SLR

February 25, 2013
Project 101.00173.00011

Mr. Tom Middleton
Washington Department of Ecology
P.O. Box 47775
Olympia, Washington 98504-7775

Re: Groundwater Sampling Report – December 2012 Event
Former Arco Service Station #0855, Longview, Washington

Dear Mr. Middleton:

On behalf of Wakefield Family LLC (the property owner), SLR International Corporation (SLR) has prepared this report to present the results of the annual groundwater sampling activities conducted in December 2012 at the above-referenced site. The former Arco Service Station #0855 property is located at 4603 Ocean Beach Highway, near the western end of Longview, Washington (see Figure 1). The purposes of the groundwater sampling program are to assess the effectiveness of the 2007 site remedial action (soil excavation and shallow groundwater extraction) and the subsequent deep groundwater recovery operations that were deactivated in July 2011, and to monitor the migration and attenuation of the petroleum hydrocarbon concentrations in the shallow groundwater-bearing unit and the deep aquifer over time. An additional objective of the December 2012 sampling event is to evaluate if the June 2012 injection of an electron-acceptor solution is stimulating the biodegradation of the remaining petroleum hydrocarbon concentrations in the deep groundwater.

BACKGROUND

After completing the 2007 remedial action at the property, quarterly groundwater sampling results in 2007 and 2008 showed that the samples from all of the shallow groundwater monitoring wells, except MW-10, and from all of the deep groundwater monitoring wells, except DMW-4, DMW-5, DMW-9, and DMW-10, contained petroleum hydrocarbon concentrations below the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels for four consecutive quarters (SLR, 2008a; SLR, 2008b; and SLR, 2008c). To remediate the remaining impacted groundwater in the deep aquifer, a deep groundwater recovery well (RW-1) was installed and a recovery/treatment system operated from June 2009 through July 2011. The system was deactivated after the groundwater concentrations in all of the deep wells were near or below the Method A cleanup levels.

Since September 2009, the groundwater sampling program has consisted of conducting annual sampling events (collect samples from all of the shallow and deep monitoring

wells) in September, and conducting quarterly sampling events (collect samples from shallow well MW-10 and from deep wells DMW-5, DMW-9, and DMW-10) in December, March, and June. Based on the groundwater sampling results in September and December 2009 and March and June 2010, the samples from shallow monitoring well MW-10 contained petroleum hydrocarbon concentrations below the Method A cleanup levels for four consecutive quarters (SLR, 2009; SLR, 2010a; SLR, 2010b; and SLR, 2010c). Therefore, MW-10 was eliminated from the future quarterly groundwater sampling events.

Based on the groundwater sampling results in June 2011, September 2011, December 2011, March 2012, and June 2012, the samples from deep monitoring wells DMW-5 and DMW-9 contained petroleum hydrocarbon concentrations below the Method A cleanup levels for four consecutive quarters (SLR, 2011c; SLR, 2011d; SLR, 2012a; SLR, 2012b; and SLR, 2012c). Therefore, DMW-5 and DMW-9 were eliminated from the future quarterly groundwater sampling events.

The radius of pumping influence of the previous deep groundwater recovery system did not extend to deep well DMW-10, and the benzene concentrations in the groundwater samples from DMW-10 have typically been above the MTCA Method A cleanup level. The groundwater sampling results also indicate that natural attenuation of the remaining benzene concentrations at DMW-10 has been limited. To reduce the benzene concentrations in the deep groundwater near DMW-10 to below the Method A cleanup levels and to try to ensure that the benzene concentrations in the deep groundwater near wells DMW-5 and DMW-9 remain below the Method A cleanup levels, a sulfate-based, electron-acceptor solution (EAS^{TM}) was injected on June 4, 2012, in a total of nine borings to stimulate anaerobic bacteria activity (SLR, 2012c). Four of the injection borings were located near DMW-10, three of the borings were located near DMW-9, and two of the borings were located near DMW-5. In September 2012, the sulfate concentration (53.9 mg/L) in the groundwater sample from DMW-10 was similar to the sulfate concentration (59.9 mg/L) at the well in September 2011, prior to EAS^{TM} injection, indicating that the sulfate solution had not yet migrated to the well.

DECEMBER 2012 SAMPLING EVENT

SLR personnel conducted the groundwater sampling activities on December 13, 2012. Immediately prior to sampling, SLR measured the depths to groundwater in all of the shallow monitoring wells (MW-5, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, and MW-14), all of the deep monitoring wells (DMW-3, DMW-4, DMW-5, DMW-6, DMW-7, DMW-8, DMW-9, and DMW-10), and in the inactive deep groundwater recovery well (RW-1) by using an electronic water level probe. The depth to groundwater measurements were converted to groundwater elevations by using the results of previous well elevation surveys conducted by Gibbs and Olson, Inc., of Longview, Washington.

The depths to groundwater in the shallow wells ranged from 1.46 to 4.48 feet below the tops of the well casings. The groundwater elevations in the shallow wells ranged from 3.41 to 7.01 feet above the NAVD 88 datum. The depths to groundwater in the deep wells ranged from 5.24 to 6.72 feet below the tops of the well casings. The groundwater elevations in the deep wells ranged from 1.42 to 2.60 feet above the NAVD 88 datum. The groundwater elevations in the shallow wells were inconsistent and could not be used to determine the general shallow groundwater flow direction beneath the site area. Except for an anomalous groundwater elevation at deep well DMW-3, the groundwater elevations in the deep wells varied by up to only 0.17 feet, which indicates that there was limited lateral movement in the deep aquifer beneath the site area. A flat hydraulic gradient is consistent with the previous deep groundwater monitoring data. The groundwater monitoring data from the December 2012 sampling event, as well as from the previous groundwater sampling events, are presented in Table 1. The groundwater elevations in the shallow and deep wells on December 13, 2012, are shown on Figures 2 and 3, respectively.

SLR personnel collected groundwater samples from deep monitoring wells DMW-4 and DMW-10 for laboratory analysis. SLR purged the wells by using a peristaltic pump with dedicated tubing at a flow rate of approximately 0.33 liters per minute. During purging, field parameters of temperature, conductivity, dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP) were measured every three minutes. Each groundwater sample was collected following the stabilization of the field parameter measurements.

SLR submitted the groundwater samples to Friedman & Bruya, Inc. (F&B) in Seattle, Washington, for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B, and gasoline-range organics (GRO) by Ecology Method NWTPH-Gx. The analytical results indicated that the groundwater sample from deep well DMW-10 contained a benzene concentration [34 micrograms per liter (µg/L)] that exceeded the MTCA Method A cleanup level (5 µg/L). The groundwater sample from deep well DMW-10 also contained toluene, ethylbenzene, total xylenes, and GRO concentrations that were below the Method A cleanup levels. The groundwater sample from deep well DMW-4 did not contain petroleum hydrocarbon concentrations greater than the method reporting limits (MRLs). The groundwater sample analytical results (petroleum hydrocarbons only) from the December 2012 event, as well as from the previous sampling events, are presented in Table 2. The benzene and GRO concentrations in the December 2012 samples are shown on Figure 3. A copy of the laboratory analytical report is attached.

To evaluate the distribution of the injected EAS™, the samples were also analyzed for sulfate by EPA Method 300.0. The groundwater samples from deep wells DMW-4 and DMW-10 contained sulfate concentrations of 91.1 and 37.1 mg/L, respectively. The groundwater sample analytical results for sulfate and field measurements of natural

attenuation parameters (DO and ORP) from the December 2012 event, as well as from the previous sampling events, are presented in Table 3. Copies of the laboratory analytical reports are attached.

CONCLUSIONS

The 2008 groundwater sampling results from the shallow wells indicated that the 2007 remediation activities effectively removed the source of the shallow groundwater contamination and extracted most of the impacted shallow groundwater (SLR, 2008a; SLR, 2008b; and SLR, 2008c). Based on the 2009, 2010, 2011, and 2012 groundwater sampling results (SLR, 2009; SLR, 2010a; SLR, 2010b; SLR, 2010c; SLR, 2010d; SLR, 2011d; and SLR, 2012d), the remaining petroleum hydrocarbon concentrations in the shallow groundwater have naturally attenuated to below the MTCA Method A cleanup levels.

The 2008 groundwater sampling results from the deep wells showed that the 2007 remediation activities had limited short-term affects on the deep groundwater concentrations (SLR, 2008a; SLR, 2008b; and SLR, 2008c). To actively remediate the impacted deep groundwater, a deep groundwater recovery/treatment system operated from June 2009 through July 2011. Based on the results of the quarterly groundwater sampling events that have been conducted since September 2009 (SLR, 2009; SLR, 2010a; SLR, 2010b; SLR, 2010c; SLR, 2010d; SLR, 2011a; SLR, 2011b; SLR, 2011c; SLR, 2011d; SLR, 2012a; SLR, 2012b; SLR, 2012c; and SLR, 2012d), including the December 2012 results, the benzene and GRO concentrations in the deep groundwater have decreased due to the operation of the system and due to natural attenuation. At deep well DMW-4, the BTEX and GRO concentrations in December 2012 were less than the MTCA Method A groundwater cleanup levels for the fourth consecutive quarter; therefore, DMW-4 will be eliminated from the future quarterly groundwater sampling events.

Since June 2011, groundwater samples from deep well DMW-10 have been the only samples from the subject property to contain petroleum hydrocarbon (benzene only) concentrations greater than the MTCA Method A cleanup levels. The radius of pumping influence of the previous deep groundwater recovery system did not extend to DMW-10, and the natural attenuation of the remaining benzene concentrations at the DMW-10 area has been limited. To attempt to reduce the benzene concentrations in the deep groundwater near DMW-10 to below the Method A cleanup levels and to try to ensure that the benzene concentrations in the deep groundwater near wells DMW-5 and DMW-9 remain below the Method A cleanup levels, the sulfate-based EAS^{TM} was injected into the deep aquifer on June 4, 2012, to stimulate anaerobic bacteria activity. At DMW-10, the sulfate concentrations in September and December 2012 were similar to the background sulfate concentrations at the well prior to EAS^{TM} injection. Based on the sulfate concentrations and the consistent elevated benzene concentrations, it is evident that the

EAS™ has not migrated to DMW-10, likely because of the limited deep groundwater flow (due to flat and inconsistent hydraulic gradients) beneath the property. Based on the September and December 2012 sampling results, it appears unlikely that the EAS™ injection will stimulate biodegradation of the benzene in the immediate vicinity of DMW-10.

