GROUNDWATER MONITORING TECHNICAL MEMORANDUM

JULY 2011 MONITORING EVENT

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

GeoEngineers
600 Stewart Street, Suite 1700
Seattle, Washington 98101
Telephone: (206) 728-2674
Fax: (206) 728-2732

Report date:	September 20, 2011
GeoEngineers file number:	0186-774-00-0400
Client:	Greg Andrina and John Rork, Puget Sound Energy PO Box 90868, PSE-11N, Bellevue, WA 98009
GeoEngineers project manager:	Rob Leet
Sampling date:	July 18, 2011
Wells gauged and sampled:	On-property wells: Shallow wells MW-1, MW-2, MW-5, and MW-7. Off-property wells: None.
Purging/sampling methods:	Low-flow methods with dedicated submersible pump (MW-1 and MW-2) or peristaltic pump with dedicated tubing (MW-5 and MW-7).
Non-aqueous phase liquid observations (well/thickness):	Not observed in any wells.
Groundwater levels and gradients:	The measured depths to groundwater in the four shallow monitoring wells sampled in July 2011 ranged from 4.54 to 5.66 feet below the top of the well casings (Table 1). The calculated groundwater elevations in these wells in July 2011 are shown in Table 1 and Figure 2. Groundwater elevation contours are not shown in Figure 2 because the spatial footprint covered by the sampled wells is limited, and the calculated groundwater elevations indicate the groundwater table is relatively flat. Deep monitoring wells were not gauged or sampled during the July 2011 monitoring event.
Groundwater levels/gradients similar to previous monitoring events?	The measured groundwater levels on July 18, 2011 are within the range of groundwater levels measured during previous monitoring events. As with past monitoring events, there does not appear to be a predominant hydraulic gradient direction beneath the former MGP property. This is a consequence of the relatively flat groundwater table.
Chemical analysis:	The groundwater samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270D-SIM.
Summary of chemical analytical results:	The July 2011 analytical results are presented in Table 2 and Figure 3. The results were generally consistent with previous monitoring events. cPAHs were detected at a concentration (total toxic equivalent concentration calculated per WAC 173-340-708[8][e]) of 0.41 micrograms per liter (ug/l) in well MW-7; this concentration exceeds the Model Toxics Control Act (MTCA) Method A cleanup level of 0.1 ug/l. cPAH concentrations detected in well MW-7 have exceeded the MTCA Method A cleanup level for five of the last six monitoring events. cPAHs were detected below the MTCA Method A cleanup level in the groundwater sample obtained from well MW-5 in July (0.042 ug/l); cPAHs were not detected in the samples obtained from wells MW-1 and MW-2. Arsenic concentrations in groundwater are no longer being monitored based on Ecology's concurrence (as expressed in a project review meeting on June 29, 2011) that the elevated arsenic concentrations previously detected in groundwater do not appear to be related to the former MGP.

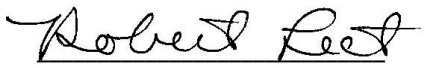
Attachments:

Table 1 – Measured Groundwater Levels in Monitoring Wells, 2008-2011
Table 2 – Groundwater Chemical Analytical Results, 2008-2011
Figure 1 – Vicinity Map
Figure 2 – Groundwater Elevations in Monitoring Wells – July 18, 2011
Figure 3 – Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater
Attachment A – Data Quality Assessment Summary
Attachment B – Laboratory Report

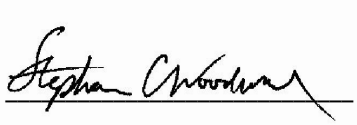
Distribution:

One electronic copy submitted to Greg Andrina and John Rork

Submitted by:



Robert C. Leet, PhD, LG
Senior Project Manager



Stephen C. Woodward, LG
Principal

Table 1

Measured Groundwater Levels in Monitoring Wells

2008-2011

PSE Former Olympia MGP Site
Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Shallow/Deep Well	Top-of-Casing Elevation[1] (feet NAVD88)	Date	Measured Depth to Groundwater[2] (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-00S[3]	12.4[3]	Shallow	13.59	2/15/10	4.47	9.12
				5/26/10	4.74	8.85
				1/7/11	4.75	8.84
				4/19/11	4.79	8.80
				7/18/11	NM	–
MW-00D	25.5-30.5	Deep	13.32	1/7/11	4.46	8.86
				4/19/11	4.51	8.81
				7/18/11	NM	–
MW-1	5.0-20.0	Shallow	13.17	8/26/08	4.74	8.43
				10/6/08	4.64	8.53
				11/3/09	4.55	8.62
				2/15/10	4.16	9.01
				5/26/10	4.41	8.76
				1/7/11	4.27	8.90
				4/19/11	4.34	8.83
				7/18/11	4.54	8.63
MW-2	5.0-20.0	Shallow	13.67	8/26/08	5.33	8.34
				10/6/08	5.23	8.44
				11/3/09	5.05	8.62
				2/15/10	4.44	9.23
				5/26/10	4.97	8.70
				1/7/11	4.77	8.90
				4/19/11	4.80	8.87
				7/18/11	5.17	8.50
MW-3	39.5-44.5	Deep	13.65	8/26/08	5.27	8.38
				10/6/08	5.08	8.57
				11/3/09	5.02	8.63
				2/15/10	4.62	9.03
				5/26/10	4.94	8.71
				1/7/11	4.75	8.90
				4/19/11	4.82	8.83
				7/18/11	NM	–
MW-4	23.5-28.5	Deep	13.75	8/26/08	5.30	8.45
				10/6/08	5.18	8.57
				11/3/09	5.06	8.69
				2/15/10	4.72	9.03
				5/26/10	5.28	8.47
				1/7/11	4.85	8.90
				4/19/11	4.90	8.85
				7/18/11	NM	–
MW-5	4.5-19.5	Shallow	14.25	11/3/09	5.64	8.61
				2/15/10	5.28	8.97
				5/26/10	5.55	8.70
				1/7/11	5.40	8.85
				4/19/11	5.46	8.79
				7/18/11	5.66	8.59
MW-6[3]	11.1[3]	Shallow	13.69	8/26/08	5.37	8.32
				10/6/08	5.37	8.32
				11/3/09	5.08	8.61
				2/15/10	4.46	9.23
				5/26/10	5.08	8.61
				1/6/11	4.88	8.81
				4/19/11	4.90	8.79
				7/18/11	NM	–

