Blaine Mini Mart
Groundwater Monitoring
Blaine, WA

Third Quarter of 2012 Sampling
Summary Report

FINAL

Prepared for

DEPARTMENT OF
ECOLOGY
State of Washington

Toxics Cleanup Program
Northwest Regional Office
Washington State Department of Ecology
Bellevue, Washington

Prepared by

SAIC
From Science to Solutions

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

October 2012

Table of Contents

Page

1.0 Introduction **1**

2.0 Field Activities **1**

3.0 Groundwater Results **2**

4.0 References **4**

Figures

Figure 1. Location Map for the Blaine Mini Mart Site
Figure 2. Site Map
Figure 3. Groundwater Elevation Contour Map

Tables

Table 1. Sampling Locations
Table 2. Groundwater Analytical Results

Appendices

Appendix A Groundwater Sampling Field Forms
Appendix B Laboratory Reports and Chain-of-Custody Forms
Appendix C Data Validation Report

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
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). The property is a one-half acre triangular lot bounded by Peace Portal Drive on the southwest and Bell Road to the west. Vacant land is present between the property and Interstate 5 to the north, and an abandoned former Rocky Mountain Trading Post building is located on the southeast. The property is located within a mixed commercial / residential area and was previously identified as 1828 Peace Portal Drive. The property is entirely covered with asphalt, concrete, or structures, and 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 in a south to southwest direction (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 been asked by Ecology to perform two rounds of groundwater monitoring at this site to obtain data to assess onsite groundwater contamination, if any. The locations of the monitoring wells are presented on Figure 2.

This document provides information regarding the sampling locations and presents the results for the first 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 2012).

The field activities and results are summarized in the following sections and in Table 1.

2.0 Field Activities

The third quarter of 2012 semi-annual groundwater monitoring event was conducted by SAIC from July 23 to 24, 2012. The well depths, depths to groundwater, elevation (relative to site datum), and coordinates are listed in Table 1. Groundwater monitoring field forms are presented in Appendix A.

Groundwater elevation (relative to site datum) ranged from 39.98 feet (MW-6) to 39.18 feet (MW-8). Groundwater flows south, which is consistent with the historical direction of flow. The horizontal hydraulic gradient during this sampling event was 0.009 foot per foot (ft/ft). Groundwater elevation contours are presented on 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	3.25	43.23	39.98	726374.01	1185408.25
MW-7	16.77	2.94	42.57	39.63	726341.51	1185386.48
MW-8	19.59	2.65	41.83	39.18	726294.58	1185432.36

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

No field deviations were encountered during groundwater monitoring and sampling with one exception. Observation well OW-1 could not be sampled because it was paved over and was therefore inaccessible. An attempt will be made to locate, open, and sample this observation well during the next groundwater monitoring event scheduled to occur during the first quarter of 2013.

3.0 Groundwater Results

Groundwater samples were collected from the three monitoring wells on July 24, 2012, 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 presented in Appendix B.

No chemicals were detected in any of the groundwater samples. All results were independently validated by EcoChem, Inc. of Seattle, Washington. EcoChem performed a full level EPA Stage 4 data validation following USEPA guidance (USEPA 2008, 2009). No data were qualified as a result of data validation. Analytical results are presented in Table 2 and the data validation report is presented in Appendix C.

Table 2. Groundwater Analytical Results

Chemical	Unit	CULs	MW-6-072412	MW-7-072412	MW-8-072412	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
1,2-Dichloroethane (EDC)	µg/L	4[b]	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
Ethylbenzene	µg/L	700[a]	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
Methyl t-butyl ether	µg/L	20[a]	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
Toluene	µg/L	1,000[a]	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
Naphthalenes						
1-Methylnaphthalene	µg/L	-	0.096 U	0.096 U	0.096 U	na
2-Methylnaphthalene	µg/L	-	0.13 U	0.13 U	0.13 U	na
Naphthalene	µg/L	-	0.096 U	0.096 U	0.096 U	na
Total Naphthalenes	µg/L	160[a]	0.13 U	0.13 U	0.13 U	na
Petroleum Hydrocarbons						
TPH-Gasoline	µg/L	800[a]	50 U	50 U	50 U	50 U
TPH-Diesel	µg/L	500[a]	120 U	120 U	120 U	na
TPH-Motor oil	µg/L	500[a]	240 U	240 U	240 U	na