If you have any questions, please contact Mike Staton at (425) 471-0479.

Sincerely,

SLR International Corporation

Christopher Lee
Project Geologist

Michael D. Staton, L.G.
Principal Geologist

Attachments: Limitations
References
Tables 1, 2, and 3
Figures 1 through 3
Laboratory Analytical Reports

cc: Kurt Peterson, Cascadia Law Group PLLC (4 copies)

LIMITATIONS

The services reflected in this report were performed consistent with generally accepted professional consulting principals and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This information is solely for the use of our client unless otherwise noted. Any reliance on this information by a third party is at such party's sole risk.

Opinions and recommendations contained herein apply to conditions existing when services were performed and are intended only for the client, purposes, location, timeframes, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

REFERENCES

SLR. 2008a. *Remedial Action Report, Former Arco Service Station #0855, 4603 Ocean Beach Highway, Longview, Washington.* July 21.

SLR. 2008b. *Quarterly Groundwater Sampling Report – July 2008 Event, Former Arco Service Station #0855, Longview, Washington.* August 29.

SLR. 2008c. *Quarterly Groundwater Sampling Report – September/October 2008 Event, Former Arco Service Station #0855, Longview, Washington.* October 29.

SLR. 2009. *Deep Groundwater Remediation System Installation and Performance Report, Former Arco Service Station #0855, Longview, Washington.* November 4.

SLR. 2010a. *Quarterly Groundwater Sampling Report – December 2009 Event, Former Arco Service Station #0855, Longview, Washington.* January 9.

SLR. 2010b. *Quarterly Groundwater Sampling Report – March 2010 Event, Former Arco Service Station #0855, Longview, Washington.* April 5.

SLR. 2010c. *Quarterly Groundwater Sampling Report – June 2010 Event, Former Arco Service Station #0855, Longview, Washington.* July 20.

SLR. 2010d. *Groundwater Sampling Report – September 2010 Event, Former Arco Service Station #0855, Longview, Washington.* October 25.

SLR. 2011a. *Groundwater Sampling Report – December 2010 Event, Former Arco Service Station #0855, Longview, Washington.* January 4.

SLR. 2011b. *Groundwater Sampling Report – March 2011 Event, Former Arco Service Station #0855, Longview, Washington.* May 23.

SLR. 2011c. *Groundwater Sampling Report – June 2011 Event, Former Arco Service Station #0855, Longview, Washington.* July 20.

SLR. 2011d. *Groundwater Sampling Report – September 2011 Event, Former Arco Service Station #0855, Longview, Washington.* October 31.

SLR. 2012a. *Groundwater Sampling Report – December 2011 Event, Former Arco Service Station #0855, Longview, Washington.* January 9.

SLR. 2012b. *Groundwater Sampling Report – March 2012 Event, Former Arco Service Station #0855, Longview, Washington.* April 13.

SLR. 2012c. *Groundwater Sampling Report – June 2012 Event, Former Arco Service Station #0855, Longview, Washington.* August 10.

SLR. 2012d. *Groundwater Sampling Report – September 2012 Event, Former Arco Service Station #0855, Longview, Washington.* November 19.

TABLES

Table 1
Groundwater Monitoring Data
Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Shallow Monitoring Wells					
MW-1	8.34	03/27/00	4.36	NP	3.98
		05/23/00	5.20	NP	3.14
		07/20/00	5.55	NP	2.79
		10/18/00	5.41	NP	2.93
		01/18/01	4.81	NP	3.53
		04/18/01	4.58	NP	3.76
		07/17/01	5.54	NP	2.80
		10/18/01	5.26	NP	3.08
		01/16/02	4.45	NP	3.89
		07/09/03	5.80	NP	2.54
	8.25[c]	05/25/05	4.12	NP	4.13
		12/07/05	3.77	NP	4.48
		08/16/06	6.58	NP	1.67
		Well abandoned in September 2007.			
MW-2	8.76	03/27/00	3.61	NP	5.15
		05/23/00	4.64	NP	4.12
		07/20/00	5.06	NP	3.70
		10/18/00	5.19	NP	3.57
		01/18/00	3.96	NP	4.80
		04/18/01	3.83	NP	4.93
		07/17/01	5.08	NP	3.68
		10/18/01	4.83	NP	3.93
		01/16/02	3.71	NP	5.05
		07/09/03	5.36	NP	3.40
	8.89[c]	05/25/05	4.15	NP	4.74
		12/07/05	4.09	NP	4.80
		08/16/06	5.96	NP	2.93
		Well abandoned in September 2007.			
MW-3	8.78	03/27/00	5.61	NP	3.17
		05/23/00	6.46	NP	2.32
		07/20/00	7.05	NP	1.73
		10/18/00	6.84	NP	1.94
		01/18/01	6.37	NP	2.41
		04/18/01	5.46	NP	3.32
		07/17/01	6.93	NP	1.85
		10/18/01	6.47	NP	2.31
		01/16/01	4.83	NP	3.95
		07/09/03	6.72	0.02	2.08*
	8.58[c]	05/25/05	4.65	Film	3.93
		12/07/05	4.45	0.01	4.14*
		08/16/06	6.91	0.24	1.86*
		Well abandoned in September 2007.			
MW-4	8.78	11/15/00	6.88	NP	1.90
		01/18/01	6.78	NP	2.00
		04/18/01	6.90	NP	1.88
		07/17/01	7.50	NP	1.28
		10/18/01	6.92	NP	1.86
		01/16/02	6.15	NP	2.63
		07/09/03	7.04	NP	1.74
	8.69[c]	05/25/05	6.24	NP	2.45
		12/07/05	5.70	NP	2.99
		08/16/06	6.84	NP	1.85
		Well abandoned in September 2007.			

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Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Shallow Monitoring Wells (continued)					
MW-5	8.78	11/15/00	6.54	NP	2.24
		01/18/01	6.07	NP	2.71
		04/18/01	5.46	NP	3.32
		07/17/01	6.79	NP	1.99
		10/18/01	6.50	NP	2.28
		01/16/02	5.49	NP	3.29
		07/09/03	6.86	NP	1.92
	8.67[c]	05/25/05	5.64	NP	3.03
		12/07/05	5.53	NP	3.14
		08/16/06	6.28	NP	2.39
		12/11/07	4.64	NP	4.03
		03/11/08	4.90	NP	3.77
		07/01/08	5.33	NP	3.34
		09/30/08	6.17	NP	2.50
		09/02/09	7.08	NP	1.59
		12/15/09	4.63	NP	4.04
		03/18/10	4.85	NP	3.82
		06/15/10	4.84	NP	3.83
		09/14/10	6.87	NP	1.80
		12/14/10	3.03	NP	5.64
		03/16/11	2.80	NP	5.87
		06/16/11	5.66	NP	3.01
		09/14/11	7.12	NP	1.55
		12/08/11	5.57	NP	3.10
		03/13/12	2.83	NP	5.84
		06/15/12	5.44	NP	3.23
		09/11/12	7.02	NP	1.65
		12/13/12	2.99	NP	5.68
MW-6	8.21	11/15/00	6.15	NP	2.06
		01/18/01	5.85	NP	2.36
		04/18/01	5.70	NP	2.51
		07/17/01	6.02	NP	2.19
		10/18/01	6.03	NP	2.18
		01/16/02	5.80	NP	2.41
		07/09/03	6.16	NP	2.05
	8.11[c]	05/25/05	4.00	NP	4.11
		12/07/05	5.70	NP	2.41
		08/16/06	6.40	NP	1.71
		Well destroyed in November 2007.			
MW-7	8.45	11/15/00	6.52	NP	1.93
		01/18/01	6.24	NP	2.21
		04/18/01	5.98	NP	2.47
		07/17/01	6.44	NP	2.01
		10/18/01	6.39	NP	2.06
		01/16/02	6.31	NP	2.14
		07/09/03	7.00	NP	1.45
	8.26[c]	05/25/05	5.61	NP	2.65
		12/07/05	6.36[d]	NP	1.90
		08/16/06	6.40	NP	1.86
		Well abandoned in September 2007.			

