GROUNDWATER MONITORING TECHNICAL MEMORANDUM

APRIL 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:	July 13, 2011
GeoEngineers file number:	0186-774-00-0300
Client:	Greg Andrina and John Rork, Puget Sound Energy PO Box 90868, PSE-11N, Bellevue, WA 98009
GeoEngineers project manager:	Rob Leet
Sampling date:	April 19, 2011
Wells gauged and sampled:	On-property wells: MW-1 through MW-5, MW-7, and MW-8. Off-property wells: MW-6, MW-10, MW-00S, MW-00D, MW-12S, MW-12D, MW-13S, and MW-13D.
Purging/sampling methods:	Dedicated submersible pump (MW-1 through MW-4) or peristaltic pump with dedicated tubing (MW-5 through MW-8, MW-10, MW-00S, MW-00D, MW-12S, MW-12D, MW-13S, and MW-13D).
Non-aqueous phase liquid observations (well/thickness):	Not observed in any wells.
Groundwater levels and gradients:	The measured depths to groundwater on April 19, 2011 ranged from 4.34 to 5.46 feet below the top of the well casings (Table 1). Calculated groundwater elevations for shallow and deep monitoring wells based on the April 2011 measurements are shown in Figure 2. Groundwater elevation contours are not presented in Figure 2 because the groundwater table is relatively flat. Groundwater elevations varied by only 0.08 feet (0.96 inches) in shallow monitoring wells. Groundwater elevations in the deeper monitoring wells varied by only 0.04 feet (0.48 inches). Vertical gradients were also very small, being slightly upward at well pairs MW-00S/MW-00D and MW-12S/MW-12D, and slightly downward at well pairs MW-2/MW-3 and MW-13S/MW-13D.
Groundwater levels/gradients similar to previous monitoring events?	The measured groundwater levels on April 19, 2011 are within the range of groundwater levels measured during previous monitoring events. As with past monitoring events, groundwater beneath the site and adjacent properties does not display a consistent gradient (flow direction). This is a result of the relatively flat groundwater table.
Chemical analysis:	The groundwater samples were analyzed for total and dissolved arsenic by EPA Method 200.8. The sample from MW-7 also was analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270D-SIM.
Summary of chemical analytical results:	The April 2011 analytical results are presented in Table 2 and Figure 3. The results were generally consistent with previous monitoring events. cPAHs (total toxic equivalent concentration) were detected at a concentration less than the Model Toxics Control Act (MTCA) Method A cleanup level of 0.1 micrograms per liter (ug/l) in on-property well MW-7. This was the first time cPAH concentrations detected in this well were below the cleanup level. Total arsenic was detected at concentrations exceeding the MTCA Method A cleanup level of 5 ug/l in four on-property wells (shallow wells MW-1 and MW-5 and deep wells MW-3 and MW-4) and five off-property wells (shallow wells MW-00S, MW-10, and

MW-12S, and deep wells MW-12D and MW-13D). Dissolved arsenic was detected at concentrations exceeding the cleanup level in two on-property wells (deep wells MW-3 and MW-4) and two off-property wells (deep wells MW-12D and MW-13D).

The highest dissolved arsenic concentration detected in April 2011 was 82 ug/l, detected in on-property deep well MW-4. Off-property deep well MW-13D had a similar dissolved arsenic concentration (80 ug/l). The total arsenic concentration of 79 ug/l detected in deep well MW-13D in April 2011 was significantly less than the 340 ug/l detected in this well in January 2011.

In general, the shallow wells had much lower dissolved arsenic concentrations than total arsenic concentrations, whereas the deep wells had similar dissolved and total arsenic concentrations. The exception to this was deep well MW-3, which had a total arsenic concentration of 61 ug/l and a dissolved arsenic concentration of 33 ug/l.

The variations in arsenic concentrations may be related to geochemical conditions in the saturated groundwater zone. Field measurements indicate that the oxidation-reduction (redox) potential in the deeper portion of the saturated zone is generally less than the redox potential in the shallower portion. This indicates that reducing conditions appear to be present in the deeper portion of the saturated zone. Arsenic more easily partitions into groundwater under reducing conditions. This may explain the higher concentrations of dissolved arsenic detected in the deeper versus the shallower monitoring wells.