[a] Model Toxics Control Act (MTCA) Method A CUL
[b] Site-Specific Cleanup Levels
CUL = cleanup level
MTCA = Model Toxics Control Act
na = not analyzed
TPH – total petroleum hydrocarbons

The next semi-annual groundwater monitoring event is scheduled for the first quarter of 2013.

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.

SAIC. 2011. Blaine Remedial Excavation Report, Blaine, Washington, Submitted to Ecology, August 2011.

SAIC. 2012. Blaine Mini Mart Groundwater Monitoring, Blaine, Washington, Sampling and Analysis Plan / Quality Assurance Project Plan, Submitted to Ecology, July 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.

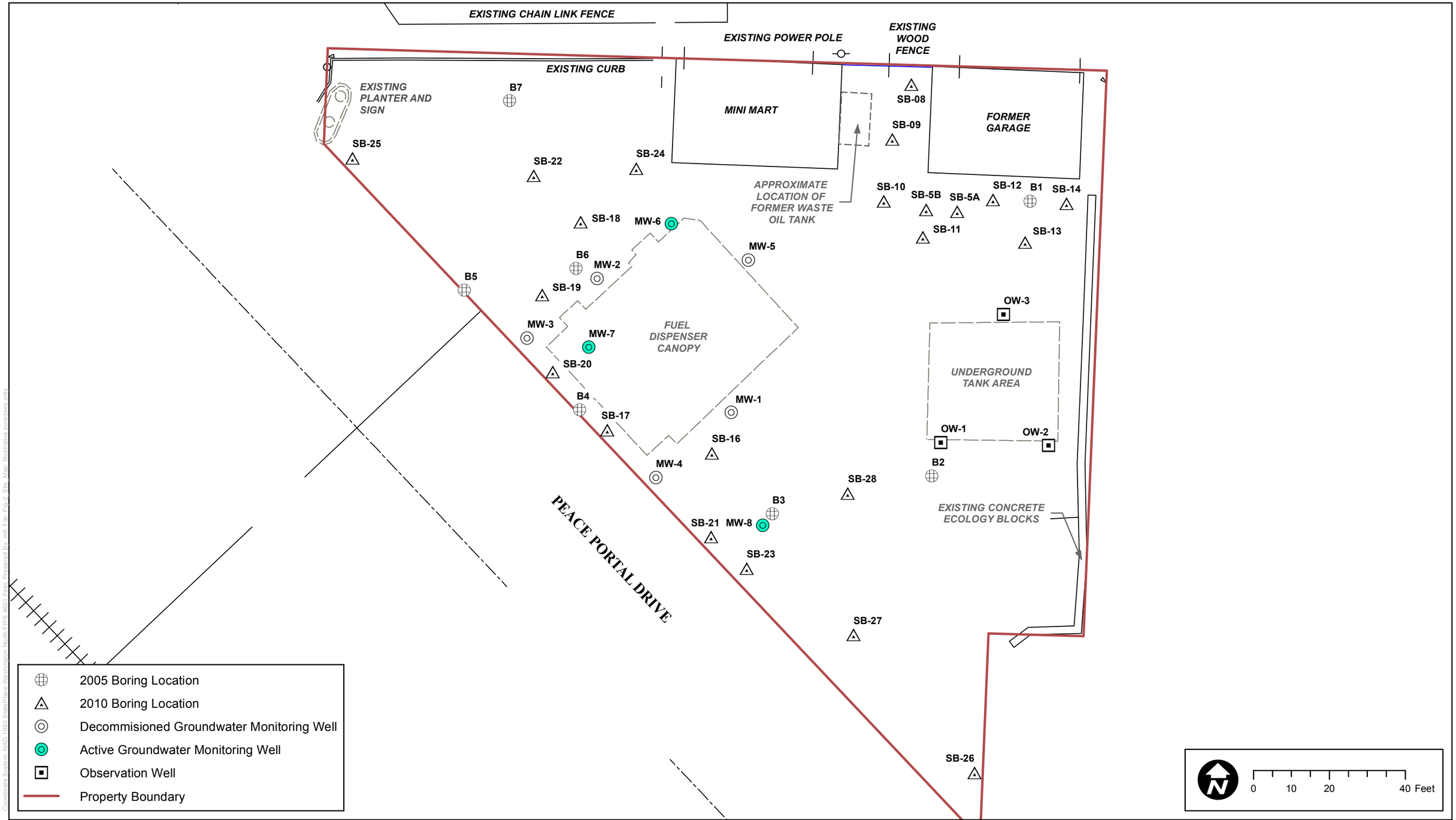
USEPA, Office of Emergency and Remedial Response. January 2009. *Guidance for labeling externally validated laboratory analytical data for Superfund use.* EPA-540-R-08-005. Washington, DC.

