0.25 U

Reported in µg/L (ppb)

Chlorophenol Surrogate Recovery	
2,4,6-Tribromophenol	50.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Matrix: Water
Data Release Authorized:
Reported: 10/06/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-092614	Method Blank	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19783	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		86.3%
ZB62A	MW-02S-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19783	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		110%
ZB62B	MW-05S-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19784	HC ID: **DRO**		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	**100**	**100**
					o-Terphenyl		76.5%
ZB62C	PZ-30-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19785	HC ID: **DRO**		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	**100**	**130**
					o-Terphenyl		105%
ZB62D	LW-3-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19786	HC ID: **DRO**		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	**100**	**270**
					o-Terphenyl		115%
ZB62E	LW-4R-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19787	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		108%
ZB62F	PZ-17-20140923	09/26/14	10/03/14	1.00	**Diesel Range**	**100**	**110**
14-19788	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**200**	**640**
					Creosote Range	**100**	**310**
					o-Terphenyl		99.9%
ZB62G	PZ-18-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19789	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		110%
ZB62H	CW-13-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19790	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		113%
ZB62I	MW-02D-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19791	HC ID: **DRO**		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	**100**	**130**
					o-Terphenyl		115%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Matrix: Water
Data Release Authorized:
Reported: 10/06/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
ZB62J	MW-05D-20140923	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19792	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		95.2%
ZB62K	PZ-12-20140924	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19793	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		75.3%
ZB62L	PZ-13-20140924	09/26/14	10/03/14	1.00	Diesel Range	100	< 100 U
14-19794	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		109%
ZB62M	MW-01S-20140924	09/26/14	10/04/14	1.00	**Diesel Range**	**100**	**10000 E**
14-19795	HC ID: **CREOSOTE/RRO**		FID3B	1.0	**Motor Oil Range**	**200**	**690**
					Creosote Range	**100**	**54000 E**
					o-Terphenyl		120%
ZB62M DIL	MW-01S-20140924	09/26/14	10/06/14	1.00	**Diesel Range**	**5000**	**11000**
14-19795	HC ID: **CREOSOTE**		FID3B	50	Motor Oil Range	10000	< 10000 U
					Creosote Range	**5000**	**59000**
					o-Terphenyl		D
ZB62N	MW-01D-20140924	09/26/14	10/04/14	1.00	Diesel Range	100	< 100 U
14-19796	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**200**	**400**
					Creosote Range	**100**	**290**
					o-Terphenyl		83.6%
ZB62O	PZ-19-20140924	09/26/14	10/04/14	1.00	Diesel Range	100	< 100 U
14-19797	HC ID: ---		FID3B	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		106%

Reported in ug/L (ppb)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
Creosote range quantitation on total peaks in the range from C8 to C22.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
21039.110.111

Client ID	OTER	TOT OUT
MB-092614	86.3%	0
LCS-092614	106%	0
LCSD-092614	107%	0
MW-02S-20140923	110%	0
MW-05S-20140923	76.5%	0
PZ-30-20140923	105%	0
LW-3-20140923	115%	0
LW-4R-20140923	108%	0
PZ-17-20140923	99.9%	0
PZ-18-20140923	110%	0
CW-13-20140923	113%	0
MW-02D-20140923	115%	0
MW-05D-20140923	95.2%	0
PZ-12-20140924	75.3%	0
PZ-13-20140924	109%	0
MW-01S-20140924	120%	0
MW-01S-20140924 DL	D	0
MW-01D-20140924	83.6%	0
PZ-19-20140924	106%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-19783 to 14-19797

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-092614**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-092614 QC Report No: ZB62-Landau Associates, Inc.
LIMS ID: 14-19783 Project: Port of Olympia
Matrix: Water 21039.110.111
Data Release Authorized: Date Sampled: 09/23/14
Reported: 10/06/14 Date Received: 09/24/14

Date Extracted LCS/LCSD: 09/26/14 Sample Amount LCS: 500 mL
LCSD: 500 mL
Date Analyzed LCS: 10/03/14 17:09 Final Extract Volume LCS: 1.0 mL
LCSD: 10/03/14 17:34 LCSD: 1.0 mL
Instrument/Analyst LCS: FID/JLW Dilution Factor LCS: 1.00
LCSD: FID/JLW LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2300	3000	76.7%	2340	3000	78.0%	1.7%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	106%	107%

Results reported in ug/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: ZB62
Matrix: Water
Project: Port of Olympia
Date Received: 09/24/14
21039.110.111