Monitoring Well	Screened Interval (feet bgs)	Shallow/Deep Well	Top-of-Casing Elevation[1] (feet NAVD88)	Date	Measured Depth to Groundwater[2] (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-7	4.5-19.5	Shallow	13.65	11/3/09	5.09	8.56
				2/15/10	4.63	9.02
				5/26/10	4.92	8.73
				1/7/11	4.77	8.88
				4/19/11	4.85	8.80
				7/18/11	5.05	8.60
MW-8	5.0-20.0	Shallow	13.76	11/3/09	5.11	8.65
				2/15/10	4.49	9.27
				5/26/10	5.07	8.69
				1/7/11	4.83	8.93
				4/19/11	4.89	8.87
				7/18/11	NM	–
MW-10[3]	14.0[3]	Shallow	13.76	8/26/08	5.31	8.45
				10/6/08	5.25	8.51
				11/3/09	5.14	8.62
				2/15/10	4.66	9.10
				5/26/10	4.96	8.80
				1/6/11	4.91	8.85
				4/19/11	4.92	8.84
				7/18/11	NM	–
MW-12S	5.0-20.2	Shallow	14.19	1/7/11	5.28	8.91
				4/19/11	5.39	8.80
				7/18/11	NM	–
MW-12D	25.0-30.0	Deep	14.20	1/7/11	5.37	8.83
				4/19/11	5.37	8.83
				7/18/11	NM	–
MW-13S	4.5-19.5	Shallow	13.43	1/7/11	4.60	8.83
				4/19/11	4.61	8.82
				7/18/11	NM	–
MW-13D	25.5-30.5	Deep	13.84	1/7/11	5.06	8.78
				4/19/11	5.04	8.80
				7/18/11	NM	–

Notes:

bgs = Below ground surface

TOC = Top of well casing

NAVD88 = North American Vertical Datum of 1988.

NM = Not measured

[1]Elevations surveyed in December 2010 by Barghausen Consulting Engineers, Inc. relative to NAVD88. Previous investigations used an arbitrary site-specific datum with an assigned elevation of 10 feet.