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Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Shallow Monitoring Wells (continued)					
MW-8	6.45	05/25/05	4.50	NP	1.95
		12/07/05	3.69	NP	2.76
		08/16/06	4.67	NP	1.78
		12/11/07	3.55	NP	2.90
		03/11/08	3.51	NP	2.94
		07/01/08	4.03	NP	2.42
		09/30/08	4.19	NP	2.26
		09/02/09	4.55	NP	1.90
		12/15/09	3.31	NP	3.14
		03/18/10	3.05	NP	3.40
		06/15/10	2.48	NP	3.97
		09/14/10	4.32	NP	2.13
		12/14/10	2.70	NP	3.75
		03/16/11	2.15	NP	4.30
		06/16/11	2.37	NP	4.08
		09/14/11	4.79	NP	1.66
		12/08/11	3.52	NP	2.93
		03/13/12	2.76	NP	3.69
		06/15/12	3.01	NP	3.44
		09/11/12	4.78	NP	1.67
		12/13/12	3.04	NP	3.41
MW-9	9.43	05/25/05	4.66	NP	4.77
		12/07/05	4.59	NP	4.84
		08/16/06	5.23	NP	4.20
		12/11/07	4.52	NP	4.91
		03/11/08	4.65	NP	4.78
		07/01/08	5.06	NP	4.37
		09/30/08	5.08	NP	4.35
		09/02/09	5.20	NP	4.23
		12/15/09	4.51	NP	4.92
		03/18/10	4.64	NP	4.79
		06/15/10	4.72	NP	4.71
		09/14/10	4.94	NP	4.49
		12/14/10	4.66	NP	4.77
		03/16/11	3.91	NP	5.52
		06/16/11	4.83	NP	4.60
		09/14/11	5.35	NP	4.08
		12/08/11	4.78	NP	4.65
		03/13/12	4.25	NP	5.18
		06/15/12	4.78	NP	4.65
		09/11/12	5.38	NP	4.05
		12/13/12	4.48	NP	4.95
MW-10	9.52	05/25/05	10.30	NP	-0.78
		12/07/05	5.90	NP	3.62
		08/16/06	7.18	NP	2.34
		12/11/07	4.22	NP	5.30
		03/11/08	6.02	NP	3.50
		07/01/08	6.53	NP	2.99
		09/30/08	4.51	NP	5.01
		09/02/09	7.76	NP	1.76
		12/15/09	5.97	NP	3.55
		03/18/10	8.14	NP	1.38
		06/15/10	5.15	NP	4.37
		09/14/10	7.88	NP	1.64
		12/14/10	3.42	NP	6.10
		03/16/11	3.54	NP	5.98
		06/16/11	6.40	NP	3.12
		09/14/11	8.01	NP	1.51
		12/08/11	5.36	NP	4.16
		03/13/12	3.73	NP	5.79
		06/15/12	5.93	NP	3.59
		09/11/12	7.71	NP	1.81
		12/13/12	4.17	NP	5.35

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Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Shallow Monitoring Wells (continued)					
MW-11	8.16	12/07/05	3.87	NP	4.29
		08/16/06	6.10	NP	2.06
		12/11/07	3.51	NP	4.65
		03/11/08	4.86	NP	3.30
		07/01/08	5.61	NP	2.55
		09/30/08	6.56	NP	1.60
		09/02/09	7.52	NP	0.64
		12/15/09	4.35	NP	3.81
		03/18/10	4.17	NP	3.99
		06/15/10	4.22	NP	3.94
		09/14/10	6.28	NP	1.88
		12/14/10	1.86	NP	6.30
		03/16/11	2.59	NP	5.57
		06/16/11	5.43	NP	2.73
		09/14/11	8.17	NP	-0.01
		12/08/11	4.18	NP	3.98
		03/13/12	5.91	NP	2.25
		06/15/12	4.94	NP	3.22
		09/11/12	6.63	NP	1.53
		12/13/12	3.45	NP	4.71
MW-12	8.21	12/11/07	2.69	NP	5.52
		03/11/08	4.25	NP	3.96
		07/01/08	5.20	NP	3.01
		09/30/08	5.85	NP	2.36
		09/02/09	6.33	NP	1.88
		12/15/09	3.09	NP	5.12
		03/18/10	3.46	NP	4.75
		06/15/10	3.65	NP	4.56
		09/14/10	5.65	NP	2.56
		12/14/10	1.45	NP	6.76
		03/16/11	1.90	NP	6.31
		06/16/11	4.77	NP	3.44
		09/14/11	5.35	NP	2.86
		12/08/11	3.89	NP	4.32
		03/13/12	2.00	NP	6.21
		06/15/12	4.25	NP	3.96
		09/11/12	6.34	NP	1.87
		12/13/12	2.78	NP	5.43
MW-13	9.03	12/11/07	1.10	NP	7.93
		03/11/08	1.53	NP	7.50
		07/01/08	3.53	NP	5.50
		09/30/08	4.73	NP	4.30
		09/02/09	7.04	NP	1.99
		12/15/09	2.24	NP	6.79
		03/18/10	1.48	NP	7.55
		06/15/10	1.65	NP	7.38
		09/14/10	5.80	NP	3.23
		12/14/10	1.48	NP	7.55
		03/16/11	1.45	NP	7.58
		06/16/11	3.12	NP	5.91
		09/14/11	6.97	NP	2.06
		12/08/11	2.46	NP	6.57
		03/13/12	1.74	NP	7.29
		06/15/12	3.16	NP	5.87
		09/11/12	6.76	NP	2.27
		12/13/12	2.02	NP	7.01

Table 1
Groundwater Monitoring Data
Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Shallow Monitoring Wells (continued)					
MW-14	8.39	12/11/07	1.50	NP	6.89
		03/11/08	3.85	NP	4.54
		07/01/08	4.27	NP	4.12
		09/30/08	6.44	NP	1.95
		09/02/09	6.93	NP	1.46
		12/15/09	1.77	NP	6.62
		03/18/10	1.65	NP	6.74
		06/15/10	1.78	NP	6.61
		09/14/10	6.23	NP	2.16
		12/14/10	1.37	NP	7.02
		03/16/11	1.41	NP	6.98
		06/16/11	4.77	NP	3.62
		09/14/11	7.25	NP	1.14
		12/08/11	1.88	NP	6.51
		03/13/12	1.45	NP	6.94
		06/15/12	1.98	NP	6.41
		09/11/12	6.75	NP	1.64
		12/13/12	1.46	NP	6.93
Deep Monitoring Wells					
DMW-1	8.55	12/07/05	6.73	NP	1.82
		08/16/06	6.28	NP	2.27
		Well abandoned in September 2007.			
DMW-2	8.29	12/07/05	6.10	NP	2.19
		08/16/06	6.71	NP	1.58
		Well abandoned in September 2007.			
DMW-3	6.66	12/07/05	12.15[d]	NP	-5.49
		08/16/06	4.55	NP	2.11
		12/11/07	4.60	NP	2.06
		03/11/08	5.68	NP	0.98
		07/01/08	5.52	NP	1.14
		09/30/08	5.03	NP	1.63
		09/02/09	5.19	NP	1.47
		12/15/09	4.71	NP	1.95
		03/18/10	4.55	NP	2.11
		06/15/10	4.42	NP	2.24
		09/14/10	5.01	NP	1.65
		12/14/10	4.36	NP	2.30
		03/16/11	3.95	NP	2.71
		06/16/11	4.10	NP	2.56
		09/14/11	4.73	NP	1.93
		12/08/11	7.52	NP	-0.86
		03/13/12	6.24	NP	0.42
		06/15/12	4.70	NP	1.96
		09/11/12	4.98	NP	1.68
		12/13/12	5.24	NP	1.42
DMW-4	8.55	12/07/05	6.30	NP	2.25
		08/16/06	7.12	NP	1.43
		12/11/07	6.08	NP	2.47
		03/11/08	6.54	NP	2.01
		07/01/08	6.41	NP	2.14
		09/30/08	6.91	NP	1.64
		09/02/09	7.13	NP	1.42
		12/15/09	6.26	NP	2.29
		03/18/10	6.43	NP	2.12
		06/15/10	6.11	NP	2.44
		09/14/10	6.97	NP	1.58
		12/14/10	5.18	NP	3.37
		03/16/11	5.55	NP	3.00
		06/16/11	6.11	NP	2.44
		09/14/11	7.20	NP	1.35
		12/08/11	6.67	NP	1.88
		03/13/12	5.66	NP	2.89
		06/15/12	6.44	NP	2.11
		09/11/12	7.18	NP	1.37
		12/13/12	6.09	NP	2.46

Table 1
Groundwater Monitoring Data
Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Deep Monitoring Wells (continued)					
DMW-5	8.14	12/07/05	5.88	NP	2.26
		08/16/06	6.57	NP	1.57
		12/11/07	5.75	NP	2.39
		03/11/08	6.14	NP	2.00
		07/01/08	5.01	NP	3.13
		09/30/08	6.52	NP	1.62
		09/02/09	6.75	NP	1.39
		12/15/09	5.87	NP	2.27
		03/18/10	6.03	NP	2.11
		06/15/10	5.68	NP	2.46
		09/14/10	6.55	NP	1.59
		12/14/10	4.80	NP	3.34
		03/16/11	5.17	NP	2.97
		06/16/11	5.69	NP	2.45
		09/14/11	6.79	NP	1.35
		12/08/11	6.28	NP	1.86
		03/13/12	5.25	NP	2.89
		06/15/12	6.05	NP	2.09
		09/11/12	6.74	NP	1.40
		12/13/12	5.69	NP	2.45
DMW-6	9.15	08/16/06	7.74	NP	1.41
		12/11/07	6.68	NP	2.47
		03/11/08	7.15	NP	2.00
		07/01/08	7.04	NP	2.11
		09/30/08	7.53	NP	1.62
		09/02/09	7.79	NP	1.36
		12/15/09	6.89	NP	2.26
		03/18/10	7.06	NP	2.09
		06/15/10	6.74	NP	2.41
		09/14/10	7.59	NP	1.56
		12/14/10	5.79	NP	3.36
		03/16/11	6.18	NP	2.97
		06/16/11	6.75	NP	2.40
		09/14/11	7.82	NP	1.33
		12/08/11	7.31	NP	1.84
		03/13/12	6.34	NP	2.81
		06/15/12	7.09	NP	2.06
		09/11/12	5.38	NP	3.77
		12/13/12	6.72	NP	2.43
DMW-7	8.12	08/16/06	6.68	NP	1.44
		12/11/07	5.68	NP	2.44
		03/11/08	6.11	NP	2.01
		07/01/08	6.02	NP	2.10
		09/30/08	6.61	NP	1.51
		09/02/09	6.74	NP	1.38
		12/15/09	5.85	NP	2.27
		03/18/10	5.93	NP	2.19
		06/15/10	5.82	NP	2.30
		09/14/10	6.55	NP	1.57
		12/14/10	5.27	NP	2.85
		03/16/11	5.15	NP	2.97
		06/16/11	5.70	NP	2.42
		09/14/11	6.64	NP	1.48
		12/08/11	6.28	NP	1.84
		03/13/12	5.22	NP	2.90
		06/15/12	6.05	NP	2.07
		09/11/12	6.76	NP	1.36
		12/13/12	5.69	NP	2.43