Figures

DEPARTMENT OF ECOLOGY
State of Washington

Figure 1. Location Map for the Blaine Mini Mart Site

SAIC®
From Science to Solutions



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

SAIC
From Science to Solutions

EXISTING CHAIN LINK FENCE

EXISTING POWER POLE

EXISTING WOOD FENCE

EXISTING CURB

EXISTING PLANTER AND SIGN

MINI MART

FORMER GARAGE

APPROXIMATE LOCATION OF FORMER WASTE OIL TANK

MW-6

40.00

39.98

39.75

MW-7

39.63

FUEL DISPENSER CANOPY

OW-3

UNDERGROUND TANK AREA

OW-1

OW-2

39.50

39.25

MW-8

39.18

EXISTING CONCRETE ECOLOGY BLOCKS

PEACE PORTAL DRIVE

39.00

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

N

0 10 20 40 Feet

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

DEPARTMENT OF ECOLOGY State of Washington

Figure 3. Groundwater Elevation Contour Map

SAIC® From Science to Solutions

Appendix A
Groundwater Sampling Field Forms

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-6-072412 **WELL ID:** MW-6

DATE/TIME: 07/24/12 **WEATHER:** PARTLY SUNNY 68°F

ANALYSIS: COC

WELL PURGING DATA

Initial depth to water: 3.25ft Depth of well: 17.08 ft

Screened interval: 7.08 to 17.08 Volume of water in well: 4.53 gallons

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

Method of decontaminating: Liquinox, Dedicate tubing

SAMPLE CONTAINER DATA: * sample collected 2ft off well bottom 5ft @

SAMPLE METHOD: (Pump) Bailer Other

FILTERED FOR METALS? Yes (No)

Type	Preser-vative	Volume	No. Required	No. Filled
Water	HCL	40mL VOA	6	6
Water	HCL	1 liter	2	2
Water	-	1 liter	2	2

Photograph Taken? ☑

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: ICE + HCL Iced ✓

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

↳ actual is ½ 0.655

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~~ ORP (mV)	Turbidity (NTU)
7/24/12 ~~1445~~ 1503	7/24/12	3.38	17.94	7.30	924	1.84	43.2	118.2
7/24/12 1506		3.41	18.00	7.28	924	1.18	36.6	103.5
7/24/12 1509		3.42	17.43	7.28	927	0.91	34.3	66.1
7/24/12 1512		3.45	17.18	7.28	925	0.79	28.3	45.1
7/24/12 1515		3.51	16.88	7.26	923	0.69	25.8	33.6
7/24/12 1518		3.43	16.92	7.24	918	0.62	23.3	21.7
7/24/12 1521	(HP) 7/24/12	3.42	17.43	7.25	917	0.54	20.4	19.0
7/24/12 1524	~~600 ml~~	3.40	17.60	7.27	919	0.53	17.4	13.1
7/24/12 1527		3.40	17.88	7.27	916	0.50	17.8	13.5
7/24/12 1530		3.42	18.18	7.28	917	0.51	17.9	13.4
sample collected @ 1535 7/24/12	3 gallons	total purged before sample collection						
			(HP)					