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

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

Table 2

Groundwater Chemical Analytical Results
2008-2011

PSE Former Olympia MGP Site
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level[1]	Well/Sample ID: Sample Date:	MW-00S 2/15/2010	MW-00S 5/26/2010	MW-00S 1/7/2011	MW-00S 4/19/2011	MW-00D 1/7/2011	MW-00D 4/19/2011	MW-1 8/26/2008	MW-1 10/6/2008	MW-1 11/3/2009	MW-1 2/15/2010	MW-1 5/26/2010	MW-1 1/7/2011	MW-1 4/19/2011	MW-1 7/18/2011	MW-2 8/26/2008	MW-2 10/6/2008	MW-2 11/3/2009	MW-2/DUP-110309* 11/3/2009	MW-2 2/15/2010	MW-2 5/26/2010	MW-2 1/7/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Toluene	ug/l	1,000		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Ethylbenzene	ug/l	700		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Xylene, m-,p-	ug/l	1,000 (a)		--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Xylene, o-	ug/l	1,000 (a)		--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0094 U	0.0095 U	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8		--	--	--	--	--	--	0.10 U	--	--	--	--	--	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	0.10 U	--
Diesel-Range	mg/l	0.5		--	--	--	--	--	--	0.25 U	--	--	--	--	--	--	--	0.25 U	--	0.25 U	0.25 U	0.26 U	0.26 U	--
Lube Oil-Range	mg/l	0.5		--	--	--	--	--	--	0.40 U	--	--	--	--	--	--	--	0.40 U	--	0.40 U	0.40 U	0.41 U	0.41 U	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	**0.061**	--	--	**--**	**--**	--	--
cPAHs																								
Benzo(a)anthracene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	**0.012**	--	0.0095 U	0.010 U	**0.013**	0.0095 U	--
Chrysene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	**0.0099**	--	0.0095 U	0.010 U	**0.013**	0.0095 U	--
Benzo(b)fluoranthene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	**0.020**	--	0.0095 U	0.010 U	**0.019**	0.0095 U	--
Benzo(k)fluoranthene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	--	0.0095 U	0.010 U	**0.013**	0.0095 U	--
Benzo(a)pyrene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	**0.021**	--	0.0095 U	0.010 U	**0.029**	0.0095 U	--
Indeno(1,2,3-cd)pyrene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	**0.026**	--	0.0095 U	0.010 U	**0.030**	0.0095 U	--
Dibenzo(a,h)anthracene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	--	0.0095 U	0.010 U	0.0095 U	0.0095 U	--
Total cPAHs TEC	ug/l	0.1		--	--	--	--	--	--	0.0072 U	--	0.0071 U	0.0071 U	0.0072 U	--	--	0.0074 U	**0.028**	--	0.0072 U	0.0076 U	**0.037**	0.0072 U	--
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		**0.010**	**0.017**	**0.0052**	**0.017**	**0.0051**	**0.0047**	**0.024**	**0.016**	**0.0062**	**0.013**	**0.0061**	**0.0072**	**0.050**	--	**0.010**	**0.012**	**0.0066**	**0.0069**	**0.0072**	0.0033 U	0.0033 U
Dissolved Arsenic[2]	mg/l	0.005		--	--	--	0.0030 U	--	0.0030 U	--	**0.017**	--	--	--	--	0.0030 U	--	--	**0.011**	--	--	--	--	--
Total Chromium	mg/l	0.050		--	--	--	--	--	--	**0.022**	--	0.011 U	0.011 U	0.011 U	--	--	--	**0.013**	--	0.011 U	0.011 U	0.011 U	0.011 U	--
Total Copper	mg/l	0.59 (b)		--	--	--	--	--	--	**0.012**	--	--	--	--	--	--	--	**0.0071**	--	--	**--**	**--**	--	--
Total Lead	mg/l	0.015		--	--	--	--	--	--	**0.0032**	**0.0023**	0.0011 U	**0.0019**	0.0011 U	--	--	--	**0.0051**	**0.0036**	0.0011 U	0.0011 U	**0.0046**	0.0011 U	--
Dissolved Lead[2]	mg/l	0.015		--	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	0.0010 U	--	--	--	--	--
Total Mercury	mg/l	0.002		--	--	--	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	0.005 U	--	--	**--**	**--**	--	--

Analyte	Units	MTCA Method A Cleanup Level[1]	Well/Sample ID: Sample Date:	MW-2 4/19/2011	MW-2 7/18/2011	MW-3 8/26/2008	MW-3/D-08-26-08* 8/26/2008	MW-3 10/6/2008	MW-3 11/3/2009	MW-3 2/15/2010	MW-3 5/26/2010	MW-3 1/7/2011	MW-3 4/19/2011	MW-4 8/26/2008	MW-4 10/6/2008	MW-4 11/3/2009	MW-4 2/15/2010	MW-4 5/26/2010	MW-4 1/7/2011	MW-4 4/19/2011	MW-5 11/3/2009	MW-5 2/15/2010	MW-5 5/26/2010	MW-5 1/7/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--
Toluene	ug/l	1,000		--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--
Ethylbenzene	ug/l	700		--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--
Xylene, m-,p-	ug/l	1,000 (a)		--	--	1.0 U	1.0 U	--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--
Xylene, o-	ug/l	1,000 (a)		--	--	1.0 U	1.0 U	--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8		--	--	0.10 U	0.10 U	--	--	--	--	--	--	0.10 U	--	--	--	--	--	--	0.10 U	0.10 U	0.10 U	
Diesel-Range	mg/l	0.5		--	--	0.26 U	0.25 U	--	--	--	--	--	--	0.25 U	--	--	--	--	--	--	0.25 U	0.26 U	0.26 U	0.26 U
Lube Oil-Range	mg/l	0.5		--	--	0.41 U	0.40 U	--	--	--	--	--	--	0.41 U	--	--	--	--	--	--	0.40 U	0.41 U	0.41 U	0.41 U
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Benzo(g,h,i)perylene	ug/l	--		--	--	0.0095 U	0.0095 U	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	**--**	--	--	--
cPAHs																								
Benzo(a)anthracene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	**0.013**	--	--	**0.012**	0.0095 U	**0.021**	**0.023**
Chrysene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	**0.012**	0.0095 U	**0.017**	**0.023**
Benzo(b)fluoranthene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	**0.017**	0.0095 U	**0.014**	**0.028**
Benzo(k)fluoranthene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	**0.012**	**0.024**
Benzo(a)pyrene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	**0.017**	**0.046**
Indeno(1,2,3-cd)pyrene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	**0.011**	0.0095 U	**0.015**	**0.035**
Dibenzo(a,h)anthracene	ug/l	--		--	0.010 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	**0.0098**	0.0097 U
Total cPAHs TEC	ug/l	0.1		--	0.0076 U	0.0072 U	0.0072 U	--	0.0070 U	0.0071 U	0.0072 U	--	--	0.0072 U	--	0.0072 U	0.0072 U	**0.0079**	--	--	**0.010**	0.0072 U	**0.024**	**0.058**
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		**0.0039**	**0.0039**	**0.083**	**0.084**	**0.052**	**0.031**	**0.047**	**0.041**	**0.047**	**0.061**	**0.12**	**0.057**	**0.088**	**0.092**	**0.085**	**0.093**	**0.084**	**0.023**	**0.025**	**0.018**	**0.0088**
Dissolved Arsenic[2]	mg/l	0.005		0.0030 U	--	--	--	**0.034**	--	--	--	--	**0.033**	--	**0.042**	--	--	--	--	**0.082**	--	--	--	--
Total Chromium	mg/l	0.050		--	--	**0.043**	**0.045**	--	0.011 U	**0.017**	0.011 U	--	--	**0.052**	--	0.011 U	0.011 U	0.011 U	0.011 U	--	0.011 U	0.011 U	0.011 U	0.011 U
Total Copper	mg/l	0.59 (b)		--	--	**0.040**	**0.040**	--	--	--	--	--	--	**0.026**	--	**--**	**--**	--	--	--	**--**	**--**	--	--
Total Lead	mg/l	0.015		--	--	**0.018**	**0.018**	**0.0072**	**0.0039**	**0.0080**	**0.0038**	--	--	**0.0062**	**0.0039**	**0.0013**	0.0011 U	0.0011 U	--	--	**0.0054**	0.0011 U	0.0011 U	0.0011 U
Dissolved Lead[2]	mg/l	0.015		--	--	--	--	0.0010 U	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--	--
Total Mercury	mg/l	0.002		--	--	0.00050 U	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U
Total Cyanide	mg/l	0.2 (c)		--	--	0.005 U	0.005 U	--	--	--	--	--	--	0.005 U	--	**--**	**--**	--	--	--	**--**	**--**	--	--

