Blaine Mini Mart
Groundwater Monitoring
Blaine, WA

First Quarter of 2013 Sampling Summary Report

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

Toxics Cleanup Program
Headquarters
Washington State Department of Ecology
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Prepared by

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List of Acronyms

BTEX	benzene, toluene, ethylbenzene, total xylenes
CUL	cleanup level
dCAP	draft Cleanup Action Plan
Ecology	Washington State Department of Ecology
EDB	1, 2-dibromoethane (ethylene dibromide)
EDC	1, 2-dichlorethane
µg/L	micrograms per liter
MTBE	methyl-tertiary-butyl ether
MTCA	Model Toxics Control Act
NAD	North American Datum
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
TPH-G	total petroleum hydrocarbons – gasoline
TPH-Dx	total petroleum hydrocarbons – diesel and motor oil
USEPA	United States Environmental Protection Agency

1.0 Introduction

The Blaine Mini Mart is an active gas station located at 2530 Peace Portal Drive within the city limits of Blaine, Washington (Figure 1). Previously identified as 1828 Peace Portal Drive, the property is situated within a mixed commercial/residential area. The property is a half-acre triangular lot bounded by Peace Portal Drive to the southwest and Bell Road to the west. Adjacent to the property, vacant land is located to the east and northeast, and an abandoned former Rocky Mountain Trading Post building is located to the southeast. The property is entirely covered with asphalt, concrete, and other structures. The surface slopes gently to the southwest, toward Peace Portal Drive. Dakota Creek is located approximately 1,000 feet south of the property and discharges to Drayton Harbor of Puget Sound, roughly 1,500 feet southwest of the site (Environmental Associates 2005). Shallow groundwater at the site generally flows to the south-southwest, toward Dakota Creek and Drayton Harbor (SAIC 2010a).

In April and May 2011, the Washington State Department of Ecology (Ecology) performed a remedial excavation on the site (SAIC 2011), per the draft Cleanup Action Plan (dCAP) (SAIC 2010b). Following remediation, three monitoring wells were installed. Science Applications International Corporation (SAIC) has performed two rounds of groundwater monitoring at this site to obtain data to assess onsite groundwater contamination on behalf of Ecology. The first round of sampling was conducted in the third quarter of 2012 on July 24, 2012 (SAIC 2012b), and the second round was conducted in the first quarter of 2013 on March 6, 2013. The locations of the groundwater monitoring and observation wells are presented in Figure 2.

This document provides information regarding the sampling locations and presents the results for the second round of sampling. Descriptions of the sample collection and handling procedures, analytical methods, data quality objectives, and quality assurance/quality control (QA/QC) requirements for this study are presented in the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) (SAIC 2012a).

The field activities and results are summarized in the following sections.

2.0 Field Sampling

As the second round of sampling, the first quarter of 2013 semi-annual groundwater monitoring event was conducted by SAIC on March 6, 2013. The well depths, depths to groundwater, elevation (relative to site datum), and coordinates are listed in Table 1. Groundwater monitoring field forms are provided in Appendix A.

Groundwater elevation (relative to site datum) ranged from 39.78 feet (MW-8) to 41.63 feet (MW-6). Shallow groundwater flowed in the south-southeast direction. The hydraulic gradient during this sampling event was approximately 0.023 foot per foot (ft/ft). Only the three groundwater monitoring wells were used to calculate the hydraulic gradient. The groundwater elevation measurement in the observation well OW-1 was not included in the calculation because it is not considered a representative monitoring well and the well casing was found uncapped inside an unsealed well vault containing a significant amount of water. Groundwater elevation contours are presented in Figure 3.

Table 1. Sampling Locations

Well ID	Depth of Well (in feet from top of casing)	Depth to Water (feet)	Elevation of Well Casing (feet)	Groundwater Elevation (feet)	Northing	Easting
MW-6	17.08	1.60	43.23	41.63	726374.01	1185408.25
MW-7	16.77	1.33	42.57	41.24	726341.51	1185386.48
MW-8	19.59	2.05	41.83	39.78	726294.58	1185432.36
OW-1	12.51	1.60	42.18	40.58	726315.94	1185479.26

Note: Data are measured to the north rim of the monitoring wells.
Coordinates are in the WA State coordinate system North Zone NAD 1983.

Observation well OW-1 was originally intended to be sampled during the first round of groundwater monitoring in July 2012; however, it was successfully located, monitored, and sampled during this round of sampling instead. There were no other field deviations.

All three observation wells (OW-1, OW-2, and OW-3) were found uncapped with open casings inside unsealed vaults, where a significant amount of water was observed inside. Strong hydrocarbon odors were observed inside the well vaults of observation wells OW-2 and OW-3. A sheen was observed in observation wells OW-1 and OW-2.

3.0 Groundwater Results

Groundwater samples were collected from the three monitoring wells and one observation well (Table 1) on March 6, 2013, and submitted to Test America in Tacoma, Washington, for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX); 1,2-dibromoethane (EDB); 1,2-dichlorethane (EDC); methyl-tertiary-butyl ether (MTBE); naphthalene; 1-methylnapthalene; 2-methylnapthalene; total petroleum hydrocarbons – gasoline (TPH-G); and total petroleum hydrocarbons – diesel and motor oil (TPH-Dx). The laboratory reports and chain-of-custody forms are provided in Appendix B.

No chemicals were detected in any of the samples collected from the groundwater monitoring wells MW-6, MW-7, and MW-8. Similarly, no chemicals were detected in any of the samples collected from the groundwater monitoring wells in the first round of sampling in July 2012 (SAIC 2012b).

The sample collected from observation well OW-1 had detected concentrations of 1-methylnaphthalene (0.12 µg/L), total naphthalenes (0.12 µg/L), and TPH-diesel (250 µg/L), although these detected concentrations were below cleanup levels (CULs). Sample analysis results are summarized and presented in Table 2.

All analytical results were independently validated by EcoChem, Inc. of Seattle, Washington. EcoChem performed a summary level EPA Stage 2B data validation following U.S. Environmental Protection Agency (USEPA) guidance (USEPA 2008, 2009) on all data. The laboratory received three sample coolers with measured temperatures greater than the upper control limit of 6.0°C, at 6.6°, 6.8° and 6.9°C; however, these temperature outliers did not impact data quality. Three analytical results were J-qualified as estimated for the following reasons: the recovery of a continuing calibration verification sample was below control limits (TPH-gasoline in MW-6-030613), a sample surrogate recovery was below control limits (toluene in MW-6-030613), and the chromatographic pattern for TPH-diesel in sample OW-1-030613 did not match the pattern of the calibration standard. No data were rejected during data validation; all results are acceptable for use, as qualified. Analytical results are presented in Table 2 and the data validation report is provided in Appendix C. No additional monitoring is planned at this time.