ORP

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

Comments: MW-6-072712

Signature: [signature] Date/Time: 7/24/12 - 1700

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-7-072412 **WELL ID:** MW-7

DATE/TIME: 7/24/12 **WEATHER:** SUNNY 70°F

ANALYSIS: COC

WELL PURGING DATA

Initial depth to water: 2.94 Depth of well: 16.77 ft

Screened interval: ~6.77 to 16.77 Volume of water in well: 4.53 gallons

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

Method of decontaminating: Liquinox / Dedicated tubing

SAMPLE CONTAINER DATA: 5 ~~4~~ (5)

* Sample collected from ~~2ft~~ off bottom of well

Type	Preser-vative	Volume	No. Required	No. Filled
water	HCL	40ml VOA	6	6
water	HCL	1 liter	2	2
water	-	1 liter	2	2

SAMPLE METHOD: (Pump) ~~Pump~~ Bailer Other_____

FILTERED FOR METALS? Yes (No)

Photograph Taken? ~~☐~~ - not taken (forgot)

Sample Entered on C.O.C.? ☑

SAMPLE PRESERVATION METHOD: Ice + HCl Iced ✓

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

↳ actual is 1/2 0.655

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~~ ORP (mV)	Turbidity (NTU)
7/24/12 1222		3.24	20.50	6.12	263	8.61	80.5	25.4
7/24/12 1225		3.27	20.56	5.98	260	8.25	84.9	25.0
7/24/12 1228		3.31	20.53	5.91	254	8.13	86.6	25.1
7/24/12 1231		3.32	20.41	5.84	250	8.38	87.2	23.7
7/24/12 1234		3.29	20.46	5.83	248	8.46	86.9	27
7/24/12 1237		3.30	20.48	5.78	247	8.40	86.3	32.5
7/24/12 1240		3.31	20.96	5.78	243	8.19	84.4	35.5
7/24/12 1243	(5) total 2L	3.26	21.36	5.88	238	8.10	77.2	28.8
7/24/12 1246	(5) ~~400ml~~	3.24	21.66	5.90	233	9.38	76.2	31.8
7/24/12 1249		3.18	21.79	5.92	236	10.09	74.8	26.3
7/24/12 1252		3.17	22.06	5.92	237	9.69	74.8	22.4
7/24/12 1255		3.21	22.43	5.93	241	9.28	73.8	18.1
7/24/12 1258		3.20	22.53	5.91	244	9.03	73.9	19.9
7/24/12 1301		3.20	21.97	5.90	249	8.81	73.1	18.8

				✓	✓	✓	ORP ✓	✓
Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	~~Redox~~ (mV)	Turbidity (NTU)
7/24/12 1304	~~400~~	3.22	21.55	5.84	247	8.47	75.2	16.1
7/24/12 1307		3.24	21.17	5.82	246	8.42	75.5	13.7
7/24/12 1311		3.24	20.91	5.81	248	8.29	75.6	10.7
7/24/12 1314		3.25	20.73	5.80	249	8.16	75.9	9.2
7/24/12 1317	mwm 7/24/12	3.25	20.83	5.79	250	7.97	76.9	8.9
7/24/12 1320		3.58	21.02	5.83	250	7.79	74.2	10.3
7/24/12 1323		3.19	21.28	5.82	252	7.53	74.6	11.5
7/24/12 1328		3.18	21.62	5.83	253	7.42	74.6	11.4
7/24/12 1331		3.20	22.02	5.86	253	7.46	74.3	12.4
7/24/12 1334		3.24	21.84	5.90	256	7.54	72.2	11.8
7/24/12 1337		3.63	21.30	5.85	252	7.78	75.3	11.9
7/24/12 1340		3.25	20.95	5.81	250	7.89	77.4	11.0
7/24/12 1344		3.20	20.94	5.80	252	7.68	77.5	10.2
7/24/12 1347		3.18	20.93	5.79	254	7.60	78.4	9.2
7/24/12 1350		3.20	21.12	5.79	254	7.52	78.0	10.1
Sample collected @ 1355 7/24/12	5 gallons (~~total~~) purged before			Sample collection				
				NP				