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-19783-092614MB1	Method Blank	500 mL	1.00 mL	09/26/14
14-19783-092614LCS1	Lab Control	500 mL	1.00 mL	09/26/14
14-19783-092614LCSD1	Lab Control Dup	500 mL	1.00 mL	09/26/14
14-19783-ZB62A	MW-02S-20140923	500 mL	1.00 mL	09/26/14
14-19784-ZB62B	MW-05S-20140923	500 mL	1.00 mL	09/26/14
14-19785-ZB62C	PZ-30-20140923	500 mL	1.00 mL	09/26/14
14-19786-ZB62D	LW-3-20140923	500 mL	1.00 mL	09/26/14
14-19787-ZB62E	LW-4R-20140923	500 mL	1.00 mL	09/26/14
14-19788-ZB62F	PZ-17-20140923	500 mL	1.00 mL	09/26/14
14-19789-ZB62G	PZ-18-20140923	500 mL	1.00 mL	09/26/14
14-19790-ZB62H	CW-13-20140923	500 mL	1.00 mL	09/26/14
14-19791-ZB62I	MW-02D-20140923	500 mL	1.00 mL	09/26/14
14-19792-ZB62J	MW-05D-20140923	500 mL	1.00 mL	09/26/14
14-19793-ZB62K	PZ-12-20140924	500 mL	1.00 mL	09/26/14
14-19794-ZB62L	PZ-13-20140924	500 mL	1.00 mL	09/26/14
14-19795-ZB62M	MW-01S-20140924	500 mL	1.00 mL	09/26/14
14-19796-ZB62N	MW-01D-20140924	500 mL	1.00 mL	09/26/14
14-19797-ZB62O	PZ-19-20140924	500 mL	1.00 mL	09/26/14

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111

Data Release Authorized:
Reported: 10/07/14

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-100214	Method Blank	10/02/14	1.0	Gasoline	< 250 U
14-19783		PID1		HC ID	---
				Trifluorotoluene	96.2%
				Bromobenzene	97.2%
ZB62A	MW-02S-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19783		PID1		HC ID	---
				Trifluorotoluene	97.6%
				Bromobenzene	98.3%
ZB62B	MW-05S-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19784		PID1		HC ID	---
				Trifluorotoluene	98.4%
				Bromobenzene	97.6%
ZB62C	PZ-30-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19785		PID1		HC ID	---
				Trifluorotoluene	95.6%
				Bromobenzene	96.8%
ZB62D	LW-3-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19786		PID1		HC ID	---
				Trifluorotoluene	95.8%
				Bromobenzene	96.2%
ZB62E	LW-4R-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19787		PID1		HC ID	---
				Trifluorotoluene	96.8%
				Bromobenzene	97.8%
ZB62F	PZ-17-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19788		PID1		HC ID	---
				Trifluorotoluene	96.2%
				Bromobenzene	95.1%
ZB62G	PZ-18-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19789		PID1		HC ID	---
				Trifluorotoluene	92.6%
				Bromobenzene	93.4%
ZB62H	CW-13-20140923	10/02/14	1.0	Gasoline	< 250 U
14-19790		PID1		HC ID	---
				Trifluorotoluene	93.1%
				Bromobenzene	92.3%
ZB62I	MW-02D-20140923	10/03/14	1.0	Gasoline	< 250 U
14-19791		PID1		HC ID	---
				Trifluorotoluene	96.2%
				Bromobenzene	96.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111

Data Release Authorized:
Reported: 10/07/14

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-100314	Method Blank	10/03/14	1.0	Gasoline	< 250 U
14-19792		PID1		HC ID	---
				Trifluorotoluene	95.1%
				Bromobenzene	94.8%
ZB62J	MW-05D-20140923	10/03/14	1.0	Gasoline	< 250 U
14-19792		PID1		HC ID	---
				Trifluorotoluene	94.9%
				Bromobenzene	94.6%
ZB62K	PZ-12-20140924	10/03/14	1.0	Gasoline	< 250 U
14-19793		PID1		HC ID	---
				Trifluorotoluene	87.6%
				Bromobenzene	87.8%
ZB62L	PZ-13-20140924	10/03/14	1.0	Gasoline	< 250 U
14-19794		PID1		HC ID	---
				Trifluorotoluene	93.0%
				Bromobenzene	93.0%
MB-100614	Method Blank	10/06/14	1.0	Gasoline	< 250 U
14-19795		PID1		HC ID	---
				Trifluorotoluene	96.7%
				Bromobenzene	95.8%
ZB62M	MW-01S-20140924	10/06/14	20	**Gasoline**	**52000**
14-19795		PID1		HC ID	GRO
				Trifluorotoluene	102%
				Bromobenzene	101%
ZB62N	MW-01D-20140924	10/06/14	1.0	Gasoline	< 250 U
14-19796		PID1		HC ID	---
				Trifluorotoluene	100%
				Bromobenzene	99.8%
ZB62O	PZ-19-20140924	10/06/14	1.0	Gasoline	< 250 U
14-19797		PID1		HC ID	---
				Trifluorotoluene	102%
				Bromobenzene	99.8%
ZB62P	Trip Blanks	10/03/14	1.0	Gasoline	< 250 U
14-19798		PID1		HC ID	---
				Trifluorotoluene	97.8%
				Bromobenzene	97.4%