Analyte	Units	MTCA Method A Cleanup Level[1]	Well/Sample ID: Sample Date:	MW-5 4/19/2011	MW-5 7/18/2011	MW-6 8/26/2008	MW-6 10/6/2008	MW-6 11/3/2009	MW-6 2/15/2010	MW-6 5/26/2010	MW-6 1/6/2011	MW-6 4/19/2011	MW-7 11/3/2009	MW-7 2/15/2010	MW-7/DUP-021510* 2/15/2010	MW-7 5/26/2010	MW-7/DUP-100526* 5/26/2010	MW-7 1/7/2011	MW-7/DUP-010711* 1/7/2011	MW-7 4/19/2011	MW-7 DUP 4/19/2011	MW-7 7/18/2011	MW-8 11/3/2009	MW-8 2/15/2010
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	**1.1**	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	--	1.0 U	1.0 U
Toluene	ug/l	1,000		--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	--	1.0 U	1.0 U
Ethylbenzene	ug/l	700		--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	--	1.0 U	1.0 U
Xylene, m-,p-	ug/l	1,000 (a)		--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	--	1.0 U	1.0 U
Xylene, o-	ug/l	1,000 (a)		--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	--	1.0 U	1.0 U
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	0.0095 U	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8		--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	**0.26**	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--	--	--	0.10 U	0.10 U
Diesel-Range	mg/l	0.5		--	--	0.25 U	--	0.25 U	0.26 U	0.26 U	--	--	0.25 U	0.25 U	0.25 U	0.26 U	0.26 U	--	--	--	--	--	0.25 U	0.25 U
Lube Oil-Range	mg/l	0.5		--	--	0.40 U	--	0.40 U	0.41 U	0.41 U	--	--	0.40 U	0.40 U	0.40 U	0.41 U	0.41 U	--	--	--	--	--	0.40 U	0.40 U
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Benzo(g,h,i)perylene	ug/l	--		--	--	0.0095 U	--	--	--	--	--	--	**--**	--	**--**	--	--	--	--	--	--	--	**--**	**--**
cPAHs																								
Benzo(a)anthracene	ug/l	--		--	**0.018**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.051**	**0.064**	**0.090**	**0.084 J**	**0.12 J**	**0.079 J**	**0.049 J**	**0.015 J**	**0.028 J**	**0.082**	0.0097 U	**0.011**
Chrysene	ug/l	--		--	**0.017**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.067**	**0.087 J**	**0.13 J**	**0.12 J**	**0.17 J**	**0.12 J**	**0.072 J**	**0.013 J**	**0.036 J**	**0.11**	0.0097 U	0.0095 U
Benzo(b)fluoranthene	ug/l	--		--	**0.024**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.13**	**0.14 J**	**0.22 J**	**0.16 J**	**0.24 J**	**0.19 J**	**0.12 J**	**0.023 J**	**0.063 J**	**0.22**	0.0097 U	0.0095 U
Benzo(k)fluoranthene	ug/l	--		--	**0.016**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.030**	**0.12 J**	**0.18 J**	**0.10 J**	**0.17 J**	**0.16 J**	**0.087 J**	**0.014 J**	**0.045 J**	**0.14**	0.0097 U	0.0095 U
Benzo(a)pyrene	ug/l	--		--	**0.034**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.14**	**0.21 J**	**0.31 J**	**0.23 J**	**0.37 J**	**0.28 J**	**0.17 J**	**0.019 J**	**0.062 J**	**0.33**	0.0097 U	0.0095 U
Indeno(1,2,3-cd)pyrene	ug/l	--		--	**0.024**	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.15**	**0.22 J**	**0.32 J**	**0.28 J**	**0.42 J**	**0.30 J**	**0.17 J**	**0.033 J**	**0.095 J**	**0.29**	0.0097 U	0.0095 U
Dibenzo(a,h)anthracene	ug/l	--		--	0.0098 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	**0.016**	**0.023**	**0.032**	**0.032 J**	**0.048 J**	**0.033 J**	**0.018 J**	**0.0095 U**	**0.011**	**0.033**	0.0097 U	0.0095 U
Total cPAHs TEC	ug/l	0.1		--	**0.042**	0.0072 U	--	0.0073 U	0.0072 U	0.0073 U	--	--	**0.18**	**0.27 J**	**0.40 J**	**0.30 J**	**0.47 J**	**0.36 J**	**0.22 J**	**0.028 J**	**0.087 J**	**0.41**	0.0073 U	**0.0078**
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		**0.024**	--	**0.0056**	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	**0.011**	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	**0.0035**	0.0033 U	--	--	0.0033 U	0.0033 U
Dissolved Arsenic[2]	mg/l	0.005		**0.0044**	--	--	0.0030 U	--	--	--	--	0.0030 U	--	--	--	--	--	--	--	0.0030 U	0.0030 U	--	--	--
Total Chromium	mg/l	0.050		--	--	**0.013**	--	0.011 U	0.011 U	0.011 U	--	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	--	--	--	0.011 U	0.011 U
Total Copper	mg/l	0.59 (b)		--	--	0.011 U	--	--	--	--	--	--	**--**	--	--	--	--	--	--	--	--	--	**--**	--
Total Lead	mg/l	0.015		--	--	**0.0022**	**0.0086**	0.0011 U	0.0011 U	**0.0025**	--	--	**0.0063**	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.0029**	**0.0029**	--	--	--	**0.0012**	0.0011 U
Dissolved Lead[2]	mg/l	0.015		--	--	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	mg/l	0.002		--	--	0.0005 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--	--	--	0.00050 U	0.00050 U
Total Cyanide	mg/l	0.2 (c)		--	--	0.005 U	--	--	--	--	--	--	**--**	--	--	--	--			--	--	--	**--**	--