Comments: MW-7-072412

Signature: Mel Pgl Date/Time: 7/24/12 - 1400

GROUNDWATER SAMPLE COLLECTION FORM

Blaine Mini Mart

SAMPLE ID NO.: MW-8-072412 **WELL ID:** MW-8

DATE/TIME: 7/24/2012 **WEATHER:** CLOUDY 60°F

ANALYSIS: COC

WELL PURGING DATA

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

Screened interval: 9.59 - 19.59 Volume of water in well: 5.55 gallons

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

Method of decontaminating: Liquinox / Dedicated tubing

SAMPLE CONTAINER DATA:

* Sample collected from 5ft off bottom of well

Type	Preservative	Volume	No. Required	No. Filled
water	HCL	40ml VOA	6	6
water	HCL	1 Liter w/ 40ml VOA	2	2
water		1 Liter	2	2

SAMPLE METHOD: (Pump) Bailer Other_____

FILTERED FOR METALS? Yes (No)

Photograph Taken? ✓

Sample Entered on C.O.C.? ✓

SAMPLE PRESERVATION METHOD: ICE + HCL Iced ✓

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

↳ actual is 1/2 0.655

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~~ ORP (mV)	Turbidity (NTU)
7/24/12 0931	—	2.65	17.74	6.59	1372	5.97	122.2	13.9
7/24/12 0934	~~400 mL~~ (NR) 7/24/12	3.53	17.35	6.84	1397	4.88	115.2	14.2
7/24/12 0937		3.41	17.34 / 6.93 KL 7/24/12	6.93	1399	4.49	111.2	12.2
7/24/12 0940	~~400 mL~~ (NR) 7/24/12	3.43	17.42	6.98	1400	4.18	106.4	10.5
7/24/12 0943		3.47	17.32	7.01	1402	3.98	101.1	7.1
7/24/12 0946		3.52	17.08	7.03	1401	3.73	97.4	5.3
7/24/12 0949		3.55	16.95	7.03	1401	3.50	94.4	4.6
7/24/12 0952		3.61	16.84	7.05	1401	3.34	92.0	4.2
7/24/12 0955		3.50	16.71	7.06	1401	3.13	90.0	2.9
7/24/12 0958		3.34	16.89	7.07	1397	2.97	87.7	2.4
7/24/12 1001		3.34	17.02	7.09	1396	2.84	85.8	2.7
7/24/12 1004		3.40	17.13	7.09	1398	2.79	83.2	1.9
7/24/12 1007		3.49	17.09	7.10	1400	2.75	81.7	1.0
7/24/12 1010		3.47	17.03	7.10	1403	2.67	80.7	0.6

Date/Time	Volume Purged (gallons)	Depth to Water (ft)	Temp (°C)	pH	Conductivity (µS/cm)	D.O. (mg/L)	~~Redox~~ ORP (mV)	Turbidity (NTU)
7/24/12 1013	~~total~~ 1991P	3.51	16.91	7.09	1461	2.63	79.5	0.4
7/24/12 1016	↓	3.52	16.93	7.10	1400	2.58	78.1	0.3
7/24/12 1019		3.54	16.90	7.10	1399	2.53	76.8	0.1
7/24/12 1022		3.53	16.89	7.11	1399	2.48	76.3	0.1
7/24/12 1026		3.56	16.94	7.12	1398	2.46	73.2	-0.2
7/24/12 1029		3.58	16.85	7.12	1398	2.45	71.9	0.0
sample collected @ 1030 7/24/12	4 gallons	(total) purged before sample collection						