Table 2. Groundwater Analytical Results

Chemical	Unit	CULs	MW-6-030613	MW-7-030613	MW-8-030613	OW-1-030613	Trip Blank
Volatile Organic Compounds							
1,2-Dibromoethane (EDB)	µg/L	0.01[a]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane (EDC)	µg/L	4[b]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	µg/L	2.6[b]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	700[a]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m, p-Xylene	µg/L	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl t-butyl ether	µg/L	20[a]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	µg/L	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1,000[a]	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U
Total Xylenes	µg/L	900[b]	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalenes							
1-Methylnaphthalene	µg/L	-	0.095 U	0.10 U	0.098 U	**0.12**	na
2-Methylnaphthalene	µg/L	-	0.12 U	0.13 U	0.13 U	0.13 U	na
Naphthalene	µg/L	-	0.095 U	0.10 U	0.098 U	0.1 U	na
Total Naphthalenes	µg/L	160[a]	0.12 U	0.13 U	0.13 U	**0.12**	na
Petroleum Hydrocarbons							
TPH-Gasoline	µg/L	800[a]	50 UJ	50 U	50 U	50 U	50 U
TPH-Diesel	µg/L	500[a]	120 U	130 U	120 U	**250 J**	na
TPH-Motor oil	µg/L	500[a]	250 U	250 U	240 U	250 U	na

Detections are **bold**
[a] MTCA Method A CUL
[b] Site-Specific CUL
CUL = cleanup level
MTCA = Model Toxics Control Act
na = not analyzed
TPH – total petroleum hydrocarbons
U = not detected at reporting limit shown
UJ = not detected at estimated reporting limit shown
J = the associated numerical value is the approximate concentration of the analyte in the sample

4.0 References

Environmental Associates, Inc. 2005. Subsurface Sampling and Testing Blaine Mini Mart (Gas Station and Convenience Store). December 08, 2005.

SAIC. 2010a. Site Characterization Report, Blaine Mini Mart, Blaine, Washington. Submitted to Ecology, July 21, 2010.

SAIC. 2010b. Draft Cleanup Action Plan, Blaine, Washington, Submitted to Ecology, September 14, 2010.

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SAIC. 2012b. Blaine Mini Mart Groundwater Monitoring, Blaine, Washington, Third Quarter of 2012 Sampling Summary Report, Submitted to Ecology, October 2012.

USEPA, Office of Emergency and Remedial Response. June 2008. *USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review*. EPA-540-R-08-01. Washington, DC.

USEPA, Office of Emergency and Remedial Response. January 2009. *Guidance for labeling externally validated laboratory analytical data for Superfund use.* EPA-540-R-08-005. Washington, DC.

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Figures

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State of Washington

Figure 1. Location Map for the Blaine Mini Mart Site

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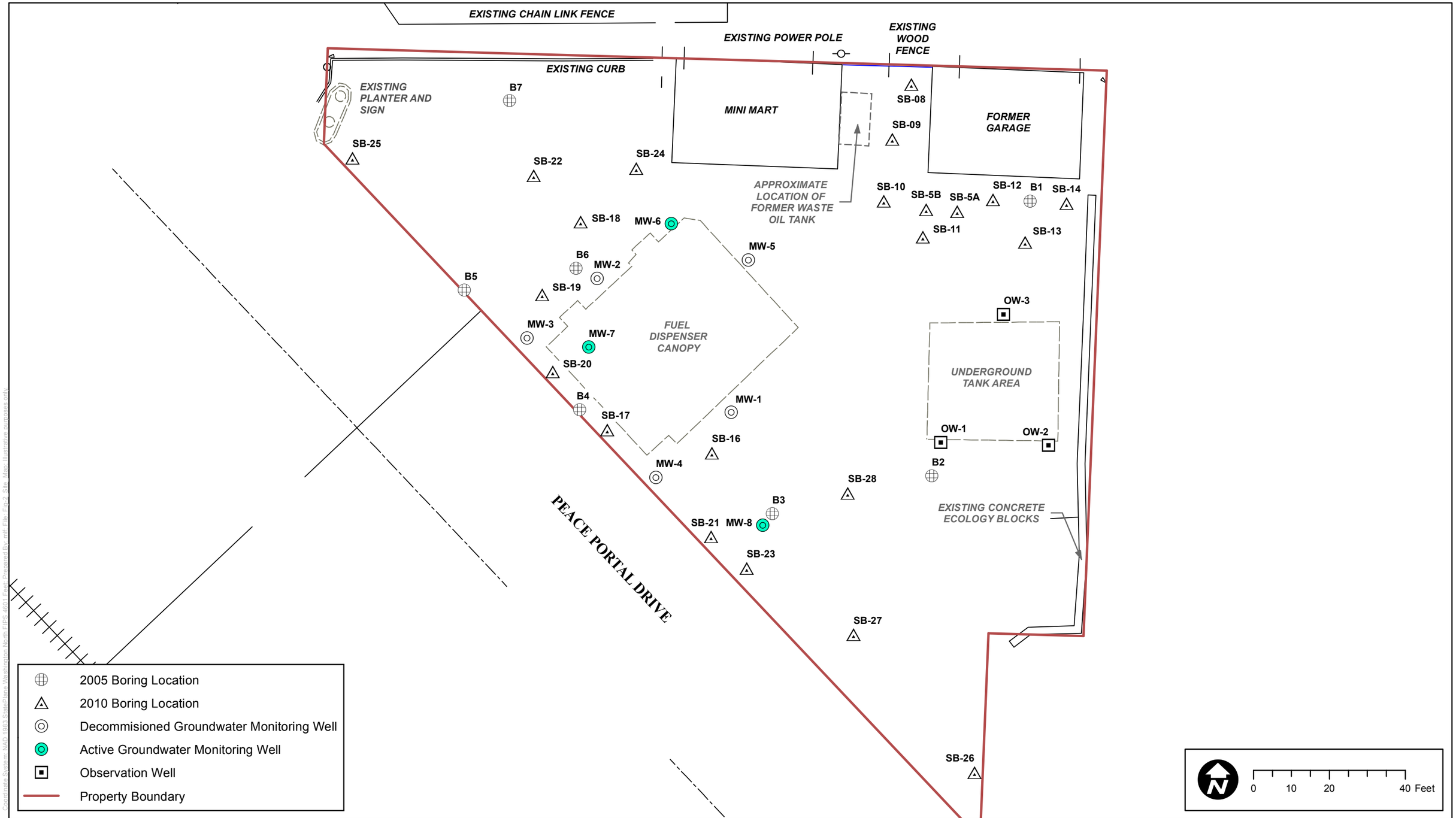

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Prepared By: mlf File: Fig 2 Site Map Illustrative purposes only

DEPARTMENT OF ECOLOGY
State of Washington

Figure 2. Site Map

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EXISTING CHAIN LINK FENCE

EXISTING POWER POLE

EXISTING WOOD FENCE

EXISTING CURB

EXISTING PLANTER AND SIGN

42.00

MINI MART

FORMER GARAGE

41.50

APPROXIMATE LOCATION OF FORMER WASTE OIL TANK

41.63

MW-6

41.00

FUEL DISPENSER CANOPY

OW-3

MW-7

41.24

40.50

UNDERGROUND TANK AREA

OW-1

OW-2

40.00

PEACE PORTAL DRIVE

MW-8

39.78

39.50

EXISTING CONCRETE ECOLOGY BLOCKS

Active Groundwater Monitoring Well

Observation Well

Property Boundary

Perched Groundwater Table Contour (Dashed Where Inferred)

39.75 Approximate Groundwater Elevation in Feet for Contours and Monitoring Wells

Approximate Direction of Groundwater Flow

Note: OW-1 is not considered a representative monitoring well and was not used in the contour calculation.