Analyte	Units	MTCA Method A Cleanup Level[1]	Well/Sample ID: Sample Date:	MW-8 5/26/2010	MW-8 1/7/2011	MW-8 4/19/2011	MW-10 8/26/2008	MW-10 10/6/2008	MW-10 11/3/2009	MW-10 2/15/2010	MW-10 5/26/2010	MW-10 1/6/2011	MW-10 4/19/2011	MW-12S 1/7/2011	MW-12S 4/19/2011	MW-12D 1/7/2011	MW-12D 4/19/2011	MW-13S 1/7/2011	MW-13S 4/19/2011	MW-13D 1/7/2011	MW-13D 4/19/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																					
Benzene	ug/l	5		1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--
Toluene	ug/l	1,000		1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	ug/l	700		1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--
Xylene, m-,p-	ug/l	1,000 (a)		1.0 U	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--
Xylene, o-	ug/l	1,000 (a)		1.0 U	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																					
Gasoline-Range	mg/l	0.8		0.10 U	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--
Diesel-Range	mg/l	0.5		0.26 U	--	--	0.25 U	--	0.25 U	0.25 U	0.26 U	--	--	--	--	--	--	--	--	--	--
Lube Oil-Range	mg/l	0.5		0.42 U	--	--	0.40 U	--	0.40 U	0.40 U	0.41 U	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																					
ncPAHs																					
Benzo(g,h,i)perylene	ug/l	--		--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAHs																					
Benzo(a)anthracene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	**0.010**	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	ug/l	--		0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEC	ug/l	0.1		0.0072 U	0.0073 U	--	0.0072 U	--	0.0074 U	0.0072 U	**0.0078**	--	--	--	--	--	--	--	--	--	--
Metals (EPA 200.8/335.4/6020/7470A)																					
Total Arsenic	mg/l	0.005		0.0033 U	0.0033 U	0.0033 U	**0.012**	**0.011**	**0.0064**	0.0033 U	**0.017**	**0.019**	**0.061**	**0.0052**	**0.029**	**0.028**	**0.014**	**0.0041**	0.0033 U	**0.34**	**0.079**
Dissolved Arsenic[2]	mg/l	0.005		--	--	0.0030 U	--	**0.010**	--	--	--	--	0.0030 U	--	0.0030 U	--	**0.014**	--	0.0030 U	--	**0.080**
Total Chromium	mg/l	0.050		0.011 U	0.011 U	--	0.011 U	--	0.011 U	0.011 U	0.011 U	--	--	--		--		--	--	--	--
Total Copper	mg/l	0.59 (b)		--	--	--	0.011 U	--	--	--	--	--	--	--		--		--	--	--	--
Total Lead	mg/l	0.015		0.0011 U	0.0011 U	--	0.0011 U	**0.0047**	**0.0024**	0.0011 U	**0.0097**	--	--	--		--		--	--	--	--
Dissolved Lead[2]	mg/l	0.015		--	--	--	--	0.0010 U	--	--	--	--	--	--		--		--	--	--	--
Total Mercury	mg/l	0.002		0.00050 U	0.00050 U	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--		--		--	--	--	--
Total Cyanide	mg/l	0.2 (c)		--	--	--	0.005 U	--	--	--	--	--	--	--		--		--	--	--	--

Notes:

[1]MTCA Method A cleanup levels for potable groundwater (WAC 173-340-720[3]).