Comments: collected MS + MSD (triplicate) samples MW-8-072412

Signature: [signature] Date/Time: 7/24/12 - 1145

Appendix B
Laboratory Reports and Chain-of-Custody Forms

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 580-34144-1

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
8/24/2012 10:47 AM

Kristine Allen
Project Manager I
kristine.allen@testamericainc.com
08/24/2012
Revision: 1

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.

TestAmerica Laboratories, Inc.
TestAmerica Seattle 5755 8th Street East, Tacoma, WA 98424
Tel (253) 922-2310 Fax (253) 922-5047 www.testamericainc.com

CASE NARRATIVE

Client: Science Applications International Corp
Project: Blaine Mini Mart Groundwater Monitoring
Report Number: 580-34144-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 07/25/2012; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 2.5º C, 5.6º C and 5.9º C.

The container labels on two of the HCl preserved VOA vial containers for the following samples did not match the information listed on the Chain-of-Custody (COC): MW-6-072412 (580-34144-1) and MW-7-072412 (580-34144-2). Sample MW-6-072412 (580-34144-1): The container labels on two of the HCl preserved VOA vial containers list MW-6- as the sample ID. The COC lists the sample ID as MW-6-072412. Sample MW-7-072412 (580-34144-2): The container labels on two of the HCl preserved VOA vial containers list MW-7- as the sample ID. The COC lists the sample ID as MW-7-072412. In both instances, the samples were logged in according to the IDs listed on the COC.

MW-8-072412 MS and MW-8-072412 MSD are both listed on the COC as separate samples; however a sample MW-8-072412 is also listed on the COC which has been designated as the parent sample. MW-8-072412 MS and MW-8-072412 MSD have been combined into sample 3 as volume for MS/MSD for MW-8-072412 even though there are varying times for the MS and MSD samples listed on the COC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples MW-6-072412 (580-34144-1), MW-7-072412 (580-34144-2), MW-8-072412 (580-34144-3) and Trip Blank (580-34144-4) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 08/01/2012 and 08/02/2012.

No difficulties were encountered during the VOC analyses.

All quality control parameters were within the acceptance limits.

SEMIVOLATILE ORGANIC COMPOUNDS - SELECTED ION MODE (SIM)
Samples MW-6-072412 (580-34144-1), MW-7-072412 (580-34144-2) and MW-8-072412 (580-34144-3) were analyzed for Semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with EPA SW-846 Method 8270C SIM. The samples were prepared on 07/30/2012 and analyzed on 08/02/2012.

No difficulties were encountered during the SVOC SIM analyses.

All quality control parameters were within the acceptance limits.

GASOLINE RANGE ORGANICS (GRO)
Samples MW-6-072412 (580-34144-1), MW-7-072412 (580-34144-2), MW-8-072412 (580-34144-3) and Trip Blank (580-34144-4) were analyzed for gasoline range organics (GRO) in accordance with Method NWTPH-Gx. The samples were analyzed on 07/30/2012 and 07/31/2012.

The continuing calibration verification (CCV) for GRO associated with batch 580-116450 recovered above the upper control limit. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

No difficulties were encountered during the GRO analyses.

All quality control parameters were within the acceptance limits.

DIESEL AND MOTOR OIL RANGE ORGANICS

Samples MW-6-072412 (580-34144-1), MW-7-072412 (580-34144-2) and MW-8-072412 (580-34144-3) were analyzed for diesel and motor oil range organics in accordance with Method NWTPH-Dx. The samples were prepared on 07/30/2012 and analyzed on 08/01/2012.