Table 1
Groundwater Monitoring Data
Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Deep Monitoring Wells (continued)					
DMW-8	9.09	08/16/06	7.65	NP	1.44
		12/11/07	6.60	NP	2.49
		03/11/08	7.06	NP	2.03
		07/01/08	6.97	NP	2.12
		09/30/08	7.48	NP	1.61
		09/02/09	7.69	NP	1.40
		12/15/09	6.80	NP	2.29
		03/18/10	6.81	NP	2.28
		06/15/10	6.55	NP	2.54
		09/14/10	7.50	NP	1.59
		12/14/10	6.52	NP	2.57
		03/16/11	6.26	NP	2.83
		06/16/11	6.60	NP	2.49
		09/14/11	7.23	NP	1.86
		12/08/11	7.19	NP	1.90
		03/13/12	6.17	NP	2.92
		06/15/12	6.98	NP	2.11
		09/11/12	7.72	NP	1.37
		12/13/12	6.61	NP	2.48
DMW-9	8.86	12/11/07	5.39	NP	3.47
		03/11/08	6.84	NP	2.02
		07/01/08	6.85	NP	2.01
		09/30/08	7.20	NP	1.66
		09/02/09	7.44	NP	1.42
		12/15/09	6.54	NP	2.32
		03/18/10	6.69	NP	2.17
		06/15/10	6.39	NP	2.47
		09/14/10	7.23	NP	1.63
		12/14/10	5.66	NP	3.20
		03/16/11	5.87	NP	2.99
		06/16/11	6.39	NP	2.47
		09/14/11	7.46	NP	1.40
		12/08/11	6.95	NP	1.91
		03/13/12	5.91	NP	2.95
		06/15/12	6.73	NP	2.13
		09/11/12	7.45	NP	1.41
		12/13/12	6.37	NP	2.49
DMW-10	8.38	12/11/07	4.91	NP	3.47
		03/11/08	6.35	NP	2.03
		07/01/08	6.24	NP	2.14
		09/30/08	6.75	NP	1.63
		09/02/09	6.99	NP	1.39
		12/15/09	6.09	NP	2.29
		03/18/10	6.25	NP	2.13
		06/15/10	5.91	NP	2.47
		09/14/10	6.77	NP	1.61
		12/14/10	5.02	NP	3.36
		03/16/11	5.38	NP	3.00
		06/16/11	5.92	NP	2.46
		09/14/11	7.02	NP	1.36
		12/08/11	6.51	NP	1.87
		03/13/12	5.50	NP	2.88
		06/15/12	6.28	NP	2.10
		09/11/12	7.03	NP	1.35
		12/13/12	5.92	NP	2.46

Table 1
Groundwater Monitoring Data
Former Arco Service Station #0855
Longview Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)
Inactive Deep Recovery Well					
RW-1	8.08	09/02/09	6.69	NP	1.39
		12/15/09	5.78	NP	2.30
		03/18/10	5.96	NP	2.12
		06/15/10	5.60	NP	2.48
		12/14/10	4.70	NP	3.38
		03/16/11	5.06	NP	3.02
		06/16/11	5.61	NP	2.47
		09/14/11	6.95	NP	1.13
		12/08/11	5.83	NP	2.25
		03/13/12	5.12	NP	2.96
		06/15/12	5.72	NP	2.36
		09/11/12	6.59	NP	1.49
		12/13/12	5.48	NP	2.60

NOTES:

NP = Free prroduct was not present.

[a] Top of well casing elevations were surveyed relative to NAVD 88 datum.

[b] Measurements in feet below top of well casing.

[c] Top of casing (TOC) elevation was re-surveyed in May 2005.

[d] Water in well was under pressure and rising when the cap was removed. The water level was recorded after the well cap was off for over 2 hours.

* Groundwater elevation corrected for product thickness by using the equation: Groundwater elevation = TOC elevation - depth to groundwater + (product thickness x 0.80).

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Shallow Monitoring Wells							
MW-1	03/27/00	ND	ND	ND	ND	ND	ND
	05/23/00	ND	ND	ND	ND	ND	NA
	07/20/00	ND	ND	ND	ND	ND	NA
	10/18/00	ND	ND	1.61	ND	404	NA
	01/18/01	ND	ND	ND	ND	95.6	NA
	04/18/01	ND	ND	ND	ND	NA	NA
	07/17/01	ND	2.63	1.46	ND	386	NA
	10/18/01	ND	ND	ND	ND	ND	NA
	01/16/02	ND	ND	ND	ND	104	NA
	07/09/03	<0.50	<0.50	<0.50	<1.0	<50	<250
	05/25/05	<1.0	<1.0	<1.0	<2.0	<100	<50
	11/30/05	<1.0	<1.0	<1.0	<3.0	<100	<50
	Well abandoned in September 2007.						
MW-2	03/27/00	**6.89**	49.5	599	**2,490**	**17,100**	ND
	05/23/00	**26.2**	16.2	614	**1,770**	**13,200**	NA
	07/20/00	**11.9**	11.8	304	330	**7,220**	NA
	10/18/00	3.67	1.23	13.9	7.55	743	NA
	01/18/00	ND	ND	41.1	5.62	691	NA
	04/18/01	ND	ND	8.73	ND	NA	NA
	07/17/01	ND	1.26	14	ND	430	NA
	10/18/01	2.11	ND	3.64	ND	304	NA
	01/16/02	1.16	0.81	37.1	6.71	370	NA
	07/09/03	0.86	<0.50	6.43	1.28	131	<250
	05/30/05	<1.0	<1.0	<1.0	<2.0	<100	52
	12/01/05	<1.0	<1.0	<1.0	<3.0	120	<50
	Well abandoned in September 2007.						
MW-3	03/07/00	**7,520**	**12,900**	**2,780**	**14,500**	**93,700**	ND
	05/23/00	**4,710**	**8,330**	**2,280**	**11,200**	**65,200**	NA
	07/20/00	**10,700**	**22,600**	**3,160**	**17,400**	**145,000**	NA
	10/18/00	**12,900**	**33,000**	**4,890**	**26,700**	**179,000**	NA
	01/18/01	**9,380**	**17,200**	**3,940**	**20,230**	**121,000**	NA
	04/18/01	**7,700**	**15,300**	**3,430**	**16,990**	NA	NA
	07/17/01	**10,100**	**21,400**	**4,120**	**20,900**	**940,000**	NA
	10/18/01	**7,200**	**19,700**	**3,340**	**17,300**	**139,000**	NA
	01/16/02	**13,600**	**26,600**	**3,920**	**20,800**	**177,000**	NA
	07/09/03	**11,800**	**20,100**	**4,560**	**21,200**	**124,000**	**3,750**
	05/25/05	Not sampled due to presence of free product.					
	11/28/05	Not sampled due to presence of free product.					
	Well abandoned in September 2007.						

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Shallow Monitoring Wells (continued)							
MW-4	11/15/00	**1,310**	53.6	**2,430**	**7,250**	**45,500**	NA
	01/18/01	**1,130**	ND	**2,030**	**2,764**	**29,400**	NA
	04/18/01	**1,280**	ND	**1,700**	**2,591**	NA	NA
	07/17/01	**1,610**	35	**2,870**	**1,870**	**34,900**	NA
	10/18/01	**1,040**	ND	**2,300**	**1,320**	**33,000**	NA
	01/16/02	**733**	ND	**920**	948	**19,300**	NA
	07/09/03	**906**	39.1	**1,350**	156	**14,100**	**798**
	05/24/05	**310**	2.90	410	185[e]	**9,600**	**2,300**
	12/01/05	**990**	140	**1,100**	**1,353**[e]	**11,000**	**2,900**[f]
	Well abandoned in September 2007.						
MW-5	11/15/00	ND	ND	ND	ND	ND	NA
	01/18/01	ND	ND	ND	ND	786	NA
	04/18/01	**9.42**	ND	6.76	10.1	NA	NA
	07/17/01	1.83	1.16	1.90	3.28	694	NA
	10/18/01	3.05	1.39	1.48	1.45	647	NA
	01/16/02	**52.3**	3.82	48	24.9	**2,800**	NA
	07/09/03	1.26	0.99	1.54	4.64	615	<250
	05/24/05	<1.0	<1.0	<1.0	<2.0	460	120
	11/28/05	<1.0	<1.0	<1.0	<3.0	420	230[f]
	12/11/07	<1.0	<1.0	<1.0	<3.0	140	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA
MW-6	11/15/00	ND	ND	ND	ND	131	NA
	01/18/01	ND	ND	ND	ND	732	NA
	04/18/01	ND	ND	ND	ND	NA	NA
	07/17/01	ND	1.35	1.33	5.79	**892**	NA
	10/18/01	ND	ND	2.60	5.48	**1,000**	NA
	01/16/02	ND	0.72	1.58	2.78	**810**	NA
	07/09/03	<0.50	0.53	1.15	4.84	462	**958**
	05/25/05	<1.0	<1.0	<1.0	<2.0	370	270
	11/28/05	<1.0	<1.0	<1.0	<1.0	NA	<1.0
	Well destroyed in November 2007.						
MW-7	11/15/00	ND	ND	ND	1.35	113	NA
	01/18/01	ND	ND	ND	ND	242	NA
	04/18/01	ND	ND	ND	ND	NA	NA
	07/17/01	ND	ND	ND	ND	275	NA
	10/18/01	ND	ND	ND	ND	286	NA
	01/16/02	ND	ND	ND	ND	362	NA
	07/09/03	<0.50	<0.50	<0.50	1.48	232	**2,050**
	05/25/05	<1.0	<1.0	<1.0	<2.0	<100	220
	11/30/05	<1.0	<1.0	<1.0	<3.0	<100	140
	Well abandoned in September 2007.						