[2]Groundwater samples analyzed for dissolved arsenic and dissolved lead were field-filtered with a 45 micron filter.

(a) Total value for all xylenes.

(b) MTCA Method B cleanup level (standard formula value) for potable groundwater (WAC 173-340-720[4][b]).

(c) Federal Primary Maximum Contaminant Level (MCL) (40 C.F.R. 141).

MTCA = Washington State Model Toxics Control Act

ug/l = Micrograms per liter

mg/l = Milligrams per liter

*Field duplicate sample

ft bgs = Feet below ground surface

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

ncPAHs = Non-carcinogenic polycyclic aromatic hydrocarbons (results are shown only for ncPAHs that have been historically detected)

TEC = Total toxic equivalent concentration calculated per WAC 173-340-708[8][e]. For non-detected cPAHs, one-half the practical quantitation limit was used in the calculation.

-- = Constituent not analyzed or cleanup level not established

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported practical quantitation limit.

Chemical analyses (except cyanide) performed by OnSite Environmental, Inc. in Redmond, WA; cyanide analysis performed by Analytical Resources, Inc. in Seattle, WA.

Detections are shown in **bold** typeface.

Yellow highlighted cells indicate values that exceed the associated MTCA cleanup level.

N
W E
S

2,000 0 2,000

Feet

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

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

PSE Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 1

Office: SEA Path: P:\0\0186774\GIS\FI-018677400_F1_.mxd Map Revised: July 13, 2011 mm2,EL

THURSTON AVENUE NW

COLUMBIA STREET NW

CAPITOL WAY

OLYMPIA AVENUE NW

HORTONSPHERE/ ABOVEGROUND GAS TANK (1934)

PRODUCTION BUILDING WASH BOXES

SCRUBBERS

SIDEWALK

APPROXIMATE BOUNDARY OF UST EXCAVATION (1990)

OUTBUILDING (1924)

GENERATOR

GAS HOLDER

PURIFIERS

GAS HOLDER

SIDEWALK

ALLEY

1908 APPROXIMATE SHORELINE LOCATION

MW-10 (NM)

MW-00D (NM)

MW-00S (NM)

MW-6 (NM)

MW-2 (8.50)

MW-3 (NM)

MW-7 (8.60)

MW-8 (NM)

MW-1 (8.63)

MW-4 (NM)

MW-5 (8.59)

MW-13D (NM)

MW-13S (NM)

MW-12D (NM)

MW-12S (NM)

Legend

- 1908 Site facilities / features
- Existing building
- Former office building (demolished 10/2009)
- Existing fence
- Monitoring well
- (8.50) Elevation of groundwater in feet relative to NAVD88
- (NM) Groundwater level not measured

N W E S

30 0 30

FEET

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Groundwater Elevations in Monitoring Wells - July 18, 2011

PSE Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 2

THURSTON AVENUE NW

COLUMBIA STREET NW

CAPITOL WAY

OLYMPIA AVENUE NW

SIDEWALK

ALLEY

HORTONSPHERE/ ABOVEGROUND GAS TANK (1934)

OUTBUILDING (1924)

SCRUBBERS

PRODUCTION BUILDING WASH BOXES

APPROXIMATE BOUNDARY OF UST EXCAVATION (1990)

GENERATOR

GAS HOLDER

PURIFIERS

GAS HOLDER

1908 APPROXIMATE SHORELINE LOCATION

MW-6		
DATE	As-T	As-D
2006	<5	-
8/26/08	**5.6**	-
10/6/08	<3.3	<3.0
11/3/09	<3.3	-
2/15/10	<3.3	-
5/26/10	<3.3	-
1/6/11	<3.3	-
4/19/11	<3.3	<3.0

MW-10		
DATE	As-T	As-D
2006	**15**	-
8/26/08	**12**	-
10/6/08	**11**	**10**
11/3/09	**6.4**	-
2/15/10	<3.3	-
5/26/10	**17**	-
1/6/11	**19**	-
4/19/11	**61**	<3.0

MW-00D		
DATE	As-T	As-D
1/7/11	**5.1**	-
4/19/11	4.7	<3.0

MW-00S		
DATE	As-T	As-D
2/15/10	**10**	-
5/26/10	4.7	-
1/7/11	**5.2**	-
4/19/11	**17**	<3.0

B-3		
DATE	cPAHs	As-T
2006	**0.17**	**14**

MW-2		
DATE	As-T	As-D
8/26/08	**10**	-
10/6/08	**12**	**11**
11/3/09	**6.6**	-
2/15/10	**7.2**	-
5/26/10	<3.3	-
1/7/11	<3.3	-
4/19/11	3.9	<3.0

B-4		
DATE	As-T	
2006	**12**	

MW-7			
DATE	cPAHs	As-T	As-D
11/3/09	**0.18**	**11**	-
2/15/10	**0.27 J**	<3.3	-
5/26/10	**0.30 J**	<3.3	-
1/7/11	**0.36 J**	<3.3	-
4/19/11	0.028	<3.3	<3.0
7/18/11	**0.41**	-	-