No difficulties were encountered during the DRO analyses.

All quality control parameters were within the acceptance limits.

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-6-072412**

Lab Sample ID: 580-34144-1
Client Matrix: Water

Date Sampled: 07/24/2012 1535
Date Received: 07/25/2012 1430

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-116738	Instrument ID:	TAC001
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H0112047.D
Dilution:	1.0			Initial Weight/Volume:	10 mL
Analysis Date:	08/02/2012 0212			Final Weight/Volume:	10 mL
Prep Date:	08/02/2012 0212				

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 (EDB)	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	97		75 - 120
Ethylbenzene-d10	94		80 - 120
Fluorobenzene (Surr)	103		80 - 120
Toluene-d8 (Surr)	100		85 - 120
Trifluorotoluene (Surr)	108		80 - 120

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-7-072412**

Lab Sample ID: 580-34144-2
Client Matrix: Water

Date Sampled: 07/24/2012 1355
Date Received: 07/25/2012 1430

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-116738	Instrument ID:	TAC001
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H0112048.D
Dilution:	1.0			Initial Weight/Volume:	10 mL
Analysis Date:	08/02/2012 0236			Final Weight/Volume:	10 mL
Prep Date:	08/02/2012 0236				

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 (EDB)	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	96		75 - 120
Ethylbenzene-d10	95		80 - 120
Fluorobenzene (Surr)	102		80 - 120
Toluene-d8 (Surr)	99		85 - 120
Trifluorotoluene (Surr)	106		80 - 120

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-8-072412**

Lab Sample ID: 580-34144-3
Client Matrix: Water

Date Sampled: 07/24/2012 1030
Date Received: 07/25/2012 1430

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-116738	Instrument ID:	TAC001
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H0112049.D
Dilution:	1.0			Initial Weight/Volume:	10 mL
Analysis Date:	08/02/2012 0300			Final Weight/Volume:	10 mL
Prep Date:	08/02/2012 0300				

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 (EDB)	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	96		75 - 120
Ethylbenzene-d10	95		80 - 120
Fluorobenzene (Surr)	102		80 - 120
Toluene-d8 (Surr)	99		85 - 120
Trifluorotoluene (Surr)	107		80 - 120

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **Trip Blank**

Lab Sample ID: 580-34144-4
Client Matrix: Water

Date Sampled: 07/24/2012 0000
Date Received: 07/25/2012 1430

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	580-116738	Instrument ID:	TAC001
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H0112041.D
Dilution:	1.0			Initial Weight/Volume:	10 mL
Analysis Date:	08/01/2012 2349			Final Weight/Volume:	10 mL
Prep Date:	08/01/2012 2349				

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 (EDB)	ND		1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	99		75 - 120
Ethylbenzene-d10	99		80 - 120
Fluorobenzene (Surr)	102		80 - 120
Toluene-d8 (Surr)	101		85 - 120
Trifluorotoluene (Surr)	107		80 - 120

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-6-072412**

Lab Sample ID: 580-34144-1
Client Matrix: Water

Date Sampled: 07/24/2012 1535
Date Received: 07/25/2012 1430

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

Analysis Method:	8270C SIM	Analysis Batch:	580-116790	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-116439	Lab File ID:	SE0062795.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/02/2012 2018			Final Weight/Volume:	10 mL
Prep Date:	07/30/2012 1007			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.096
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	ND		0.096

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	78		66 - 140
Nitrobenzene-d5	77		62 - 125
Terphenyl-d14	88		20 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-7-072412**

Lab Sample ID: 580-34144-2
Client Matrix: Water

Date Sampled: 07/24/2012 1355
Date Received: 07/25/2012 1430

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

Analysis Method:	8270C SIM	Analysis Batch:	580-116790	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-116439	Lab File ID:	SE0062796.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/02/2012 2041			Final Weight/Volume:	10 mL
Prep Date:	07/30/2012 1007			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.096
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	ND		0.096