Gasoline values reported in µg/L (ppb)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: ZB62
Matrix: Water

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111

Client ID	TFT	BBZ	TOT OUT
MB-100214	96.2%	97.2%	0
LCS-100214	97.7%	98.1%	0
LCSD-100214	92.7%	92.3%	0
MW-02S-20140923	97.6%	98.3%	0
MW-05S-20140923	98.4%	97.6%	0
PZ-30-20140923	95.6%	96.8%	0
LW-3-20140923	95.8%	96.2%	0
LW-4R-20140923	96.8%	97.8%	0
PZ-17-20140923	96.2%	95.1%	0
PZ-18-20140923	92.6%	93.4%	0
CW-13-20140923	93.1%	92.3%	0
MW-02D-20140923	96.2%	96.5%	0
MB-100314	95.1%	94.8%	0
LCS-100314	98.0%	97.0%	0
LCSD-100314	94.2%	94.4%	0
MW-05D-20140923	94.9%	94.6%	0
PZ-12-20140924	87.6%	87.8%	0
PZ-13-20140924	93.0%	93.0%	0
MB-100614	96.7%	95.8%	0
LCS-100614	103%	102%	0
LCSD-100614	100%	99.4%	0
MW-01S-20140924	102%	101%	0
MW-01D-20140924	100%	99.8%	0
PZ-19-20140924	102%	99.8%	0
Trip Blanks	97.8%	97.4%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(80-120)
(BBZ) = Bromobenzene	(80-120)	(80-120)

Log Number Range: 14-19783 to 14-19798

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-100214
LAB CONTROL SAMPLE

Lab Sample ID: LCS-100214
LIMS ID: 14-19783
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/02/14 10:47
LCSD: 10/02/14 11:16
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL
Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	1010	1000	101%	930	1000	93.0%	8.2%

Reported in ug/L (ppb)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	97.7%	92.7%
Bromobenzene	98.1%	92.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-100314
LAB CONTROL SAMPLE

Lab Sample ID: LCS-100314
LIMS ID: 14-19792
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/03/14 11:14
LCSD: 10/03/14 11:44
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL
Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	960	1000	96.0%	900	1000	90.0%	6.5%

Reported in ug/L (ppb)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	98.0%	94.2%
Bromobenzene	97.0%	94.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-100614
LAB CONTROL SAMPLE

Lab Sample ID: LCS-100614
LIMS ID: 14-19795
Matrix: Water
Data Release Authorized:
Reported: 10/07/14

QC Report No: ZB62-Landau Associates, Inc.
Project: Port of Olympia
Event: 21039.110.111
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/06/14 10:41
LCSD: 10/06/14 11:10
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL
Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	1040	1000	104%	1020	1000	102%	1.9%

Reported in ug/L (ppb)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	103%	100%
Bromobenzene	102%	99.4%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

October 21, 2014

Chris Kimmel
Landau Associates, Inc.
130 2nd Avenue S.
Edmonds, WA 98020

RE: Project: Port of Olympia, 21039.110.111
ARI Job No: ZF85

Dear Chris:

Please find enclosed the original Chain-of-Custody record (COC), sample receipt documentation, and final results for the project referenced above. Analytical Resources, Inc. accepted one water sample in good condition on October 17, 2014.

The sample was analyzed for NWTPH-Dx, as requested on the COC.

Please refer to the Case Narrative for details regarding requested analyses.

An electronic copy of this report and all associated ARI raw data will be kept on file with ARI. Should you have any questions or problems, please feel free to contact me at any time.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: ZF85	Turn-around Requested: Standard 2-week	Page: 1 of 1	
ARI Client Company: Landau	Phone: 425-778-0907	Date: 10/16/14	Ice Present?
Client Contact: Chris Kimmel		No. of Coolers:	Cooler Temps:
Client Project Name: Cascade Pole			
Client Project #: 21039 110.111	Samplers: Sierra Mott		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: NWTPH-Dx + Creosote	Notes/Comments
P2-17-20141016	10/16/14	1657	H2O	2	X	Please bill Don Bache at Port of Olympia