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 – April 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 or 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
MW-00D	25.5-30.5	Deep	13.32	1/7/11	4.46	8.86
				4/19/11	4.51	8.81
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
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
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
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
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
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

Monitoring Well	Screened Interval (feet bgs)	Shallow or 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
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
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
MW-12S	5.0-20.2	Shallow	14.19	1/7/11	5.28	8.91
				4/19/11	5.39	8.80
MW-12D	25.0-30.0	Deep	14.20	1/7/11	5.37	8.83
				4/19/11	5.37	8.83
MW-13S	4.5-19.5	Shallow	13.43	1/7/11	4.60	8.83
				4/19/11	4.61	8.82
MW-13D	25.5-30.5	Deep	13.84	1/7/11	5.06	8.78
				4/19/11	5.04	8.80

Notes:

bgs = Below ground surface

TOC = Top of well casing

NAVD88 = North American Vertical Datum of 1988.

[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-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	MW-2 4/19/2011
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	–	–	**0.012**	–	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	–	–	**0.0099**	–	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	–	–	**0.020**	–	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	–	–	0.0095 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	–	–	**0.021**	–	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	–	–	**0.026**	–	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	–	–	0.0095 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	–	–	**0.028**	–	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	**0.0039**
Dissolved Arsenic[2]	mg/l	0.005		–	–	–	0.0030 U	–	0.0030 U	–	**0.017**	–	–	–	–	0.0030 U	–	**0.011**	–	–	–	–	–	0.0030 U
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-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	MW-5 4/19/2011
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	--		0.0095 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	--		0.0095 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	--		0.0095 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	--		0.0095 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	--		0.0095 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	--		0.0095 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	--		0.0095 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		0.0072 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		**0.083**	**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**	**0.024**
Dissolved Arsenic[2]	mg/l	0.005		--	--	**0.034**	--	--	--	--	**0.033**	--	**0.042**	--	--	--	--	**0.082**	--	--	--	--	**0.0044**
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-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-8 11/3/2009	MW-8 2/15/2010	MW-8 5/26/2010	MW-8 1/7/2011	MW-8 4/19/2011
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	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	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	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	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	1.0 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	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	0.26 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	0.42 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	0.0097 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**	0.0097 U	**0.011**	0.0095 U	0.0097 U	--
Chrysene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Benzo(b)fluoranthene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Benzo(k)fluoranthene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Benzo(a)pyrene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Indeno(1,2,3-cd)pyrene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Dibenzo(a,h)anthracene	ug/l	--		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**	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--
Total cPAHs TEC	ug/l	0.1		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**	0.0073 U	**0.0078**	0.0072 U	0.0073 U	--
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		**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	0.0033 U	0.0033 U	0.0033 U
Dissolved Arsenic[2]	mg/l	0.005		--	0.0030 U	--	--	--	--	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	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	0.0011 U	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	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-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		0.50 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	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	ug/l	700		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	--	--	--	--	--	--	--	--	--	--
Xylene, o-	ug/l	1,000 (a)		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	--	--	--	--	--	--	--	--	--	--
Diesel-Range	mg/l	0.5		0.25 U	--	0.25 U	0.25 U	0.26 U	--	--	--	--	--	--	--	--	--	--
Lube Oil-Range	mg/l	0.5		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	--	0.0098 U	0.0095 U	**0.010**	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	ug/l	--		0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEC	ug/l	0.1		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		**0.012**	**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		--	**0.010**	--	--	--	--	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	--	--	--		--		--	--	--	--
Total Copper	mg/l	0.59 (b)		0.011 U	--	--	--	--	--	--	--		--		--	--	--	--
Total Lead	mg/l	0.015		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	--	--	--		--		--	--	--	--
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 = 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.