N

0 10 20 40 Feet

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet. Prepared By: mlf. File: Fig-3_GW_Contours_Apr2013.mxd. Illustrative purposes only.

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Figure 3. Groundwater Elevation Contour Map

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Appendix A
Groundwater Sampling Field Forms

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-6-030613 **WELL ID:** MW-6

DATE/TIME: 3/6/13 1050 **WEATHER:** Overcast 45°F

ANALYSIS: COC

WELL PURGING DATA

Initial depth to water: 2.71 ft Depth of well: 17.08

Screened interval: 7.08-17.08 Volume of water in well: 4.69 gallons

Method of purging: Peristaltic Pump Purge rate: ~400 mL/3 min

Method of decontaminating: Liquinox/Dedicated Tubing

SAMPLE CONTAINER DATA:

Type	Preser-vative	Volume	No. Required	No. Filled
water	HCl	40 ml	6	6
water	HCl	1L	2	2
water	—	1L	2	2

SAMPLE METHOD: (Pump) Bailer Other______

FILTERED FOR METALS? Yes (No)

Photograph Taken? ☑

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: HCL & ice Iced ✓

[Volume of water in monitoring well (2-ich diameter PVC) = (0.655)*h'/2, h = height of water column in well]

WATER QUALITY OBSERVATIONS DURING PURGING ±3%

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	±0.1 pH	Conductivity (µS/cm)	D.O. (mg/L) 10%	~~Redox~~ ORP (mV) 10 mV	Turbidity (NTU) ±10%
3/6/13 1012		2.72	9.56	7.22	935	~~56.3~~ 3.78	48.2	5.4
3/6/13 1015		2.75	9.68	7.31	938	3.36	41.1	4.8
1018		2.75	9.79	7.31	939	2.84	31.5	4.2
1021	400 ml/3 min rate=	2.75	9.85	7.35	940	2.53	23.5	3.7
1024		2.75	9.89	7.36	938	2.15	16.7	3.3
1027		2.76	9.97	7.36	938	1.95	12.7	2.9
1030		2.75	10.03	7.37	937	1.83	9.3	2.4
1033	1¼ Gallons	2.75	10.12	7.38	936	1.80	6.2	2.2
1036		2.76	10.19	7.38	935	1.68	3.9	1.9
1039		2.79	10.20	7.37	934	1.59	1.3	1.6
1042		2.80	10.22	7.40	934	1.49	-0.4	1.4
1045		2.76	10.26	7.38	3-6-13 CHW ~~935~~ 935	1.44	1.2	1.1
1048	1¾ Gallons	2.75	10.05	7.38	936	1.41	2.6	1.0
1050	Sample Collected (MW-6-030613)							

3/4 gallon total

CHW 3/6/13

2.81 @ end of sampling

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	Redox (mV)	Turbidity (NTU)

Comments:

Signature: [signature] Date/Time: 3/6/13 1100

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-7-030613 **WELL ID:** MW-7

DATE/TIME: 3/6/13 1338 **WEATHER:** Overcast 45°F

ANALYSIS: COC

WELL PURGING DATA CHW 3-6-13

Initial depth to water: ~~6.68 ft~~ 2.68 ft Depth of well: 16.77'

Screened interval: 6.77 - 16.77 Volume of water in well: 4.61 gallons

Method of purging: Peristaltic Pump Purge rate: 400 mL/3 min

Method of decontaminating: Liquinox/Dedicated Tubing

SAMPLE CONTAINER DATA:

SAMPLE METHOD: (Pump) Bailer Other_____

FILTERED FOR METALS? Yes (No)

Type	Preser-vative	Volume	No. Required	No. Filled
~~Water~~	HCl	40 ml	6	6
~~Water~~	HCl	1 L	2	2
~~Water~~	—	1 L	2	2

Photograph Taken? ☑

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: HCL + Ice Iced ✓

[Volume of water in monitoring well (2-ich diameter PVC) = $\frac{(0.655)*h'}{2}$, h = height of water column in well]

WATER QUALITY OBSERVATIONS DURING PURGING

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH ±0.1	Conductivity (µS/cm) ±3%	D.O. (mg/L) ±10%	~~Redox~~ ORP (mV) ±10mV	Turbidity (NTU) +/- 10%
3-6-13 1254		2.67	9.94	5.92	280	7.59	153.4	35.9
1257 ~~1257~~ (D) 3/6/13		2.60	9.88	5.92	283	7.23	155.5	27.6
1300		2.58	9.89	5.93	284	7.16	157.5	22.6
1303		2.58	9.97	5.93	284	7.12	159	18.6
1306		2.58	9.98	5.93	284	7.08	160.6	15.9
1309		2.60	9.94	5.92	284	7.03	162.4	13.8
1312		2.59	9.93	5.92	284	6.96	163.4	12.4
1315		2.60	9.92	5.92	285	6.88	164.8	10.4
1318		2.60	9.91	5.92	286	6.80	165.8	9.4
1321	1 Gallon	2.59	9.92	5.92	286	6.75	166.2	8.3
1324		2.59	9.89	5.92	286	6.69	166.8	8.0
1327		2.59	9.86	5.93	287	6.67	167.3	7.4
1330		2.59	9.84	5.92	287	6.63	168.0	6.8
1333		2.60	9.83	5.92	288	6.64	168.4	6.5

D

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	Redox (mV)	Turbidity (NTU)
1316		2.60	9.78	5.92	288	6.66	169.1	5.6
1318 Sample Collected								
		2.70 at end of sampling						

Comments:

Signature: Mel Psl Date/Time: 3/6/13 1400

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-8-030613 **WELL ID:** MW-8

DATE/TIME: 3/6/13 **WEATHER:** Light Rain 45°F

ANALYSIS: COC

WELL PURGING DATA

Initial depth to water: 2.65 Ft Depth of well: 19.59

Screened interval: 9.59 - 19.59 Volume of water in well: 5.54 gallons

Method of purging: Peristaltic Pump Purge rate: 460 ml/3 mins

Method of decontaminating: liquinox / dedicated tubing

SAMPLE CONTAINER DATA:

SAMPLE METHOD: (Pump) Bailer Other_____

FILTERED FOR METALS? Yes (No)

Type	Preser-vative	Volume	No. Required	No. Filled
~~water~~	HCl	40 ml	6	6
water	HCl	1L	2	2
water	—	1L	2	2

Photograph Taken? ☑

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: HCL + Ice Iced ✓

[Volume of water in monitoring well (2-ich diameter PVC) = $\frac{(0.655)*h'}{2}$, h = height of water column in well]