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Shallow Monitoring Wells (continued)							
MW-8	05/25/05	<1.0	<1.0	<1.0	<3.0	<100	<70
	11/29/05	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/01/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/01/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
MW-9	05/25/05	<1.0	<1.0	<1.0	<3.0	<100	<50
	11/28/05	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
MW-10	05/25/05	**45**	<1.0	110	<2.0	**1,000**	**1,200**
	11/30/05	**31**	<1.0	110	<3.0	**1,400**	**1,000[f]**
	12/11/07	**9.0**	3.0	65	<3.0	**3,100**	**1,000[g]**
	03/11/08	**16**	2.0	40	<3.0	**3,000**	**1,200[g]**
	07/03/08	**18**	2.0	53	41	**2,500**	**1,100[g]**
	10/02/08	<1.0	<1.0	<1.0	<3.0	**1,300**	NA
	09/03/09	<1.0	<1.0	2.0	<3.0	200	NA
	12/15/09	3.0	<1.0	11	<3.0	310	NA
	03/18/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	06/15/10	<1.0	<1.0	<1.0	<3.0	170	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	180	NA
	09/14/11	1.5	<1.0	<1.0	<3.0	120	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	160	NA
MW-11	12/05/05	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Shallow Monitoring Wells (continued)							
MW-12	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
MW-13	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/03/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA
MW-14	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/01/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
Deep Monitoring Wells							
DMW-1	12/07/05	**4,000**	160	**1,100**	**4,090[e]**	**22,000**	**2,900[f]**
	08/17/06	**4,100**	<1.0	**520**	**841[e]**	**16,000**	**930[f]**
	Well abandoned in September 2007.						
DMW-2	12/07/05	**11**	<1.0	40	46[f]	270	<50
	08/16/06	**10**	<1.0	5.6	<3.0	<100	<50
	Well abandoned in September 2007.						
DMW-3	12/07/05	<1.0	<1.0	<1.0	<3.0	<50	<50
	08/17/06	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/01/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
DMW-4	12/05/05	**56**	<1.0	<1.0	<3.0	230	<50
	08/17/06	**5.7**	<1.0	<1.0	<3.0	210	<50
	12/11/07	**27**	3.0	2.0	4.0	260	<50
	03/11/08	**6.0**	<1.0	<1.0	<3.0	230	68[g]
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	1.2	<1.0	3.3	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	03/13/12	<1.0	<1.0	<1.0	<3.0	<100	NA
	06/15/12	1.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA
	12/13/12	<1.0	<1.0	<1.0	<3.0	<100	NA

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Deep Monitoring Wells (continued)							
DMW-5	12/05/05	**36**	<1.0	<1.0	<3.0	130	<50
	08/17/06	**74**	<1.0	<1.0	<3.0	170	<50
	12/11/07	**41**	<1.0	<1.0	<3.0	100	<50
	03/11/08	**10**	<1.0	<1.0	<3.0	<100	<50
	07/02/08	1.0	<1.0	<1.0	<3.0	<100	<50
	10/01/08	**42**	<1.0	<1.0	<3.0	110	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	12/15/09	1.0	<1.0	<1.0	<3.0	<100	NA
	03/18/10	**13**	<1.0	<1.0	<3.0	<100	NA
	06/15/10	**13**	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	12/14/10	**9.0**	<1.0	<1.0	<3.0	<100	NA
	03/16/11	**11**	<1.0	<1.0	<3.0	<100	NA
	06/16/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	12/08/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	03/13/12	3.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA
DMW-6	08/16/06	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/12/12	<1.0	<1.0	<1.0	<3.0	<100	NA
DMW-7	08/16/06	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/01/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/01/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	<100	NA
DMW-8	08/16/06	<1.0	<1.0	<1.0	<3.0	<100	<50
	12/11/07	<1.0	<1.0	<1.0	<3.0	<100	<50
	03/11/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	07/02/08	<1.0	<1.0	<1.0	<3.0	<100	<50
	10/02/08	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/03/09	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/10	<1.0	<1.0	<1.0	<3.0	<100	NA
	09/14/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	0911/12	<1.0	<1.0	<1.0	<3.0	<100	NA

Table 2
Groundwater Sample Analytical Results - Petroleum Hydrocarbons
Former Arco Service Station #0855
Longview, Washington

Well Number	Sample Date	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	GRO[b] (µg/L)	DRO[c] (µg/L)
MTCA Method A Cleanup Levels[d]		**5**	**1,000**	**700**	**1,000**	**800**	**500**
Deep Monitoring Wells (continued)							
DMW-9	12/11/07	**6,100**	**1,900**	**970**	**3,100**	**27,000**	**600[g]**
	03/11/08	**3,000**	150	380	880	**13,000**	450[g]
	07/03/08	**3,600**	3.0	320	610	**9,500**	**520[g]**
	10/02/08	**3,300**	4.0	140	270	**8,600**	NA
	09/03/09	**2,800**	4.0	320	**1,100**	**14,000**	NA
	12/15/09	**980**	2.0	<1.0	**1,100**	**5,300**	NA
	03/18/10	**190**	<1.0	10	200	**1,600**	NA
	06/15/10	**50**	<1.0	9.1	60	630	NA
	09/14/10	**210**	<1.0	5.2	120	**1,000**	NA
	12/14/10	3.3	<1.0	1.3	9.8	320	NA
	03/16/11	**14**	<1.0	2.0	3.7	310	NA
	06/16/11	**87**	<1.0	<1.0	33	700	NA
	09/14/11	<1.0	<1.0	<1.0	3.4	200	NA
	12/08/11	<1.0	<1.0	<1.0	<3.0	140	NA
	03/13/12	1.9	<1.0	<1.0	<3.0	310	NA
	06/15/12	<1.0	<1.0	<1.0	<3.0	160	NA
	09/11/12	<1.0	<1.0	<1.0	<3.0	230	NA
DMW-10	12/11/07	**60**	4.0	88	130	750	53[g]
	03/11/08	**75**	4.0	140	120	**1,000**	74[g]
	07/02/08	**89**	6.0	160	130	**1,100**	68[g]
	10/01/08	**90**	5.0	120	25	**820**	NA
	09/03/09	**9.0**	<1.0	2.0	<3.0	<100	NA
	12/15/09	**20**	<1.0	13	7.0	150	NA
	03/18/10	**41**	<1.0	21	13	310	NA
	06/15/10	**34**	2.3	14	12	340	NA
	09/14/10	**12**	<1.0	<1.0	<3.0	<100	NA
	12/14/10	**32**	1.7	7.1	11	120	NA
	03/16/11	**27**	1.2	8.2	11	220	NA
	06/16/11	**27**	1.8	<1.0	9.9	130	NA
	09/14/11	**20**	<1.0	<1.0	3.9	140	NA
	12/08/11	<1.0	<1.0	<1.0	<3.0	<100	NA
	03/13/12	**37**	1.0	3.6	14	260	NA
	06/15/12	**51**	1.4	1.7	20	400	NA
	09/11/12	**29**	<1.0	<1.0	<3.0	200	NA
	12/13/12	**34**	1.4	4.7	3.3	260	NA

NOTES: Values in bold exceed the MTCA Method A cleanup levels.

All concentrations in micrograms per liter (µg/L).

ND = Not detected above the laboratory method reporting limit (MRL).

NA = Not analyzed.

[a] Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B or EPA Method 8260B.

[b] Gasoline-range organics (GRO) by Ecology Method NWTPH-Gx.

[c] Diesel-range organics (DRO) by Ecology Method NWTPH-Dx.

[d] Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A Cleanup Levels. Amended February 12, 2001.

[e] Total xylenes calculated by using the formula: total xylenes concentration = (m, p-xylene concentration) + (o-xylene concentration).

[f] The laboratory reported that the DRO concentration is due to overlap from the gasoline range.

[g] The laboratory reported that the pattern of chromatogram peaks from the sample were not indicative of diesel.

Table 3
Groundwater Sample Analytical Results - Natural Attenuation Parameters
Former Arco Service Station #0855
Longview, Washington