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

N
W E
S

2,000 0 2,000
Feet

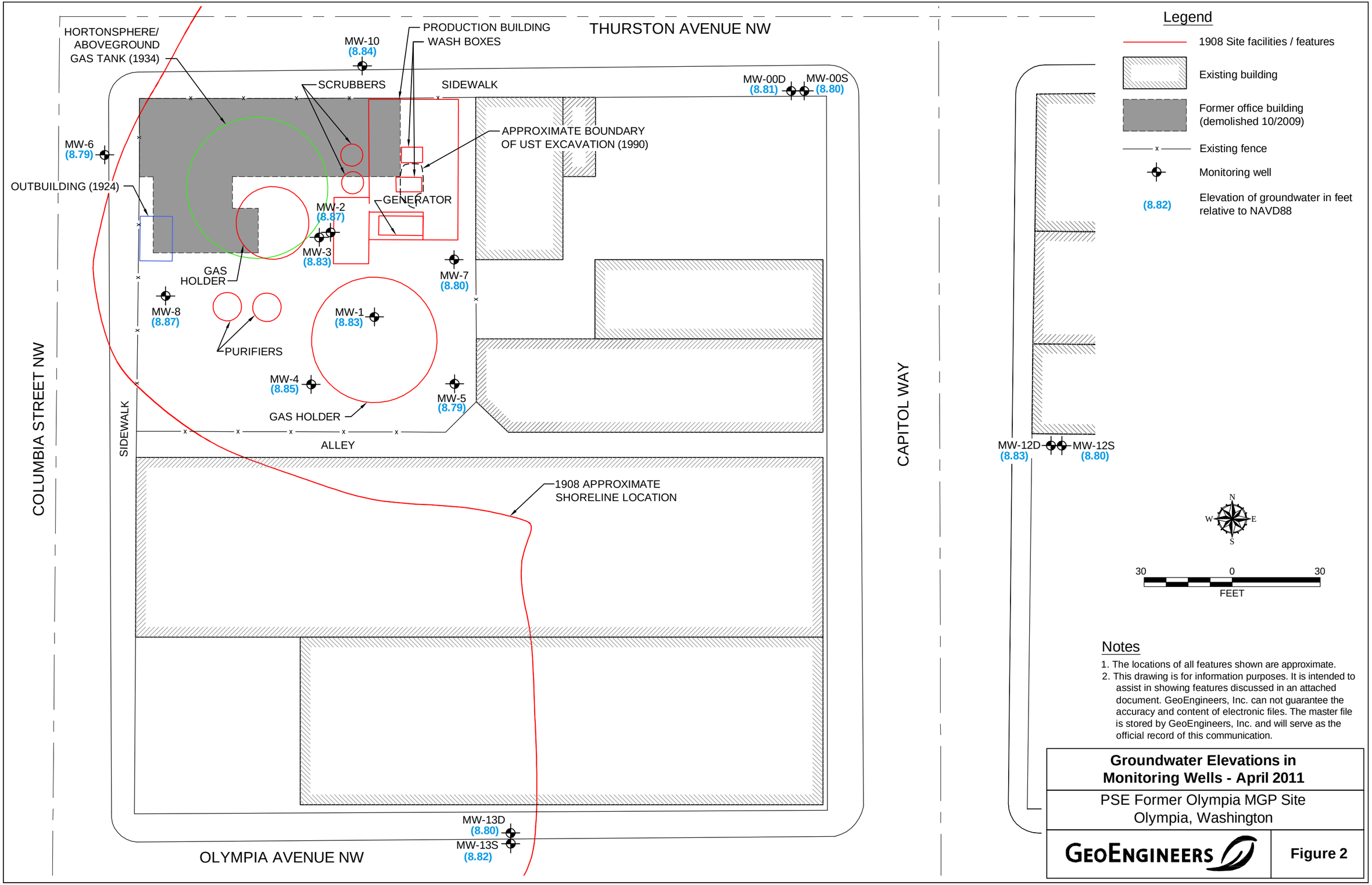
Vicinity Map

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



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 - April 2011

PSE Former Olympia MGP Site
Olympia, Washington

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Figure 2

THURSTON AVENUE NW

COLUMBIA STREET NW

CAPITOL WAY

OLYMPIA AVENUE NW

SIDEWALK

ALLEY

HORTONSPHERE/ ABOVEGROUND GAS TANK (1934)

PRODUCTION BUILDING WASH BOXES

APPROXIMATE BOUNDARY OF UST EXCAVATION (1990)

SCRUBBERS

OUTBUILDING (1924)

GAS HOLDER

PURIFIERS

GENERATOR

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 J	<3.3	<3.0

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

MW-8 (NE)

B-1 (NS)

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-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-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-13S (NE)

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

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 - 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. 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.

Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater

PSE Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 3

ATTACHMENT A
DATA QUALITY ASSESSMENT SUMMARY
cPAHs AND TOTAL/DISSOLVED ARSENIC

Project: PSE Former Olympia MGP Site Off-Property Investigation (Project No. 0186-774-00-0300)
April 2011 Groundwater Monitoring Event

LABORATORY SAMPLE DELIVERY GROUP (SDG):
1104-125

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

  Dissolved metals and cPAHs – One primary and field duplicate sample pair, MW-7_110419 and MW-7_110419 DUP, was assessed. The relative percent difference (RPD) and/or absolute difference values were greater than the control limits for the following compounds:

  Benzo(a)anthracene
  Benzo(a)pyrene
  Benzo(b)fluoranthene
  Benzo(k)fluoranthene
  Chrysene
  Indeno(1,2,3-c,d)pyrene
  Total cPAH TEQ (ND=0.5RL)

  Positive detections of these compounds were qualified "J" (estimated concentration) in both samples.
- Laboratory 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 field duplicate, laboratory duplicate, MS/MSD, and LCS/LCSD RPD values, with the exceptions noted above. Selected sample results were qualified "J" (estimated concentration) due to field duplicate precision outliers. All data are acceptable for the intended use.

ATTACHMENT B

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

April 26, 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. 1104-125

Dear Rob:

Enclosed are the analytical results and associated quality control data for samples submitted on April 20, 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: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

Case Narrative

Samples were collected on April 19, 2011 and received by the laboratory on April 20, 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: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-00 S	04-125-01	Water	4-19-11	4-20-11	
MW-00 D	04-125-02	Water	4-19-11	4-20-11	
MW-1	04-125-03	Water	4-19-11	4-20-11	
MW-2	04-125-04	Water	4-19-11	4-20-11	
MW-3	04-125-05	Water	4-19-11	4-20-11	
MW-4	04-125-06	Water	4-19-11	4-20-11	
MW-5	04-125-07	Water	4-19-11	4-20-11	
MW-6	04-125-08	Water	4-19-11	4-20-11	
MW-7	04-125-09	Water	4-19-11	4-20-11	
MW-7 DUP	04-125-10	Water	4-19-11	4-20-11	
MW-8	04-125-11	Water	4-19-11	4-20-11	
MW-10	04-125-12	Water	4-19-11	4-20-11	
MW-12 S	04-125-13	Water	4-19-11	4-20-11	
MW-12 D	04-125-14	Water	4-19-11	4-20-11	
MW-13 S	04-125-15	Water	4-19-11	4-20-11	
MW-13 D	04-125-16	Water	4-19-11	4-20-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-01					
Client ID:	**MW-00 S**					
Arsenic	**17**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-02					
Client ID:	**MW-00 D**					
Arsenic	**4.7**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-03					
Client ID:	**MW-1**					
Arsenic	**50**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-04					
Client ID:	**MW-2**					
Arsenic	**3.9**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-05					
Client ID:	**MW-3**					
Arsenic	**61**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-06					
Client ID:	**MW-4**					
Arsenic	**84**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-07					
Client ID:	**MW-5**					
Arsenic	**24**	3.3	200.8	4-21-11	4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-08					
Client ID:	**MW-6**					
Arsenic	**ND**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-09					
Client ID:	**MW-7**					
Arsenic	**ND**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-11					
Client ID:	**MW-8**					
Arsenic	**ND**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-12					
Client ID:	**MW-10**					
Arsenic	**61**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-13					
Client ID:	**MW-12 S**					
Arsenic	**29**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-14					
Client ID:	**MW-12 D**					
Arsenic	**14**	3.3	200.8	4-21-11	4-21-11	
Lab ID:	04-125-15					
Client ID:	**MW-13 S**					
Arsenic	**ND**	3.3	200.8	4-21-11	4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-16					
Client ID:	**MW-13 D**					
Arsenic	**79**	3.3	200.8	4-21-11	4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-01					
Client ID:	**MW-00 S**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-02					
Client ID:	**MW-00 D**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-03					
Client ID:	**MW-1**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-04					
Client ID:	**MW-2**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-05					
Client ID:	**MW-3**					
Arsenic	**33**	3.0	200.8		4-21-11	
Lab ID:	04-125-06					
Client ID:	**MW-4**					
Arsenic	**82**	3.0	200.8		4-21-11	
Lab ID:	04-125-07					
Client ID:	**MW-5**					
Arsenic	**4.4**	3.0	200.8		4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-08					
Client ID:	**MW-6**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-09					
Client ID:	**MW-7**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-10					
Client ID:	**MW-7 DUP**					
Arsenic	**ND**	3.0	200.8		4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-125-11					
Client ID:	**MW-8**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-12					
Client ID:	**MW-10**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-13					
Client ID:	**MW-12 S**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-14					
Client ID:	**MW-12 D**					
Arsenic	**14**	3.0	200.8		4-21-11	
Lab ID:	04-125-15					
Client ID:	**MW-13 S**					
Arsenic	**ND**	3.0	200.8		4-21-11	
Lab ID:	04-125-16					
Client ID:	**MW-13 D**					
Arsenic	**80**	3.0	200.8		4-21-11	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