WATER QUALITY OBSERVATIONS DURING PURGING

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH ±0.1	Conductivity (µS/cm) ±3%	D.O. (mg/L) ±10%	Redox (mV) 10 mV	Turbidity (NTU) ±10%
1430		2.90	10.15	7.22	1361	1.95	93.2	8.0
1433		2.92	10.19	7.24	1368	1.58	75.4	5.0
1436		2.99	10.30	7.25	1373	1.55	65.8	4.1
1439		3.05	10.39	7.25	1375	1.43	58.8	3.7
1442		3.04	10.44	7.25	1375	1.35	52.4	2.6
1445		3.04	10.52	7.25	1374	1.36	43.1	2.6
1448		3.01	10.49	7.26	1382	1.23	35.7	2.0
1451		3.02	10.51	7.26	1383	1.16	28.8	1.9
1454		3.05	10.66	7.26	1385	1.07	18.6	1.7
1457		3.02	10.79	7.26	1385	1.09	11.5	1.5
1500		3.11	10.87	7.26	1389	1.08	6.1	1.6
1503	1¾ Gallons	3.18	10.85	7.27	1384	1.05	-1.9	1.5
1506		3.18	10.92	7.27	1390	1.04	-8.4	1.2
1509		3.18	10.92	7.27	1389	1.03	-13.6	1.2

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	Redox (mV)	Turbidity (NTU)
1512		3.20	10.92	7.27	1371	1.01	-24.2	1.1
1515		3.14	10.95	7.28	1394	0.99	-30.6	0.6
1518	2.5	3.08	10.90	7.27	1396	0.98	-51.0	1.0
1521		3.05	10.89	7.28	1397	0.96	-65.0	0.5
1524		3.10	10.84	7.25	1397	0.95	-78.4	0.5
1527		3.12	10.96	7.25	1396	0.95	-105.5	0.4
1530		3.13	10.92	7.25	1396	0.95	-116.9	0.4
1533		3.05	10.89	7.25	1397	0.94	-124.5	0.3
1536	3.5	3.06	10.92	7.25	1398	0.93	-135.1	0.3
1540	—	~~Sample~~	MW-8-030613			collected		
		3.10 @ end of sampling						

Comments:

Signature: [signature] Date/Time: 3/6/13 1600

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: OW-1-030613 **WELL ID:** OW-1

DATE/TIME: 3/6/13 **WEATHER:** light rain, 45° F

ANALYSIS: (lab hold)

WELL PURGING DATA

Initial depth to water: 1.65 Ft Depth of well: 12.5'

Screened interval: ? Volume of water in well: 21.30 gallons

Method of purging: Peristaltic Pump Purge rate: 400 ml / 3 min

Method of decontaminating: Liquinox / ~~Peristaltic Tubing~~ NR 3/6/13

SAMPLE CONTAINER DATA:

SAMPLE METHOD: (Pump) Bailer Other_____

FILTERED FOR METALS? Yes (No)

Type	Preser-vative	Volume	No. Required	No. Filled
~~water~~	HCl	40 ml	6	6
water	HCl	1L	2	2
water	—	1L	2	2

Photograph Taken? ☑

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: HCL + ice Iced ✓

[Volume of water in monitoring well (2-ich diameter PVC) = $\frac{(0.655)*h'}{2}$, h = height of water column in well]

WATER QUALITY OBSERVATIONS DURING PURGING

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	Redox (mV)	Turbidity (NTU)
1625		1.65	8.64	6.77	58	4.22	80.2	13.0
1628		1.64	8.68	6.77	58	3.95	81.9	11.9
1631		1.64	8.63	6.76	57	3.92	86.3	11.2
1634		1.65	8.56	6.74	57	3.94	91.6	10.8
1637		1.63	8.56	6.74	56	3.90	95.5	10.7
1640		1.64	8.51	6.72	56	3.86	99.2	10.6
1642	Sample Collected							
		1.62 at end of sampling						

NF

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	Redox (mV)	Turbidity (NTU)
			NT					

Comments:

Signature: [illegible] Date/Time: 3/6/13 1730

BOOK 2
5/12/11 →

"Rite in the Rain"®
ALL-WEATHER
FIELD
No. 353

BLAINE MINI MART
CONFIRMATIONAL
SAMPLING

TASK 62 / ROMEO
GW SAMPLING

3/6/13

0915 - M. Pagel & ~~A. Wells~~ C. Wilson (IE) on site in Blaine (Mini Mart)

- discover OW-1 to be uncovered??
- [appears to be uncovered for some time..] (no cap on casing)
- opened all monitoring wells (6, 7, 8)

0940 - collected water level measurements

	DTW	T.D.
MW-6	1.60'	
MW-7	1.33'	
MW-8	2.05'	
OW-1	1.60'	12.5' (12" diam)

will collect sample from OW-1 even though there is no cap

0950 mob to MW-6

1012 - begin purging MW-6

1050 - parameters stabilized,
- MW-6-030613 collected
- MW-6-030613-MS
- MW-6-030613-MSD
- packed samples, demob equipment

1235 - mob to MW-7

1245 - begin purging MW-7

1338 - Parameters stabilized
- MW-7-030613 collected
- packed samples, demob equipment

1410 - mob to MW-8
1430 - begin purging MW-8
1500 - Conditions of OW's
* OW-1 : open casing, vault w/water
OW-2 : open casing, vault w/water, strong odor, sheen
OW-3 : open casing, vault w/water, strong odor

1540 - all parameters stabilized except for ORP/redox, which in more/less stabilized but just outside stable range, ↳ consistently
↳ MW-8-0306B collected

- Spoke with Nick Acklam/ECY Re: the OW-1 sampling, which he still wants collected, will hold at lab to wait for analysis confirmation

1600 - mob to OW-1
1615 - begin purging OW-1, Sheen observed
1642 - parameters stabilize,
- collected OW-1-0306B sample
1715 - demob, pack all samples in coolers (removed tubing) w/ ample amount of ice & padding

1730 - close drums w/decon + IDW
- close all wells
- to hardware store to get new bolt-cutter for well cap locks. (the one we brought is not sufficient)
↳ hardware store cut the locks
1800 - closed all wells w/ new locks on well casing caps.
1830 - SAIC off site

[illegible]

Appendix B
Laboratory Reports and Chain-of-Custody Forms

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 580-37398-1

Job Description: Blaine Mini Mart Groundwater Monitoring

For:
Science Applications International Corp
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Attention: Marina Mitchell

Approved for release.
Kristine Allen
Project Manager I
3/26/2013 4:58 PM

Kristine Allen
Project Manager I
kristine.allen@testamericainc.com
03/26/2013

TestAmerica Seattle is a part of TestAmerica Laboratories, Inc.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan and meet all requirements of NELAC. All data have been found to be compliant with laboratory protocol, with the exception of any items noted in the case narrative.

37398

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project Number: 207234.00.000.02.01.000
Project Name: Blaine Mini Mart Groundwater Monitoring
Project Location: Blaine, WA
Contact Name: Marina Mitchell 425.482.3310 marina.i.mitchell@saic.com
Samples Collected by: Michael Pagel and ~~Kate Lawson~~ Corey Wilson

	Sample ID	Depth	Matrix	Date	Time	# of Containers	TPH-G (NWTPH-G)	TPH-Dx (NWTPH-Dx) with silica gel cleanup	VOCs (EPA 8260)	Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (EPA 8270-SIM)	
1	MW-6-030613	na	water	3/6/13	1050	10	X	X	X	X	
2	MW-7-030613	na	water	3/6/13	1338	10	X	X	X	X	
3	MW-8-030613	na	water	3/6/13	1540	10	X	X	X	X	
4	OW-1-030613	na	water	3/6/13	1642	10	X	X	X	X	
1-5	MW-6-030613-MS	na	water	3/6/13	1050	10	X	X	X	X	
1-6	MW-6-030613-MSD	na	water	3/6/13	1050	10	X	X	X	X	
5-7	Trip Blank	na	DI water	na	na		X		X		

MP 03/09/13

Analyses / Tests

Shipping Information

Number of Shipping Containers:
Date Shipped:
Carrier:
Waybill No.:

Comments

Analyze per SAP/QAPP provided under separate cover.