Sample Location	Sample Date	Nitrate[a] (mg/L)	Sulfate[b] (mg/L)	Dissolved Methane[c] (mg/L)	Dissolved Oxygen[d] (mg/L)	Dissolved Manganese[e] (mg/L)	Dissolved Ferrous Iron[f] (mg/L)	Alkalinity[g] (mg/L $CaCO^3$)	Oxidation-reduction potential[h]
Shallow Wells									
MW-5	12/12/07	12.2	969	0.6	0.2	2.9	5.0	10.3	119
	03/13/08	2.3	341	<0.007	0.4	2.5	3.3	19.3	-123
	07/02/08	0.5	275	0.5	0.1	1.4	NM	80.8	10.0
	10/02/08	0.6	288	0.5	1.7	1.9	2.9	106	92.8
	09/03/09	<0.1	202	0.3	0.6	1.4	4.6	49.4	-67.4
	09/14/10	0.07	202	0.03	3.5	1.7	2.2	37.8	33.7
	09/14/11	<0.01	129	0.1	0.2	1.3	4.2	63.8	30.4
	09/11/12	NA	89.4[i]	0.04	0.3	NA	NM	NA	3.4
MW-8	12/12/07	<0.01	4.8	0.1	1.9	0.5	1.7	33.3	248
	03/13/08	<0.2	6.6	0.001	0.7	0.4	2.1	57.6	-140
	07/01/08	<0.1	14.0	2.0	0.2	0.4	NM	73.0	-78.9
	10/01/08	<0.1	15.9	1.1	1.3	0.5	3.6	74.1	-49.3
	09/03/09	<0.1	0.1	1.5	0.7	0.4	4.4	67.4	-110.3
	09/14/10	0.02	1.4	0.3	2.8	0.5	3.2	75.9	-70.6
	09/14/11	0.03	<1.0	1.5	0.2	0.4	4.2	80.0	-71.6
	09/12/12[j]	NA	2.5[i]	1.4	0.5	NA	NM	NA	-95.7
MW-9	12/12/07	0.5	5.0	0.0008	4.0	0.004	<0.1	40.1	237
	03/13/08	0.5	8.5	3.3	3.2	0.01	0.6	39.7	-33.5
	07/02/08	1.2	36.4	<0.0007	2.2	0.02	NM	80.2	85.6
	10/02/08	0.3	8.0	0.004	2.8	0.4	0.6	51.6	135
	09/03/09	0.3	9.3	0.010	1.9	0.5	0.4	52.9	-123
	09/14/10	1.8	25.2	0.02	4.1	0.01	<0.1	118	39.3
	09/14/11	0.09	6.1	0.01	0.4	1.6	<0.1	82.0	57.2
	09/12/12	NA	6.1[i]	0.04	1.0	NA	NM	NA	40.6
MW-10	12/12/07	0.04	74.9	6.5	3.0	2.4	2.0	174	294
	03/13/08	<0.2	186	1.8	2.1	2.2	3.1	160	-117
	07/02/08	<0.2	199	7.3	0.1	3.3	NM	232	15.2
	10/02/08	<0.1	69.0	1.7	1.3	2.1	3.0	181	111
	09/03/09	<0.1	34.3	7.9	1.3	1.4	3.0	180	111
	09/14/10	0.2	11.3	0.9	2.4	1.6	3.0	122	-24.6
	09/14/11	0.03	1.3	1.5	0.4	1.2	2.0	172	-81.6
	09/12/12[j]	NA	3.7[i]	3.0	0.4	NA	NM	NA	-153.1
MW-11	12/12/07	0.8	643	0.1	0.6	1.8	3.8	28.4	200
	03/13/08	0.4	199	<0.0007	0.6	2.5	1.4	45.1	-81.5
	07/02/08	0.04	162	0.2	0.2	1.0	NM	89.4	25.4
	10/02/08	<0.1	89.5	0.4	1.5	1.8	2.4	138	27.1
	09/03/09	<0.1	82.6	0.6	0.7	1.6	4.4	126	-88.1
	09/14/10	0.3	86.4	0.03	1.5	1.2	2.7	112	-67.4
	09/14/11	0.03	112	0.4	0.3	1.6	2.0	180	-48.4
	09/11/12	NA	103[i]	0.1	0.5	NA	NM	NA	-58.2
MW-12	12/12/07	37.0	1,500	0.2	0.7	5.3	3.8	6.9	178
	03/13/08	27.5	1,060	0.0009	0.8	6.8	<0.1	58.8	-147
	07/02/08	<0.1	204	0.5	0.2	8.3	NM	52.3	83.7
	10/02/08	0.4	1,280	0.3	0.9	11.3	<0.1	91.8	141
	09/03/09	<0.1	882	0.8	1.7	11.5	1.2	146	-117
	09/14/10	0.02	547	0.03	2.8	6.6	<0.1	187	32.7
	09/14/11	<0.01	912	0.2	0.6	8.1	0.4	226	55.3
	09/12/12	NA	453[i]	0.1	0.4	NA	NM	NA	13.9

Table 3
Groundwater Sample Analytical Results - Natural Attenuation Parameters
Former Arco Service Station #0855
Longview, Washington

Sample Location	Sample Date	Nitrate[a] (mg/L)	Sulfate[b] (mg/L)	Dissolved Methane[c] (mg/L)	Dissolved Oxygen[d] (mg/L)	Dissolved Manganese[e] (mg/L)	Dissolved Ferrous Iron[f] (mg/L)	Alkalinity[g] (mg/L $CaCO^3$)	Oxidation-reduction potential[h]
Shallow Wells (continued)									
MW-13	12/12/07	31.7	1,590	0.04	NM	8.7	<0.1	70.7	236
	03/13/08	21.5	1,540	0.005	0.6	9.1	<0.1	218	-113
	07/03/08	4.5	1,420	0.007	0.1	9.8	NM	133	21.9
	10/02/08	1.9	1,800	0.02	1.3	16.3	<0.1	152	376
	09/03/09	<0.1	805	0.1	0.6	11.3	0.2	96	-66.8
	09/14/10	0.07	1,038	0.05	2.2	9.8	<0.1	74.2	64.8
	09/14/11	<0.01	775	0.01	0.5	6.0	<0.1	71.0	94.1
	09/11/12	NA	542[i]	0.01	0.3	NA	NM	NA	24.7
MW-14	12/12/07	16.7	1,190	0.07	2.5	9.4	0.2	16.0	215
	03/13/08	5.7	945	0.0009	2.4	7.1	1.2	57.8	-164
	07/02/08	1.0	891	<0.0007	0.3	2.4	NM	43.4	28.7
	10/01/08	0.3	879	<0.0007	1.6	1.9	<0.1	80.7	547
	09/03/09	<0.1	444	0.1	0.7	1.1	<0.1	45.4	-108
	09/14/10	0.05	294	<0.005	2.7	0.02	<0.1	24.8	91.9
	09/14/11	0.01	154	<0.005	0.4	0.004	<0.1	23.7	128.9
	09/12/12	NA	142[i]	<0.0007	0.4	NA	NM	NA	56.9
Deep Wells									
DMW-3	12/12/07	<0.05	31.8	1.6	3.8	2.8	1.0	220	256
	03/13/08	<0.2	23.4	2.5	2.0	2.6	3.0	197	-129
	07/02/08	<0.1	43.9	1.6	0.2	2.3	NM	214	-96.2
	10/01/08	<0.1	22.2	2.2	1.3	2.8	3.5	210	276
	09/03/09	<0.1	8.8	1.4	1.3	2.3	3.5	220	276
	09/14/10	0.04	<1.0	0.2	3.0	1.9	2.5	155	-114
	09/14/11	0.01	5.5	0.8	0.5	1.6	2.8	191	-65.7
	09/12/12	NA	10.7[i]	0.9	0.5	NA	NM	NA	-89.4
DMW-4	12/12/07	<0.01	22.4	10.1	0.1	2.2	3.6	174	105
	03/13/08	<0.2	297	0.0009	0.2	15.5	4.6	22.2	-137
	07/02/08	3.4	1,040	1.6	0.1	2.3	NM	65.8	-86.8
	10/02/08	<0.2	309	0.9	1.1	3.4	3.0	72.7	-18.4
	09/03/09	<0.1	24.4	4.2	1.5	1.7	4.4	178	-93.0
	09/14/10	0.03	50.6	0.4	3.4	2.1	2.2	133	-75.3
	09/14/11	0.03	106	2.1	0.3	1.2	3.0	111	-57.1
	06/15/12	NA	1.3[i]	NA	--	NA	--	NA	--
	09/11/12	NA	25.2[i]	2.4	0.4	NA	NM	NA	-109.6
	12/13/12	NA	91.1[i]	NA	0.5	NA	NM	NA	-143.8
DMW-5	12/12/07	<0.01	13.0	13.7	0.1	2.3	3.4	177	102
	03/13/08	<0.2	10.3	8.2	0.2	2.9	3.6	180	-128
	07/02/08	<0.1	42.6	8.8	0.4	2.5	NM	221	-101
	10/01/08	<0.1	7.7	5.9	1.4	2.4	NM	166	48.6
	09/03/09	<0.05	33.6	4.2	1.7	1.6	2.8	126	-318
	09/14/10	0.01	<1.0	0.3	1.5	1.7	3.0	109	-82.7
	09/14/11	0.02	32.1	2.1	0.5	1.3	2.0	118	-74.7
	09/11/12	NA	1.7[i]	5.8	0.4	NA	NM	NA	-109.9
DMW-6	12/12/07	<0.01	8.0	11.7	0.2	1.7	2.2	104	121
	03/13/08	<0.2	7.5	9.5	0.2	4.3	2.2	112	-137
	07/02/08	<0.1	54.0	7.6	0.1	2.0	NM	149	-86.1
	10/02/08	<0.1	39.0	6.4	1.1	2.0	2.6	154	-25.6
	09/03/09	<0.1	<0.1	9.5	0.5	1.7	4.2	146	-117.0
	09/14/10	0.02	1.3	0.9	1.9	1.9	5.1	124	-73.1
	09/14/11	0.02	6.3	6.8	0.5	1.9	3.0	150	-78.2
	09/12/12	NA	1.6[i]	10.4	0.4	NA	NM	NA	-103.6

Table 3
Groundwater Sample Analytical Results - Natural Attenuation Parameters
Former Arco Service Station #0855
Longview, Washington