cPAHs 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:	04-125-09					
Benzo[a]anthracene	**0.015**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Chrysene	**0.013**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[b]fluoranthene	**0.023**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[k]fluoranthene	**0.014**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[a]pyrene	**0.019**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Indeno(1,2,3-c,d)pyrene	**0.033**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Dibenz[a,h]anthracene	**ND**	0.0095	EPA 8270/SIM	4-21-11	4-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*74*	*38 - 105*				
Pyrene-d10	*80*	*37 - 121*				
Terphenyl-d14	*73*	*32 - 112*				

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

cPAHs 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 DUP**					
Laboratory ID:	04-125-10					
Benzo[a]anthracene	**0.028**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Chrysene	**0.036**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[b]fluoranthene	**0.063**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[k]fluoranthene	**0.045**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[a]pyrene	**0.062**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Indeno(1,2,3-c,d)pyrene	**0.095**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Dibenz[a,h]anthracene	**0.011**	0.0096	EPA 8270/SIM	4-21-11	4-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*68*	*38 - 105*				
Pyrene-d10	*79*	*37 - 121*				
Terphenyl-d14	*78*	*32 - 112*				

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-21-11
Date Analyzed:	4-21-11
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0421W1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 4-21-11
Date Analyzed: 4-21-11

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-125-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**17.4**	**18.1**	4	3.3	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL ARSENIC
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 4-21-11
Date Analyzed: 4-21-11

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-125-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	110	**126**	99	**127**	100	1	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

TOTAL METALS
EPA 200.8
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppb)	Calc. Value	Percent Difference	Control Limits
Arsenic	ICV042111E	50.0	48.0	4.0	+/- 10%
Arsenic	CCV1042111E	100	98.6	1.4	+/- 10%
Arsenic	CCV1042111E	40.0	38.6	3.4	+/- 10%
Arsenic	CCV2042111E	100	98.3	1.7	+/- 10%
Arsenic	CCV2042111E	40.0	38.6	3.4	+/- 10%
Arsenic	CCV3042111E	100	99.2	0.79	+/- 10%
Arsenic	CCV3042111E	40.0	38.7	3.3	+/- 10%
Arsenic	CCV4042111E	100	96.8	3.2	+/- 10%
Arsenic	CCV4042111E	40.0	38.6	3.6	+/- 10%
Arsenic	CCV5042111E	100	97.0	3.0	+/- 10%
Arsenic	CCV5042111E	40.0	39.6	1.1	+/- 10%
Arsenic	CCV6042111E	100	97.5	2.5	+/- 10%
Arsenic	CCV6042111E	40.0	39.2	2.1	+/- 10%

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Analyzed:	4-21-11
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0421D1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.0

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Analyzed: 4-21-11

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-125-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	3.0	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8
MS/MSD QUALITY CONTROL

Date Analyzed: 4-21-11

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-125-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	200	**202**	101	**208**	104	3	