Do not dispose of samples without written authorization from SAIC.

VOCs include: BTEX, EDB, EDC, MTBE

Cooler/TB Dig/IR cor 6.8°C unc 6.5°C
Cooler Dsc Lt Green/Blue @ Lab 1500
Wet/Packs Packing Bubble
AZ w/cs

Cooler/TB Dig/IR cor 7.6°C unc 7.3°C
Cooler Dsc Lt Green/Blue @ Lab 1500
Wet/Packs Packing Bubble
AZ w/cs

Cooler/TB Dig/IR cor 6.6°C unc 6.3°C
Cooler Dsc Lt Blue/white @ Lab 1500
Wet/Packs Packing Bubble
w/cs AZ

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mike Pagel	Signature:	Signature:	Signature:
Date/Time: 3 17 ~~2012~~ 13 @ 0940	Date/Time: 3/7/13 1500	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: TA-SEA	Affiliation:	Affiliation:

Corey 3/11/13

SAMPLE SUMMARY

Client: Science Applications International Corp

Job Number: 580-37398-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-37398-1	MW-6-030613	Water	03/06/2013 1050	03/07/2013 1500
580-37398-1MS	MW-6-030613	Water	03/06/2013 1050	03/07/2013 1500
580-37398-1MSD	MW-6-030613	Water	03/06/2013 1050	03/07/2013 1500
580-37398-2	MW-7-030613	Water	03/06/2013 1338	03/07/2013 1500
580-37398-3	MW-8-030613	Water	03/06/2013 1540	03/07/2013 1500
580-37398-4	OW-1-030613	Water	03/06/2013 1642	03/07/2013 1500
580-37398-5	Trip Blank	Water	03/06/2013 0000	03/07/2013 1500

METHOD SUMMARY

Client: Science Applications International Corp

Job Number: 580-37398-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (GC/MS)	TAL SEA	SW846 8260B	
Purge and Trap	TAL SEA		SW846 5030B
Semivolatile Organic Compounds (GC/MS SIM)	TAL SEA	SW846 8270C SIM	
Liquid-Liquid Extraction (Continuous)	TAL SEA		SW846 3520C
Northwest - Volatile Petroleum Products (GC)	TAL SEA	NWTPH NWTPH-Gx	
Purge and Trap	TAL SEA		SW846 5030B
Northwest - Semi-Volatile Petroleum Products (GC)	TAL SEA	NWTPH NWTPH-Dx	
Liquid-Liquid Extraction (Continuous)	TAL SEA		SW846 3520C
Silica Gel Cleanup	TAL SEA		SW846 3630C

Lab References:

TAL SEA = TestAmerica Seattle

Method References:

NWTPH = Northwest Total Petroleum Hydrocarbon

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

DATA REPORTING QUALIFIERS

Client: Science Applications International Corp Job Number: 580-37398-1

Lab Section	Qualifier	Description
GC/MS VOA		
	X	Surrogate is outside control limits
GC VOA		
	^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.
GC Semi VOA		
	Y	The chromatographic response resembles a typical fuel pattern.

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-6-030613**

Lab Sample ID: 580-37398-1
Client Matrix: Water

Date Sampled: 03/06/2013 1050
Date Received: 03/07/2013 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-131539	Instrument ID:	TAC043
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	vb00150986.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1624			Final Weight/Volume:	5 mL
Prep Date:	03/12/2013 1624				

Analyte	Result (ug/L)	Qualifier	RL
Benzene	ND		1.0
Toluene	ND		1.0
Ethylbenzene	ND		1.0
m-Xylene & p-Xylene	ND		2.0
o-Xylene	ND		1.0
Methyl tert-butyl ether	ND		1.0
EDC	ND		1.0
1,2-Dibromoethane	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	91		75 - 120
Ethylbenzene-d10	87		80 - 120
Fluorobenzene (Surr)	96		80 - 120
Toluene-d8 (Surr)	83	X	85 - 120
Trifluorotoluene (Surr)	103		80 - 120

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-7-030613**

Lab Sample ID: 580-37398-2
Client Matrix: Water

Date Sampled: 03/06/2013 1338
Date Received: 03/07/2013 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-131539	Instrument ID:	TAC043
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	vb00150992.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1754			Final Weight/Volume:	5 mL
Prep Date:	03/12/2013 1754				

Analyte	Result (ug/L)	Qualifier	RL
Benzene	ND		1.0
Toluene	ND		1.0
Ethylbenzene	ND		1.0
m-Xylene & p-Xylene	ND		2.0
o-Xylene	ND		1.0
Methyl tert-butyl ether	ND		1.0
EDC	ND		1.0
1,2-Dibromoethane	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	88		75 - 120
Ethylbenzene-d10	102		80 - 120
Fluorobenzene (Surr)	98		80 - 120
Toluene-d8 (Surr)	100		85 - 120
Trifluorotoluene (Surr)	105		80 - 120

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-8-030613**

Lab Sample ID: 580-37398-3
Client Matrix: Water

Date Sampled: 03/06/2013 1540
Date Received: 03/07/2013 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-131539	Instrument ID:	TAC043
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	vb00150994.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1825			Final Weight/Volume:	5 mL
Prep Date:	03/12/2013 1825				

Analyte	Result (ug/L)	Qualifier	RL
Benzene	ND		1.0
Toluene	ND		1.0
Ethylbenzene	ND		1.0
m-Xylene & p-Xylene	ND		2.0
o-Xylene	ND		1.0
Methyl tert-butyl ether	ND		1.0
EDC	ND		1.0
1,2-Dibromoethane	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	88		75 - 120
Ethylbenzene-d10	99		80 - 120
Fluorobenzene (Surr)	115		80 - 120
Toluene-d8 (Surr)	99		85 - 120
Trifluorotoluene (Surr)	105		80 - 120

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **OW-1-030613**

Lab Sample ID: 580-37398-4
Client Matrix: Water

Date Sampled: 03/06/2013 1642
Date Received: 03/07/2013 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-131457	Instrument ID:	TAC043
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	vb00150960.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	03/11/2013 2125			Final Weight/Volume:	5 mL
Prep Date:	03/11/2013 2125				

Analyte	Result (ug/L)	Qualifier	RL
Benzene	ND		1.0
Toluene	ND		1.0
Ethylbenzene	ND		1.0
m-Xylene & p-Xylene	ND		2.0
o-Xylene	ND		1.0
Methyl tert-butyl ether	ND		1.0
EDC	ND		1.0
1,2-Dibromoethane	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	89		75 - 120
Ethylbenzene-d10	96		80 - 120
Fluorobenzene (Surr)	94		80 - 120
Toluene-d8 (Surr)	96		85 - 120
Trifluorotoluene (Surr)	80		80 - 120