Sample Location	Sample Date	Nitrate[a] (mg/L)	Sulfate[b] (mg/L)	Dissolved Methane[c] (mg/L)	Dissolved Oxygen[d] (mg/L)	Dissolved Manganese[e] (mg/L)	Dissolved Ferrous Iron[f] (mg/L)	Alkalinity[g] (mg/L $CaCO^3$)	Oxidation-reduction potential[h]
Deep Wells (continued)									
DMW-7	12/12/07	<0.01	23.3	9.1	0.3	3.7	3.1	158	93.6
	03/13/08	<0.2	29.6	8.3	0.4	12.4	3.0	155	-172
	07/01/08	<0.1	53.3	5.6	0.2	5.6	NM	195	-88.1
	10/01/08	<0.2	34.7	5.2	1.5	6.4	3.0	203	6.9
	09/03/09	<0.05	18.0	5.9	2.2	3.5	4.2	174	-261.0
	09/14/10	0.03	2.5	0.8	3.4	4.4	3.8	169	-93.5
	09/14/11	0.02	<1.0	6.1	0.7	4.3	5.2	236	-74.7
	09/11/12	NA	1.6[i]	8.5	0.3	NA	NM	NA	-110.1
DMW-8	12/12/07	0.01	6.2	3.8	0.2	1.9	4.4	133	109
	03/13/08	<0.2	17.6	2.0	0.3	2.1	3.1	107	-160
	07/02/08	<0.1	37.0	1.6	0.2	1.8	NM	109	-5.9
	10/02/08	<0.1	26.8	2.0	1.2	2.0	2.6	151	1,103
	09/03/09	<0.05	23.2	3.1	1.7	1.9	3.6	142	-290
	09/14/10	0.03	1.3	0.4	1.4	2.0	3.1	127	-64.6
	09/14/11	0.02	34.5	2.6	0.3	1.7	2.6	128	-79.8
	09/11/12	NA	1.9[i]	3.7	0.5	NA	NM	NA	-132.9
DMW-9	12/12/07	<0.01	55.7	27.4	0.2	1.9	5.7	270	113
	03/13/08	<0.5	32.2	19.8	0.2	3.4	3.7	355	-128
	07/03/08	<0.1	38.9	21.1	0.2	2.6	NM	406	-83.8
	10/02/08	<0.1	20.0	21.0	1.2	2.8	2.7	451	4.0
	09/03/09	<0.1	<0.1	20.6	0.7	2.1	4.2	330	-120.0
	09/14/10	0.03	<1.0	2.2	3.6	2.1	5.3	311	-89.2
	09/14/11	0.04	52.4	18.6	0.5	2.1	2.4	342	-71.8
	09/15/12	NA	<1.0[i]	NA	--	NA	--	NA	--
	09/11/12	NA	1.8[i]	20.3	0.4	NA	NM	NA	-115.6
DMW-10	12/12/07	<0.01	24.2	11.3	0.09	3.0	3.6	191	92.5
	03/13/08	<0.2	7.7	8.1	0.1	5.4	3.1	227	-94.2
	07/02/08	<0.1	27.9	11.0	0.3	4.0	NM	266	-113
	10/01/08	<0.2	5.3	11.5	1.5	4.5	4.4	271	-0.6
	09/03/09	<0.05	32.7	2.9	1.1	2.1	2.8	117	-343.0
	09/14/10	0.02	<1.0	3.7	1.2	1.7	3.9	93	-96.4
	09/14/11	0.03	59.9	3.2	0.3	1.8	3.4	132	-77.4
	06/15/12	NA	<1.0[i]	NA	--	NA	--	NA	--
	09/11/12	NA	53.9[i]	6.7	0.4	NA	NM	NA	-136.5
	12/13/12	NA	37.1[i]	NA	1.1	NA	NM	NA	-150.6

NOTES:

NM = Not measured.

NA = Not analyzed.

mg/L = milligrams per liter (ppm).

[a] Nitrate by EPA Method 353.2.

[b] Sulfate by EPA Method 375.2.

[c] Dissolved methane by EPA Method RSK 175 Modified.

[d] Dissolved oxygen by EPA Method 360.1 (field instrument reading).

[e] Dissolved manganese by EPA Method 200.8.

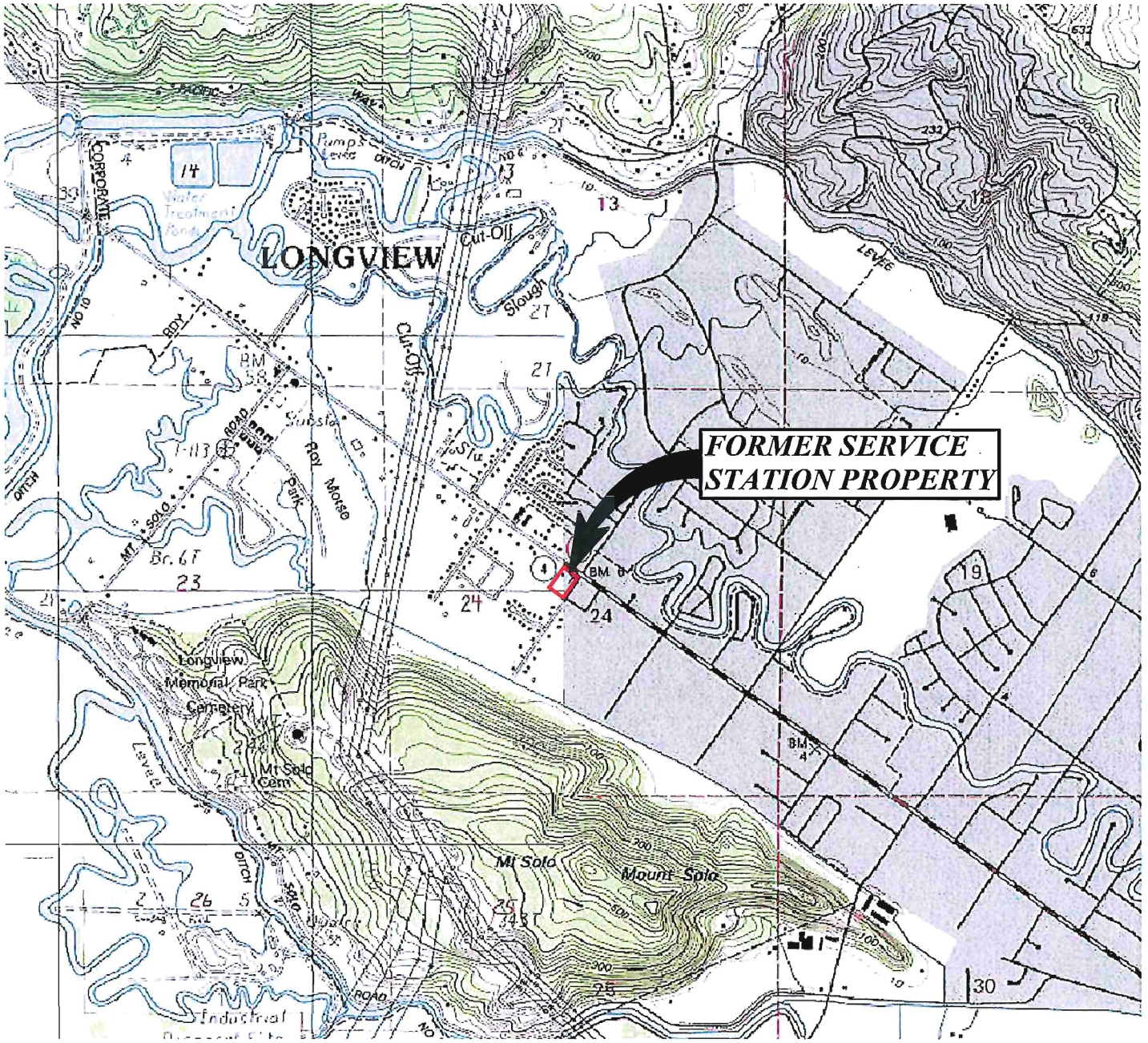
[f] Dissolved ferrous iron by Standard Method SM 3500 (field test kit).

[g] Alkalinity by Standard Method SM 2320.

[h] Oxidation-reduction potential (ORP) by EPA Method D1498-76 (field instrument reading).

[i] Sulfate by EPA Method 300.0.

FIGURES



SOURCE: USGS 7.5 Minute Quadrangles Kelso, 1970 Contour Interval 20 Feet and Abernathy Mtn., 1986 Contour Interval 20 Feet.

SLR
22122 20th AVE SE
BLDG. H, SUITE 150
BOTHELL, WA 98021
T: 425-402-8800
F: 425-402-8488

DATE	04/11
DWN.	BDT
APPR.	MDS
REVIS.	
PROJECT NO.	101.00173.00011

FIGURE 1
FORMER ARCO SERVICE STATION #0855
LONGVIEW, WASHINGTON

PROPERTY LOCATION MAP

BOON DOX MARKET

BOON DOX TAVERN

TEXACO SERVICE STATION

LEGEND

MW-5 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

MW-2 ABANDONED OR DESTROYED SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

(4.95) SHALLOW GROUNDWATER ELEVATION (IN FEET) ON DECEMBER 13, 2012

OCEAN BEACH HIGHWAY

APPROXIMATE EXTENT OF 2007 SOIL EXCAVATION

SIDEWALK

SIDEWALK

MW-10 (5.35)

MW-9 (4.95)

BUS LANE

MW-11 (4.71)

MW-3

MW-4

MW-13 (7.01)

MW-5 (5.68)

PLANTER

FORMER UNDERGROUND DISPENSER LINES

UNDEVELOPED MARSHY LAND

FORMER DISPENSER ISLAND

MW-12 (5.43)

MW-6

FORMER GASOLINE USTs

MW-2

FORMER SERVICE STATION BUILDING

PROPERTY LINE

MW-14 (6.93)

FORMER HEATING OIL UST

FORMER USED OIL UST

MW-1

MW-7

GRASS STRIP

FORMER SERVICE STATION PARCEL (SITE) BOUNDARY

UNDEVELOPED LAND

APPROXIMATE EXTENT OF 2007 SOIL EXCAVATION

PROPERTY LINE

46TH AVENUE

MW-8 (3.41)