MW-5		
DATE	As-T	As-D
11/3/09	**23**	-
2/15/10	**25**	-
5/26/10	**18**	-
1/7/11	**8.8**	-
4/19/11	**24**	4.4

B-5		
DATE	cPAHs	As-T
2006	**9.0**	**27**

B-6	
DATE	As-T
2006	**8**

B-2	
DATE	As-T
2006	**9**

MW-3				
DATE	As-T	As-D	Pb-T	Pb-D
8/26/08	**83**	-	**18**	-
10/6/08	**52**	**34**	7.2	<1.0
11/3/09	**31**	-	3.9	-
2/15/10	**47**	-	8.0	-
5/26/10	**41**	-	3.8	-
1/7/11	**47**	-	-	-
4/19/11	**61**	**33**	-	-

MW-4			
DATE	As-T	As-D	Cr-T
8/26/08	**120**	-	**52**
10/6/08	**57**	**42**	-
11/3/09	**88**	-	<11
2/15/10	**92**	-	<11
5/26/10	**85**	-	<11
1/7/11	**93**	-	<11
4/19/11	**84**	**82**	-

MW-1		
DATE	As-T	As-D
8/26/08	**24**	-
10/6/08	**16**	**17**
11/3/09	**6.2**	-
2/15/10	**13**	-
5/26/10	**6.1**	-
1/7/11	**7.2**	-
4/19/11	**50**	<3.0

MW-13D		
DATE	As-T	As-D
1/7/11	**340**	-
4/19/11	**79**	**80**

MW-8 (NE)

B-1 (NS)

MW-13S (NE)

MW-12D		
DATE	As-T	As-D
1/7/11	**28**	-
4/19/11	**14**	**14**

MW-12S		
DATE	As-T	As-D
1/7/11	**5.2**	-
4/19/11	**29**	<3.0

Legend

- 1908 Site facilities / features
- Existing building
- Former office building (demolished 10/2009)
- Existing fence
- Monitoring well
- Soil boring; groundwater grab samples collected from upper 4-6 ft of saturated zone

Groundwater results in ug/l

As-T = Total arsenic

As-D = Dissolved arsenic

Pb-T = Total lead

Pb-D = Dissolved lead

Cr-T = Total chromium

cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons - total toxic equivalent concentration

J = Estimated concentration

(NS) = No groundwater samples analyzed

(NE) = No MTCA exceedances

Red/bold values exceed MTCA Method A cleanup levels

N W E S

30 0 30

FEET

Notes

1. Only results for those constituents detected above MTCA cleanup levels in a given well are shown for that well.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater

Former Columbia Street MGP Property
Olympia, Washington

GeoEngineers

Figure 3

ATTACHMENT A

DATA QUALITY ASSESSMENT SUMMARY
cPAHs

Project: PSE Former Olympia MGP Site
(Project No. 0186-774-00-0400)
July 2011 Groundwater Monitoring Event

LABORATORY SAMPLE DELIVERY GROUP (SDG):
1107-111

This Data Quality Assessment Summary documents the results of a United States Environmental Protection Agency (USEPA) Level 2b data validation/verification of analytical data from the analysis of groundwater samples and laboratory and field quality control (QC) samples associated with the subject project. OnSite Environmental of Redmond, Washington performed the sample analyses. The assessment was performed by GeoEngineers, and included the QC elements listed below. Any data anomalies and/or deficiencies identified during the data quality assessment are noted.

- Sample holding times and sample preservation
- Surrogates (for organics only)
- Method blanks
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Matrix spikes/matrix spike duplicates (MS/MSD)
- Field duplicates
- Instrument tunes
- Internal standards
- Calibrations (initial and continuing)
- Project-required target reporting limits

Overall Assessment

The results of this USEPA Level 2b data validation/verification indicate that the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, MS/MSD, and LCS/LCSD percent recovery values. Precision was acceptable, as demonstrated by the MS/MSD, and LCS/LCSD relative percent difference values. No data were qualified for any reason. All data are acceptable for the intended use.

ATTACHMENT B

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

July 25, 2011

Rob Leet
GeoEngineers, Inc.
600 Stewart, Suite 1700
Seattle, WA 98101-1233

Re: Analytical Data for Project 0186-774-00; PSE-Olympia-MGP
Laboratory Reference No. 1107-111

Dear Rob:

Enclosed are the analytical results and associated quality control data for samples submitted on July 18, 2011.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

Case Narrative

Samples were collected on July 18, 2011 and received by the laboratory on July 18, 2011. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-1	07-111-01	Water	7-18-11	7-18-11	
MW-2	07-111-02	Water	7-18-11	7-18-11	
MW-5	07-111-03	Water	7-18-11	7-18-11	
MW-7	07-111-04	Water	7-18-11	7-18-11	