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

DISSOLVED ARSENIC
EPA 200.8
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppb)	Calc. Value	Percent Difference	Control Limits
Arsenic	ICV042111E	50.0	48.0	4.0	+/- 10%
Arsenic	CCV1042111E	100	98.6	1.4	+/- 10%
Arsenic	CCV1042111E	40.0	38.6	3.4	+/- 10%
Arsenic	CCV2042111E	100	98.3	1.7	+/- 10%
Arsenic	CCV2042111E	40.0	38.6	3.4	+/- 10%
Arsenic	CCV3042111E	100	99.2	0.79	+/- 10%
Arsenic	CCV3042111E	40.0	38.7	3.3	+/- 10%
Arsenic	CCV4042111E	100	96.8	3.2	+/- 10%
Arsenic	CCV4042111E	40.0	38.6	3.6	+/- 10%

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

cPAHs 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:	MB0421W1					
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Chrysene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[k]fluoranthene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	4-21-11	4-21-11	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*74*	*38 - 105*				
Pyrene-d10	*84*	*37 - 121*				
Terphenyl-d14	*79*	*32 - 112*				

Date of Report: April 26, 2011
Samples Submitted: April 20, 2011
Laboratory Reference: 1104-125
Project: 0186-774-00; PSE-Olympia MGP

cPAHs 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:	SB0421W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzo[a]anthracene	**0.333**	**0.367**	0.500	0.500	67	73	51 - 124	10	18	
Chrysene	**0.356**	**0.389**	0.500	0.500	71	78	53 - 123	9	20	
Benzo[b]fluoranthene	**0.367**	**0.415**	0.500	0.500	73	83	53 - 126	12	18	
Benzo[k]fluoranthene	**0.350**	**0.378**	0.500	0.500	70	76	51 - 126	8	23	
Benzo[a]pyrene	**0.339**	**0.376**	0.500	0.500	68	75	52 - 127	10	21	
Indeno(1,2,3-c,d)pyrene	**0.314**	**0.354**	0.500	0.500	63	71	49 - 123	12	26	
Dibenz[a,h]anthracene	**0.308**	**0.351**	0.500	0.500	62	70	39 - 125	13	31	
Surrogate:										
2-Fluorobiphenyl					*69*	*68*	*38 - 105*			
Pyrene-d10					*81*	*90*	*37 - 121*			
Terphenyl-d14					*79*	*85*	*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

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: 04-125

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	TOTAL ARSENIC	DISSOLVED ARSENIC	cPAHs				% Moisture
1	MW-00S	4-19-11	1048	W	2																X	X					
2	MW-00D		1126	W	2																X	X					
3	MW-1		1630	W	2																X	X					
4	MW-2		1310	W	2																X	X					
5	MW-3		1338	W	2																X	X					
6	MW-4		1742	W	2																X	X					
7	MW-5		1530	W	2																X	X					
8	MW-6		0926	W	2																X	X					
9	MW-7		1222	W	4																X	X	X				
10	MW-7 DUP	4-19-11	1230	W	3																	X	X				

	Signature	Company	Date	Time
Relinquished	B. Anderson	GeoEngineers	4-20-11	1209
Received		OSE	4/20/11	1209
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

* SAMPLES FOR DISS ARSENIC WERE FIELD FILTERED

Chromatograms with final report ☐

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

Chain of Custody

Page 2 of 2

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: 04-125

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	TOTAL ARSENIC	DISSOLVED ARSENIC					% Moisture
11	MW-8	4-19-11	1442	W	2																X	X*					
12	MW-10		0850	W	2																X	X*					
13	MW-12S		0812	W	2																X	X*					
14	MW-12D		0728	W	2																X	X*					
15	MW-13S		1010	W	2																X	X*					
16	MW-13D	4-19-11	0700	W	2																X	X*					

	Signature	Company	Date	Time
Relinquished	B Anderson	GEOENGINEERS	4-20-11	1209
Received		CORE	4/20/11	1209
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
* SAMPLES FOR DISS. ARSENIC WERE FIELD FILTERED

Chromatograms with final report ☐

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

Sample/Cooler Receipt and Acceptance Checklist

Client: GES

Client Project Name/Number: 6186-774-00

OnSite Project Number: 04-125

Initiated by: JMV

Date Initiated: 4/20/11

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 0.6	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

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

3.0 Sample Verification

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

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

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

//SERVER\OSE\Administration\forms\cooler_checklist.xls