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **Trip Blank**

Lab Sample ID: 580-37398-5
Client Matrix: Water

Date Sampled: 03/06/2013 0000
Date Received: 03/07/2013 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-131539	Instrument ID:	TAC043
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	vb00150996.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1855			Final Weight/Volume:	5 mL
Prep Date:	03/12/2013 1855				

Analyte	Result (ug/L)	Qualifier	RL
Benzene	ND		1.0
Toluene	ND		1.0
Ethylbenzene	ND		1.0
m-Xylene & p-Xylene	ND		2.0
o-Xylene	ND		1.0
Methyl tert-butyl ether	ND		1.0
EDC	ND		1.0
1,2-Dibromoethane	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	92		75 - 120
Ethylbenzene-d10	100		80 - 120
Fluorobenzene (Surr)	97		80 - 120
Toluene-d8 (Surr)	98		85 - 120
Trifluorotoluene (Surr)	104		80 - 120

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-6-030613**

Lab Sample ID: 580-37398-1
Client Matrix: Water

Date Sampled: 03/06/2013 1050
Date Received: 03/07/2013 1500

8270C SIM Semivolatile Organic Compounds (GC/MS SIM)

Analysis Method:	8270C SIM	Analysis Batch:	580-131533	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-131487	Lab File ID:	16t031123011.D
Dilution:	1.0			Initial Weight/Volume:	1056.3 mL
Analysis Date:	03/12/2013 1346			Final Weight/Volume:	10 mL
Prep Date:	03/11/2013 1252			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.095
2-Methylnaphthalene	ND		0.12
1-Methylnaphthalene	ND		0.095

Surrogate	%Rec	Qualifier	Acceptance Limits
Terphenyl-d14	60		20 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-7-030613**

Lab Sample ID: 580-37398-2
Client Matrix: Water

Date Sampled: 03/06/2013 1338
Date Received: 03/07/2013 1500

8270C SIM Semivolatile Organic Compounds (GC/MS SIM)

Analysis Method:	8270C SIM	Analysis Batch:	580-131533	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-131487	Lab File ID:	16t031123014.D
Dilution:	1.0			Initial Weight/Volume:	991.5 mL
Analysis Date:	03/12/2013 1454			Final Weight/Volume:	10 mL
Prep Date:	03/11/2013 1252			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.10
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	ND		0.10

Surrogate	%Rec	Qualifier	Acceptance Limits
Terphenyl-d14	61		20 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-8-030613**

Lab Sample ID: 580-37398-3
Client Matrix: Water

Date Sampled: 03/06/2013 1540
Date Received: 03/07/2013 1500

8270C SIM Semivolatile Organic Compounds (GC/MS SIM)

Analysis Method:	8270C SIM	Analysis Batch:	580-131533	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-131487	Lab File ID:	16t031123015.D
Dilution:	1.0			Initial Weight/Volume:	1019.6 mL
Analysis Date:	03/12/2013 1516			Final Weight/Volume:	10 mL
Prep Date:	03/11/2013 1252			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.098
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	ND		0.098

Surrogate	%Rec	Qualifier	Acceptance Limits
Terphenyl-d14	58		20 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **OW-1-030613**

Lab Sample ID: 580-37398-4
Client Matrix: Water

Date Sampled: 03/06/2013 1642
Date Received: 03/07/2013 1500

8270C SIM Semivolatile Organic Compounds (GC/MS SIM)

Analysis Method:	8270C SIM	Analysis Batch:	580-131533	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-131487	Lab File ID:	16t031123016.D
Dilution:	1.0			Initial Weight/Volume:	1000.4 mL
Analysis Date:	03/12/2013 1539			Final Weight/Volume:	10 mL
Prep Date:	03/11/2013 1252			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.10
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	0.12		0.10

Surrogate	%Rec	Qualifier	Acceptance Limits
Terphenyl-d14	62		20 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-6-030613**

Lab Sample ID: 580-37398-1
Client Matrix: Water

Date Sampled: 03/06/2013 1050
Date Received: 03/07/2013 1500

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-131530	Instrument ID:	TAC003
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1554			Injection Volume:	
Prep Date:	03/12/2013 1554			Result Type:	PRIMARY

Analyte	Result (mg/L)	Qualifier	RL
Gasoline	ND	^	0.050

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	81		50 - 150
Trifluorotoluene (Surr)	104		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-7-030613**

Lab Sample ID: 580-37398-2
Client Matrix: Water

Date Sampled: 03/06/2013 1338
Date Received: 03/07/2013 1500

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-131891	Instrument ID:	TAC003
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	03/18/2013 1411			Injection Volume:	
Prep Date:	03/18/2013 1411			Result Type:	PRIMARY

Analyte	Result (mg/L)	Qualifier	RL
Gasoline	ND		0.050

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	110		50 - 150
Trifluorotoluene (Surr)	108		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-8-030613**

Lab Sample ID: 580-37398-3
Client Matrix: Water

Date Sampled: 03/06/2013 1540
Date Received: 03/07/2013 1500

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-131891	Instrument ID:	TAC003
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	03/18/2013 1433			Injection Volume:	
Prep Date:	03/18/2013 1433			Result Type:	PRIMARY

Analyte	Result (mg/L)	Qualifier	RL
Gasoline	ND		0.050

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	114		50 - 150
Trifluorotoluene (Surr)	106		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **OW-1-030613**

Lab Sample ID: 580-37398-4
Client Matrix: Water

Date Sampled: 03/06/2013 1642
Date Received: 03/07/2013 1500

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-131891	Instrument ID:	TAC003
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	03/18/2013 1456			Injection Volume:	
Prep Date:	03/18/2013 1456			Result Type:	PRIMARY

Analyte	Result (mg/L)	Qualifier	RL
Gasoline	ND		0.050

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	117		50 - 150
Trifluorotoluene (Surr)	108		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **Trip Blank**

Lab Sample ID: 580-37398-5
Client Matrix: Water

Date Sampled: 03/06/2013 0000
Date Received: 03/07/2013 1500

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-131530	Instrument ID:	TAC003
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	03/12/2013 1254			Injection Volume:	
Prep Date:	03/12/2013 1254			Result Type:	PRIMARY

Analyte	Result (mg/L)	Qualifier	RL
Gasoline	ND		0.050

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	86		50 - 150
Trifluorotoluene (Surr)	108		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-6-030613**

Lab Sample ID: 580-37398-1
Client Matrix: Water

Date Sampled: 03/06/2013 1050
Date Received: 03/07/2013 1500

NWTPH-Dx Northwest - Semi-Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-131543	Instrument ID:	SEA011
Prep Method:	3520C	Prep Batch:	580-131489	Lab File ID:	DT13581.d
Dilution:	1.0			Initial Weight/Volume:	1008.1 mL
Analysis Date:	03/12/2013 1807			Final Weight/Volume:	5 mL
Prep Date:	03/11/2013 1307			Injection Volume:	1 uL

Analyte	Result (mg/L)	Qualifier	RL
#2 Diesel (C10-C24)	ND		0.12
Motor Oil (>C24-C36)	ND		0.25

Surrogate	%Rec	Qualifier	Acceptance Limits
o-Terphenyl	91		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-7-030613**