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
In cooler, on ice. Courier to pick up.	Sierra Mott	Bethanie Roberts	Bethanie Roberts	Rick Madsen
	Printed Name: Sierra Mott	Printed Name: Bethanie Roberts	Printed Name: Bethanie Roberts	Printed Name: Rick Madsen
	Company: LAI	Company: Landau Associates	Company: LAI	Company: ARI
	Date & Time: 10/17/14 802	Date & Time: 10/17/14 8:02	Date & Time: 10/17/14 10:45	Date & Time: 10/17/14 1045

ZF85:00002

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZF85
Client: Landau Associates, Inc.
Project Event: 21039.110.111
Project Name: Cascade Pole

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PZ-17-20141016	ZF85A	14-22178	Water	10/16/14 16:57	10/17/14 10:45

ZF85: 3R BC 10/23/14

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Landau Project Name: Cascade Polo

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: ZF85 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? (YES) NO

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 5.5

Time: 1120

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: _____ Date: 10/17/14 Time: 1045

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? (YES) NO

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... (NA) YES NO

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI (NA) _____

Was Sample Split by ARI (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

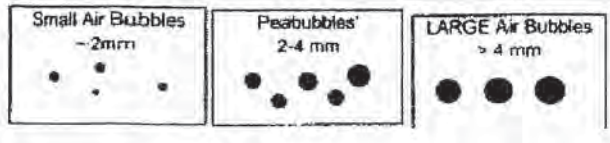
Samples Logged by: JM Date: 10/17/14 Time: 1252

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: 21039.110.111
ARI Job No.: ZF85
October 21, 2014

Sample Receipt

Please find enclosed the original *Chain of Custody (COC)* record and analytical results for the project referenced above. Analytical Resources, Inc. accepted one water sample in good condition on October 17, 2014. The samples were received at a cooler temperature of 5.5°C. Please see the *Cooler Receipt Form* for further details. Per Landau Associates, select samples were allowed to settle and sample volume was collected from the clear portion.

The following tests were performed on selected samples, as requested on the *Chain of Custody*.

NWTPH-Dx

The samples were extracted on 10/17/14 and analyzed on 10/21/14 - within the method recommended holding time.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS/LSCD (s): The LCS and LCSD percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Continuing Calibrations: The continuing calibrations were within control limits.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:
Page 1 of 1

QC Report No: ZF85-Landau Associates, Inc.
Project: Cascade Pole
21039.110.111

Matrix: Water
Data Release Authorized: VD
Reported: 10/23/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-101714	Method Blank	10/17/14	10/21/14	1.00	Diesel Range	100	< 100 U
14-22178	HC ID: ---		FID9	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		91.3%
ZF85A	PZ-17-20141016	10/17/14	10/21/14	1.00	Diesel Range	100	< 100 U
14-22178	HC ID: ---		FID9	1.0	Motor Oil Range	200	< 200 U
					Creosote Range	100	< 100 U
					o-Terphenyl		89.9%

Reported in ug/L (ppb)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
Creosote range quantitation on total peaks in the range from C12 to C22.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

ZF85: GR BC 10/23/14

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZF85-Landau Associates, Inc.
Project: Cascade Pole
21039.110.111

Client ID	OTER	TOT OUT
MB-101714	91.3%	0
LCS-101714	90.5%	0
LCSD-101714	94.4%	0
PZ-17-20141016	89.9%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-22178 to 14-22178

ZF85: ZR BC 11/23/14

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-101714**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-101714 QC Report No: ZF85-Landau Associates, Inc.
LIMS ID: 14-22178 Project: Cascade Pole
Matrix: Water 21039.110.111
Data Release Authorized: Date Sampled: 10/16/14
Reported: 10/21/14 Date Received: 10/17/14

Date Extracted LCS/LCSD: 10/17/14 Sample Amount LCS: 500 mL
LCSD: 500 mL
Date Analyzed LCS: 10/21/14 11:41 Final Extract Volume LCS: 1.0 mL
LCSD: 10/21/14 12:02 LCSD: 1.0 mL
Instrument/Analyst LCS: FID/JLW Dilution Factor LCS: 1.00
LCSD: FID/JLW LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2380	3000	79.3%	2620	3000	87.3%	9.6%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	90.5%	94.4%

Results reported in ug/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 10/17/14

ARI Job: ZF85
Project: Cascade Pole
21039.110.111

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-22178-101714MB1	Method Blank	500 mL	1.00 mL	10/17/14
14-22178-101714LCS1	Lab Control	500 mL	1.00 mL	10/17/14
14-22178-101714LCSD1	Lab Control Dup	500 mL	1.00 mL	10/17/14
14-22178-ZF85A	PZ-17-20141016	500 mL	1.00 mL	10/17/14

ZF85: QR BC 10/23/14