HENRI'S RESTAURANT

0 30 60

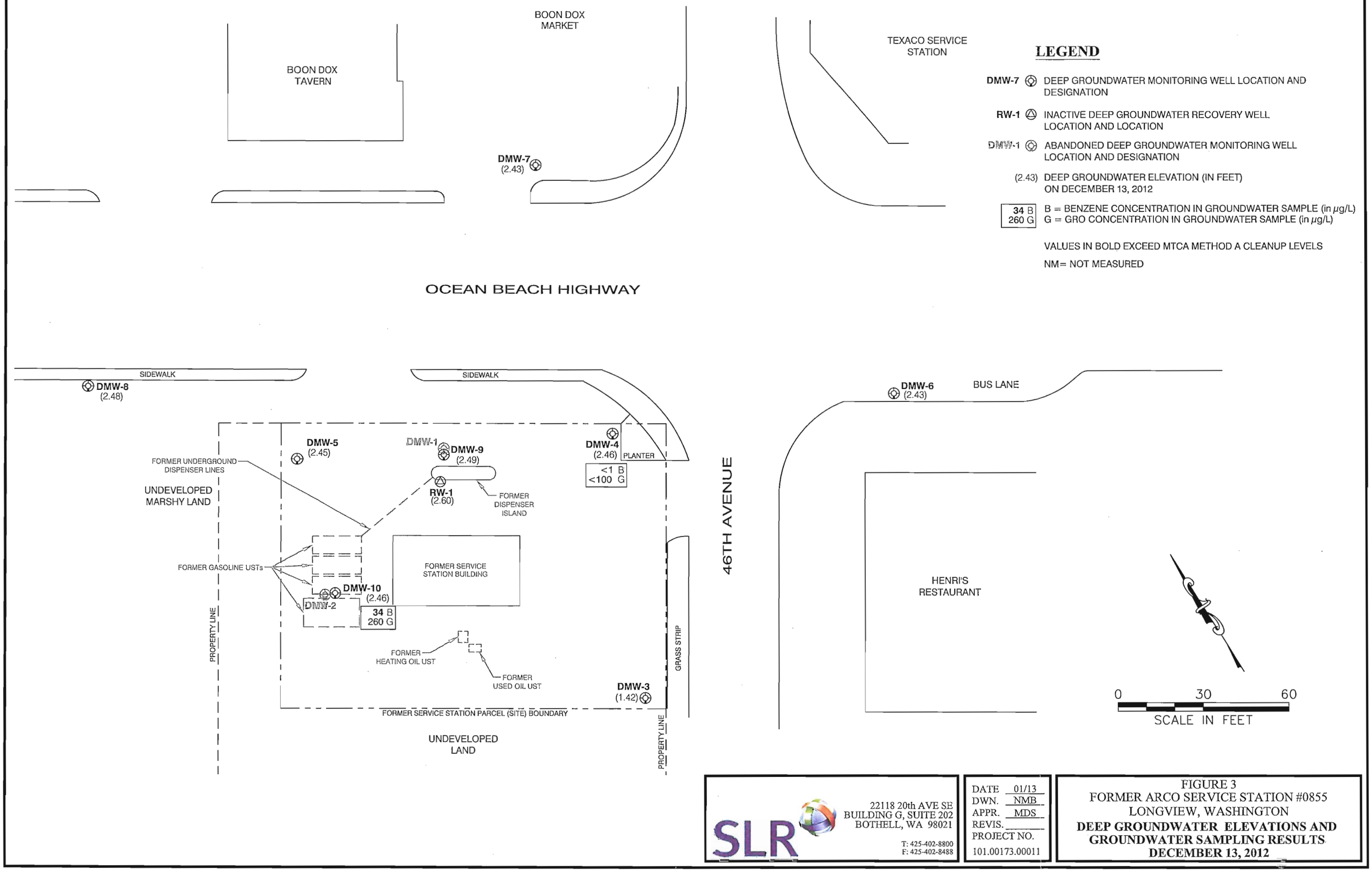
SCALE IN FEET

SLR
22118 20th AVE SE
BUILDING G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800
F: 425-402-8488

DATE 01/13
DWN. NMB
APPR. MDS
REVIS.
PROJECT NO. 101.00173.00011

FIGURE 2
FORMER ARCO SERVICE STATION #0855
LONGVIEW, WASHINGTON

SHALLOW GROUNDWATER ELEVATIONS DECEMBER 13, 2012



SLR
22118 20th AVE SE
BUILDING G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800
F: 425-402-8488

DATE 01/13
DWN. NMB
APPR. MDS
REVIS.
PROJECT NO.
101.00173.00011

FIGURE 3
FORMER ARCO SERVICE STATION #0855
LONGVIEW, WASHINGTON
DEEP GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLING RESULTS
DECEMBER 13, 2012

LABORATORY ANALYTICAL REPORTS

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
e-mail: fbi@isomedia.com

January 3, 2013

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

Dear Mr. Staton:

Included are the results from the testing of material submitted on December 14, 2012 from the Former ARCO 0855 101.00173.00011, F&BI 212278 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michele Costales Poquiz

Michele Costales Poquiz
Chemist

Enclosures
SLR0103R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 14, 2012 by Friedman & Bruya, Inc. from the SLR International Corp. Former ARCO 0855 101.00173.00011, F&BI 212278 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SLR International Corp.
212278-01	DMW4-1212
212278-02	DMW10-1212

All quality control requirements were acceptable.

In addition, the samples were sent to Analytical Resources, Inc. for sulfate analysis. The report generated by ARI is enclosed.

Date of Report: 01/03/13
Date Received: 12/14/12
Project: Former ARCO 0855 101.00173.00011, F&BI 212278
Date Extracted: 12/17/12
Date Analyzed: 12/17/12

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
DMW4-1212 212278-01	<1	<1	<1	<3	<100	90
DMW10-1212 212278-02	34	1.4	4.7	3.3	260	90
Method Blank 02-2327 MB	<1	<1	<1	<3	<100	91

Date of Report: 01/03/13
Date Received: 12/14/12
Project: Former ARCO 0855 101.00173.00011, F&BI 212278

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 212282-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	81	65-118
Toluene	ug/L (ppb)	50	90	72-122
Ethylbenzene	ug/L (ppb)	50	90	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	101	69-134

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 26, 2012

Michele Costales Poquiz
Friedman & Bruya
3012 16th Ave W
Seattle, WA 98119

RE: Project: 212278
ARI Job No.: VX04

Dear Michele:

Please find enclosed the Chain-of-Custody record (COC), sample receipt documentation, and the final data for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples on December 18, 2012, under ARI job VX04. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for Sulfate, as requested.

There were no anomalies associated with the analysis of these samples.

An electronic copy of this report and all associated raw data will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile VX04

Enclosures

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

VX04

SAMPLE CHAIN OF CUSTODY

Send Report To__Michele Costales Poquiz

Company____Friedman & Bruya, Inc.

Address_____3012 16th Ave. W.

City, State, ZIP___Seattle, WA 98119-2029

Phone #__(206) 285-8282___Fax #__(206) 283-5044

Email Address ___mpoquiz@friedmanandbruya.com

SUBCONTRACTER ARI

PROJECT NAME/NO. 212278

PO # C-185

REMARKS

☐ ELECTRONIC DATA REQUESTED

Page # 1 of 1

TURNAROUND TIME

☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL

☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Samples Received at ____ °C

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED										Notes
						Chloride	Sulfate by 300.0	Sulfide	Sieve Testing D-422	Wet Hydrometer Testing D-2216	Grain Size Distribution					
DMW4-1212		12/13/12	1214	water	1			X								
DMW10-1212		12/13/12	1247	water	1			X								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Michele Costales Poquiz	F&BI	12/18/12	12:25 PM
Received by: [signature]	A. Volgardsen	ARI	12/18/12	1520
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

VX04 : 00002

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman & Bruya | Project Name: _____

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

Assigned ARI Job No: VXO4 | Tracking No: _____ NA

Preliminary Examination Phase:

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

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 9.1

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

Cooler Accepted by: AV Date: 12/18/12 Time: 1530

Complete custody forms and attach all shipping documents

Log-In Phase:

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

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

Samples Logged by: AV Date: 12/18/12 Time: 1626

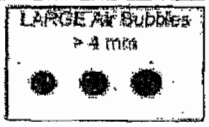
***** Notify Project Manager of discrepancies or concerns *****

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

Additional Notes, Discrepancies, & Resolutions:

C.O.C has Sulfide marked, samples logged for Sulfate. confirmed w/ client that samples should be analyzed for Sulfate. -CO

By: AV/CO Date: 12/18/12



Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Incorporated
Analytical Chemists and
Consultants

Cooler Temperature Compliance Form

VX04

Cooler#: 1	Temperature(°C): 6.1	
Sample ID	**Bottle Count**	**Bottle Type**
All samples received above 6°C		

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: AV Date: 12/18/12 Time: 1627

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VX04
Client: Friedman & Bruya
Project Event: 212278
Project Name: N/A

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	DMW4-1212	VX04A	12-25207	Water	12/13/12 12:14	12/18/12 15:20
2.	DMW10-1212	VX04B	12-25208	Water	12/13/12 12:47	12/18/12 15:20

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Sulfate by Method EPA 300.0

Data Release Authorized:
Reported: 12/26/12
Date Received: 12/18/12
Page 1 of 1

QC Report No: VX04-Friedman & Bruya
Project: 212278

Client/ ARI ID	Date Sampled	Matrix	Analysis Date & Batch	RL	Result
DMW4-1212 VX04A 12-25207	12/13/12	Water	12/21/12 122112#1	2.0	91.1
DMW10-1212 VX04B 12-25208	12/13/12	Water	12/20/12 122012#1	1.0	37.1

Reported in mg/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
VX04-Friedman & Bruya

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/26/12

Project: NA
Event: 212278
Date Sampled: NA
Date Received: NA

Analyte	Date/Time	Units	Blank
Sulfate	12/20/12 17:29	mg/L	< 0.1 U
	12/21/12 18:04		< 0.1 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
VX04-Friedman & Bruya

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/26/12

Project: NA
Event: 212278
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date/Time	Units	SRM	True Value	Recovery
Sulfate	12/20/12 17:29	mg/L	3.1	3.0	103.3%
ERA #070811	12/21/12 18:04		3.1	3.0	103.3%

SAMPLE CHAIN OF CUSTODY

Page # 1 of 1

Send Report To: MIKE STATON
Company: SLR INTERNATIONAL CORPORATION
Address: 22118 20TH AVE SE, G-202
City, State, ZIP: BOTHELL, WA 98021
Phone #: (425)402-8800 Fax #: (425)402-8188

SAMPLERS (signature):

PROJECT NAME/NO.: FORMER ARCO # 0655, LONGVIEW, WA
PO #: 101.00173.00011

REMARKS:

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Sulfate by 300.0	Notes
DMW4-1212	01 A-B	12/13/12	1214	WATER	5		X	X				X	
DMW10-1212	02 A-B	↓	1247	↓	↓		X	X				X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		CHRIS LEE	SLR	12/14/12	
Received by:	P166	JORGE LUNA	POSTAL SVC.	12/14/12	10:30
Relinquished by:					
Received by:					

Samples received at [illegible]