Lab Sample ID: 580-37398-2
Client Matrix: Water

Date Sampled: 03/06/2013 1338
Date Received: 03/07/2013 1500

NWTPH-Dx Northwest - Semi-Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-131543	Instrument ID:	SEA011
Prep Method:	3520C	Prep Batch:	580-131489	Lab File ID:	DT13587.d
Dilution:	1.0			Initial Weight/Volume:	980.5 mL
Analysis Date:	03/12/2013 1931			Final Weight/Volume:	5 mL
Prep Date:	03/11/2013 1307			Injection Volume:	1 uL

Analyte	Result (mg/L)	Qualifier	RL
#2 Diesel (C10-C24)	ND		0.13
Motor Oil (>C24-C36)	ND		0.25

Surrogate	%Rec	Qualifier	Acceptance Limits
o-Terphenyl	89		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **MW-8-030613**

Lab Sample ID: 580-37398-3
Client Matrix: Water

Date Sampled: 03/06/2013 1540
Date Received: 03/07/2013 1500

NWTPH-Dx Northwest - Semi-Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-131543	Instrument ID:	SEA011
Prep Method:	3520C	Prep Batch:	580-131489	Lab File ID:	DT13589.d
Dilution:	1.0			Initial Weight/Volume:	1037.3 mL
Analysis Date:	03/12/2013 1959			Final Weight/Volume:	5 mL
Prep Date:	03/11/2013 1307			Injection Volume:	1 uL

Analyte	Result (mg/L)	Qualifier	RL
#2 Diesel (C10-C24)	ND		0.12
Motor Oil (>C24-C36)	ND		0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
o-Terphenyl	92		50 - 150

Client: Science Applications International Corp

Job Number: 580-37398-1

Client Sample ID: **OW-1-030613**

Lab Sample ID: 580-37398-4
Client Matrix: Water

Date Sampled: 03/06/2013 1642
Date Received: 03/07/2013 1500

NWTPH-Dx Northwest - Semi-Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-131543	Instrument ID:	SEA011
Prep Method:	3520C	Prep Batch:	580-131489	Lab File ID:	DT13595.d
Dilution:	1.0			Initial Weight/Volume:	989.8 mL
Analysis Date:	03/12/2013 2122			Final Weight/Volume:	5 mL
Prep Date:	03/11/2013 1307			Injection Volume:	1 uL

Analyte	Result (mg/L)	Qualifier	RL
#2 Diesel (C10-C24)	0.25	Y	0.13
Motor Oil (>C24-C36)	ND		0.25

Surrogate	%Rec	Qualifier	Acceptance Limits
o-Terphenyl	90		50 - 150

Appendix C
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

BLAINE MINI MART
1ST QTR 2013 GROUNDWATER MONITORING

Prepared for:

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EcoChem Project: C4149-3

April 18, 2013

Approved for Release

Christine L. Ransom
Technical Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for Data Validation

This report summarizes the results of validation performed on groundwater and quality control (QC) sample data for the Blaine Mini Mart Groundwater Monitoring, 1st Quarter 2013 Sampling – Blaine, Washington. All data received a summary (EPA Stage 2B) level of review. A complete list of samples is provided in the **Sample Index**.

TestAmerica, Tacoma, Washington, analyzed the samples. The analytical methods and EcoChem project chemists are listed below:

Analysis	Method of Analysis	Primary Review	Secondary Review
Volatile Organic Compounds (MTBE/BTEX)	SW8260B	Megan Failor	Eric Strout
Naphthalenes	SW8270 SIM		
Diesel and Residual Range Organics	NWTPH-Dx		
Gasoline Range Organics	NWTPH-Gx		

The data were reviewed using guidance and quality control criteria documented in the analytical method; *Blaine Mini Mart Groundwater Monitoring, Blaine, WA- Sampling and Analysis Plan and Quality Assurance Project Plan* (July 2012) and *USEPA National Functional Guidelines for Organic Data Review* (EPA, 2008).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **Appendix A**. **Appendix B** contains the Qualified Data Summary. Data validation worksheets will be kept on file at EcoChem, Inc.

All data, as qualified, are acceptable for use.

SAMPLE INDEX

Blaine MiniMart - Groundwater Monitoring 1st QTR 2013

Sample ID	Laboratory ID	VOC	SVOC	TPH-Gx	TPH-Dx
MW-6-030613	580-37398-1	√	√	√	√
MW-7-030613	580-37398-2	√	√	√	√
MW-8-030613	580-37398-3	√	√	√	√
OW-1-030613	580-37398-4	√	√	√	√
Trip Blank	580-37398-5	√		√	

DATA VALIDATION REPORT
Blaine Mini Mart - Groundwater Monitoring 1st QTR 2013
Volatile Organic Compounds by Method 8260B

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by TestAmerica, Tacoma, Washington. Refer to the **Sample Index** for a list of samples that were reviewed.

SDG	Number of Samples	Validation Level
580-37398	4 Groundwater 1 Trip Blank	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	**1**	Matrix Spikes/Matrix Spike Duplicate (MS/MSD)
1	GC/MS Instrument Performance Check	**1**	Field Duplicates
1	Initial Calibration (ICAL)	✓	Internal Standards
✓	Continuing Calibration (CCAL)	✓	Target Analyte List
1	Laboratory Blanks	**1**	Reporting Limits
1	Trip Blank	✓	Compound Identification
2	Surrogate Compounds	✓	Reported Results
✓	Laboratory Control Samples (LCS/LCSD)		

✓Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation and Holding Times

As stated in the QAPP, sample shipping coolers should arrive at the laboratory within the temperature range of 0° to 6°C. The laboratory received three sample coolers with temperatures greater than the upper control limit at 6.6°, 6.8° and 6.9°C. These temperature outliers did not impact data quality; no data were qualified.

GC/MS Instrument Performance Check

As summarized in the table below, several measured percent relative ion abundance values were outside the specified laboratory control limits for the bromofluorobenzene (BFB) instrument performance check compound analyses. However, the control limits specified in the analytical method do not include any decimal places, e.g. 15% rather than 15.00%. The reported percent relative abundance values were rounded to the same number of significant digits and all values are acceptable; no action was taken.

Tune Date	m/z	% Relative Abundance	Lab Control Limits
2/25/2013	50	14.73%	15.00-40.00% of mass 95
3/12/2013	176	101.42%	95.00-101.00% of mass 174
3/15/2013	176	94.85%	95.00-101.00% of mass 174

Initial Calibration

The percent difference value for methyl tert-butyl ether (MTBE) was greater than the 25% control limit (at 30.1%) in the initial calibration verification analyzed 2/25/13 at 20:34. This compound was not detected in any associated sample. No action was necessary based on the potential high bias.

Laboratory Blanks

To assess the impact of blank contamination on the reported results, an action level is established at five times the concentration detected in the blank (ten times for common laboratory contaminants). If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified "U" at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level or for non-detected results.

Toluene was detected in the method blank; however, it was not detected in the field samples. No qualification of data was necessary.

Trip Blanks

One trip blank was submitted. No target analytes were detected in this sample.