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7**					
Laboratory ID:	07-111-04					
Benzo[a]anthracene	**0.082**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Chrysene	**0.11**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Benzo[b]fluoranthene	**0.22**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Benzo(j,k)fluoranthene	**0.14**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Benzo[a]pyrene	**0.33**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Indeno(1,2,3-c,d)pyrene	**0.29**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Dibenz[a,h]anthracene	**0.033**	0.0096	EPA 8270/SIM	7-18-11	7-19-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*65*	*38 - 105*				
Pyrene-d10	*72*	*37 - 121*				
Terphenyl-d14	*85*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0718W2					
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Chrysene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	7-18-11	7-19-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*66*	*38 - 105*				
Pyrene-d10	*71*	*37 - 121*				
Terphenyl-d14	*76*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
SB/SBD QUALITY CONTROL
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0718W2									
	SB	SBD	SB	SBD	SB	SBD				
Benzo[a]anthracene	**0.416**	**0.377**	0.500	0.500	83	75	51 - 124	10	18	
Chrysene	**0.401**	**0.363**	0.500	0.500	80	73	53 - 123	10	20	
Benzo[b]fluoranthene	**0.445**	**0.393**	0.500	0.500	89	79	53 - 126	12	18	
Benzo(j,k)fluoranthene	**0.395**	**0.383**	0.500	0.500	79	77	51 - 126	3	23	
Benzo[a]pyrene	**0.441**	**0.402**	0.500	0.500	88	80	52 - 127	9	21	
Indeno(1,2,3-c,d)pyrene	**0.378**	**0.340**	0.500	0.500	76	68	49 - 123	11	26	
Dibenz[a,h]anthracene	**0.372**	**0.337**	0.500	0.500	74	67	39 - 125	10	31	
Surrogate:										
2-Fluorobiphenyl					*73*	*60*	*38 - 105*			
Pyrene-d10					*80*	*71*	*37 - 121*			
Terphenyl-d14					*86*	*75*	*32 - 112*			

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	07-111-01					
Benzo[a]anthracene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Chrysene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[b]fluoranthene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo(j,k)fluoranthene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[a]pyrene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Dibenz[a,h]anthracene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*87*	*38 - 105*				
Pyrene-d10	*80*	*37 - 121*				
Terphenyl-d14	*81*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	07-111-02					
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Chrysene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*87*	*38 - 105*				
Pyrene-d10	*78*	*37 - 121*				
Terphenyl-d14	*79*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5**					
Laboratory ID:	07-111-03					
Benzo[a]anthracene	**0.018**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Chrysene	**0.017**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[b]fluoranthene	**0.024**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo(j,k)fluoranthene	**0.016**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[a]pyrene	**0.034**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Indeno(1,2,3-c,d)pyrene	**0.024**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Dibenz[a,h]anthracene	**ND**	0.0098	EPA 8270/SIM	7-20-11	7-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*100*	*38 - 105*				
Pyrene-d10	*81*	*37 - 121*				
Terphenyl-d14	*83*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0720W2					
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Chrysene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	7-20-11	7-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*92*	*38 - 105*				
Pyrene-d10	*75*	*37 - 121*				
Terphenyl-d14	*80*	*32 - 112*				

Date of Report: July 25, 2011
Samples Submitted: July 18, 2011
Laboratory Reference: 1107-111
Project: 0186-774-00; PSE-Olympia-MGP

PAHs by EPA 8270D/SIM
SB/SBD QUALITY CONTROL
(with silica gel clean-up)

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0720W2									
	SB	SBD	SB	SBD	SB	SBD				
Benzo[a]anthracene	**0.331**	**0.394**	0.500	0.500	66	79	51 - 124	17	18	
Chrysene	**0.317**	**0.379**	0.500	0.500	63	76	53 - 123	18	20	
Benzo[b]fluoranthene	**0.332**	**0.393**	0.500	0.500	66	79	53 - 126	17	18	
Benzo(j,k)fluoranthene	**0.309**	**0.382**	0.500	0.500	62	76	51 - 126	21	23	
Benzo[a]pyrene	**0.341**	**0.406**	0.500	0.500	68	81	52 - 127	17	21	
Indeno(1,2,3-c,d)pyrene	**0.287**	**0.352**	0.500	0.500	57	70	49 - 123	20	26	
Dibenz[a,h]anthracene	**0.279**	**0.346**	0.500	0.500	56	69	39 - 125	21	31	
Surrogate:										
2-Fluorobiphenyl					*87*	*97*	*38 - 105*			
Pyrene-d10					*71*	*82*	*37 - 121*			
Terphenyl-d14					*75*	*87*	*32 - 112*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

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

Company: GEOENGINEERS
Project Number: 0186-774-00
Project Name: PSE OLYMPIA - MGP
Project Manager: ROB LEET
Sampled by: BRIAN ANDERSON

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☑ 2 Days ☐ 3 Days
☐ Standard (7 Days)
(TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 07-111

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA / MTCA Metals (circle one)	TCLP Metals	HEM (oil and grease) 1664	cPAHs	HOLD				% Moisture
1	MW-1	7-18	1036	W	2																⊗	✗				
2	MW-2	7-18	0930	W	2																⊗	✗				
3	MW-5	7-18	1116	W	2																⊗	✗				
4	MW-7	7-18	1008	W	2																X					

	Signature	Company	Date	Time
Relinquished	Brian Anderson	GEOENGINEERS	7-18-11	1325
Received		OSE	7/18/11	1325
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

RESULTS FOR MW-7 NEEDED BY 7-21-11.

HOLD SAMPLES MW-1, MW-2 AND MW-5 PENDING RESULTS OF MW-7.

⊗ Added 7/20/11. DB (STA)

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____