Surrogate Compounds

The surrogate recovery for toluene-d8 in Sample MW-6-030613 was less than the lower control limit of 85%, at 83%. Toluene was not detected in the sample; the result was estimated (UJ-13) to indicate a potential low bias. No other data were qualified as the remaining four surrogate recovery values were acceptable.

Matrix Spikes/ Matrix Spike Duplicate

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed with Sample MW-6-030613.

All recovery values were acceptable. The MS/MSD relative percent difference (RPD) value for MTBE was greater than the upper control limit of 30%, at 38%. The analyte was not detected in the parent sample, therefore; no data were qualified.

Field Duplicates

No field duplicates were collected.

Reporting Limits

The laboratory reporting limits were less than the MTCA Method A Clean Up Levels (CUL) specified in the QAPP.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. With the exception noted above, accuracy was acceptable as demonstrated by the surrogate, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and MS/MSD percent recovery values. With the exception mentioned above, precision was also acceptable as demonstrated by the LCS/LCSD and MS/MSD RPD values.

One result was estimated based on a surrogate recovery outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Blaine Mini Mart – Groundwater Monitoring 1st QTR 2013
Semivolatile Organic Compounds by 8270C-SIM

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory quality control (QC) samples. Samples were analyzed by TestAmerica, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-37398	4 Groundwater	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	✓	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
✓	Initial Calibration (ICAL)	✓	Internal Standards
✓	Continuing Calibration (CCAL)	1	Field Duplicates
✓	Laboratory Blanks	✓	Target Analyte List
1	Field Blanks	1	Reporting Limits
✓	Surrogate Compounds	✓	Compound Identification
✓	Laboratory Control Sample (LCS/LCSD)	✓	Reported Results

✓Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.

Sample Receipt, Preservation and Holding Times

As stated in the QAPP, sample shipping coolers should arrive at the laboratory within the temperature range of 0° to 6°C. The laboratory received three sample coolers with temperatures greater than the upper control limit at 6.6°, 6.8° and 6.9 °C. These temperature outliers did not impact data quality; no data were qualified.

Field Blanks

No field blanks were collected.

Field Duplicates

No field duplicates were collected.

Reporting Limits

The laboratory reporting limits were less than the MTCA Method A Clean Up Levels (CUL) specified in the QAPP.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and matrix spike/matrix spike duplicate (MS/MSD) percent recovery values. Precision was also acceptable as demonstrated by the MS/MSD relative percent difference values.

No data were qualified for any reason. All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Blaine Mini Mart – Groundwater Monitoring 1st QTR 2013
Gasoline Range Hydrocarbons by Method NWTPH-Gx

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by TestAmerica, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-37398	4 Groundwater 1 Trip Blank	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- **1** Sample Receipt, Preservation, and Holding Times
- ✓ Initial Calibration (ICAL)
- **2** Continuing Calibration (CCAL)
- ✓ Laboratory Blanks
- **1** Trip Blanks
- ✓ Surrogate Compounds
- ✓ Laboratory Control Samples (LCS/LCSD)
- ✓ Matrix Spike/Matrix Spike Duplicate (MS/MSD)
- **1** Field Duplicates
- ✓ Target Analyte List
- **1** Reporting Limits
- ✓ Compound Identification
- ✓ Reported Results

✓Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation and Holding Times

As stated in the QAPP, sample shipping coolers should arrive at the laboratory within the temperature range of 0° to 6°C. The laboratory received three sample coolers with temperatures greater than the upper control limit at 6.6°, 6.8° and 6.9 °C. These temperature outliers did not impact data quality; no data were qualified.

Continuing Calibration

The continuing calibration (CCAL) percent difference (%D) control limits for gasoline range organics (GRO) are +/-20%. The %D value in the CCAL analyzed on 3/12/2013 at 18:19 was less than the lower control limit, at -24.1%, and indicated a potential low bias. GRO was not detected in the associated sample, MW-6-030613; the reporting limit was estimated (UJ-5B).

Trip Blanks

One trip blank was submitted. No target analytes were detected in this sample.

Field Duplicates

No field duplicates were collected.

Reporting Limits

The laboratory reporting limits were less than the MTCA Method A Clean Up Levels (CUL) specified in the QAPP.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and matrix spike/matrix spike duplicate (MS/MSD) recoveries. Precision was also acceptable as demonstrated by the LCS/LCSD and MS/MSD relative percent difference values.

One result was estimated based on a CCAL %D outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Blaine Mini Mart – Groundwater Monitoring 1st QTR 2013
Diesel and Residual Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory quality control (QC) samples. Samples were analyzed by TestAmerica, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-37398	4 Groundwater	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- 1 Sample Receipt, Preservation, and Holding Times
- ✓ Initial Calibration (ICAL)
- ✓ Continuing Calibration (CCAL)
- ✓ Laboratory Blanks
- 1 Field Blanks
- ✓ Surrogate Compounds
- ✓ Laboratory Control Sample (LCS)
- ✓ Matrix Spike/Matrix Spike Duplicate (MS/MSD)
- 1 Field Duplicates
- ✓ Target Analyte List
- 1 Reporting Limits
- ✓ Compound Identification
- 2 Reported Results

✓ ***Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***
[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Receipt, Preservation and Holding Times

As stated in the QAPP, sample shipping coolers should arrive at the laboratory within the temperature range of 0° to 6°C. The laboratory received three sample coolers with temperatures

greater than the upper control limit at 6.6°, 6.8° and 6.9 °C. These temperature outliers did not impact data quality; no data were qualified.

Field Blanks

No field blanks were collected.

Field Duplicates

No field duplicates were collected.

Reporting Limits

The laboratory reporting limits were less than the MTCA Method A Clean Up Levels (CUL) specified in the QAPP.

Reported Results

The chromatogram for sample OW-1-030613 did not match the pattern of the calibration standards, indicating weathering. The diesel result for this sample was estimated (J-2).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and matrix spike/matrix spike duplicate (MS/MSD) percent recovery values. Precision was also acceptable as demonstrated by the MS/MSD relative percent difference values.

One data point was estimated because the chromatogram did not match those of the calibration standards.

All data, as qualified, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS, REASON CODES, AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS CLP low conc. H2O only	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Gasoline Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Gx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Waters: 14 days preserved 7 days unpreserved Solids: 14 Days	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 80% to 120%	Narrate if frequency not met. J(+)/UJ(-) if %R < 80% J(+) if %R >120%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Trip Blank (if required by project)	No results >RL	Action is same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned.	18
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in field blank after method and trip blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Gasoline Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Gx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10
Surrogates	Bromofluorobenzene and/or 1,4-difluorobenzene added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R >UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate outliers If required by project, qualify with J(+)/UJ(-)	9
Two analyses for one sample (e.g., dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch (≤20 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

QUALIFIED DATA SUMMARY TABLE
Blaine MiniMart - Groundwater Monitoring 1st QTR 2013

Sample ID	Laboratory ID	Method	Analyte	Result	Lab Flag	Units	DV Qualifier	DV Reason
MW-6-030613	580-37398-1	NWTHP-GX	Gasoline	0.05	U^	mg/L	UJ	5B
MW-6-030613	580-37398-1	SW8260	Toluene	1	U	ug/L	UJ	13
OW-1-030613	580-37398-4	NWTPH-DX	#2 DIESEL	0.25	Y	mg/L	J	2