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	81		66 - 140
Nitrobenzene-d5	79		62 - 125
Terphenyl-d14	96		20 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-8-072412**

Lab Sample ID: 580-34144-3
Client Matrix: Water

Date Sampled: 07/24/2012 1030
Date Received: 07/25/2012 1430

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

Analysis Method:	8270C SIM	Analysis Batch:	580-116790	Instrument ID:	SEA016
Prep Method:	3520C	Prep Batch:	580-116439	Lab File ID:	SE0062797.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/02/2012 2103			Final Weight/Volume:	10 mL
Prep Date:	07/30/2012 1007			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Naphthalene	ND		0.096
2-Methylnaphthalene	ND		0.13
1-Methylnaphthalene	ND		0.096

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	77		66 - 140
Nitrobenzene-d5	80		62 - 125
Terphenyl-d14	93		20 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-6-072412**

Lab Sample ID: 580-34144-1
Client Matrix: Water

Date Sampled: 07/24/2012 1535
Date Received: 07/25/2012 1430

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-116574	Instrument ID:	TAC041
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	07/31/2012 1543			Injection Volume:	
Prep Date:	07/31/2012 1543			Result Type:	PRIMARY

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

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	106		50 - 150
Trifluorotoluene (Surr)	101		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-7-072412**

Lab Sample ID: 580-34144-2
Client Matrix: Water

Date Sampled: 07/24/2012 1355
Date Received: 07/25/2012 1430

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-116574	Instrument ID:	TAC041
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	07/31/2012 1605			Injection Volume:	
Prep Date:	07/31/2012 1605			Result Type:	PRIMARY

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

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	106		50 - 150
Trifluorotoluene (Surr)	104		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-8-072412**

Lab Sample ID: 580-34144-3
Client Matrix: Water

Date Sampled: 07/24/2012 1030
Date Received: 07/25/2012 1430

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-116574	Instrument ID:	TAC041
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	07/31/2012 1627			Injection Volume:	
Prep Date:	07/31/2012 1627			Result Type:	PRIMARY

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

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	107		50 - 150
Trifluorotoluene (Surr)	104		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **Trip Blank**

Lab Sample ID: 580-34144-4
Client Matrix: Water

Date Sampled: 07/24/2012 0000
Date Received: 07/25/2012 1430

NWTPH-Gx Northwest - Volatile Petroleum Products (GC)

Analysis Method:	NWTPH-Gx	Analysis Batch:	580-116450	Instrument ID:	TAC041
Prep Method:	5030B		N/A	Initial Weight/Volume:	5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	07/30/2012 1941			Injection Volume:	
Prep Date:	07/30/2012 1941			Result Type:	PRIMARY

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

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	109		50 - 150
Trifluorotoluene (Surr)	104		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-6-072412**

Lab Sample ID: 580-34144-1
Client Matrix: Water

Date Sampled: 07/24/2012 1535
Date Received: 07/25/2012 1430

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

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-116544	Instrument ID:	SEA012
Prep Method:	3520C	Prep Batch:	580-116441	Lab File ID:	CF00831.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/01/2012 0046			Final Weight/Volume:	5 mL
Prep Date:	07/30/2012 1020			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	80		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-7-072412**

Lab Sample ID: 580-34144-2
Client Matrix: Water

Date Sampled: 07/24/2012 1355
Date Received: 07/25/2012 1430

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

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-116544	Instrument ID:	SEA012
Prep Method:	3520C	Prep Batch:	580-116441	Lab File ID:	CF00832.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/01/2012 0105			Final Weight/Volume:	5 mL
Prep Date:	07/30/2012 1020			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	73		50 - 150

Client: Science Applications International Corp

Job Number: 580-34144-1

Client Sample ID: **MW-8-072412**

Lab Sample ID: 580-34144-3
Client Matrix: Water

Date Sampled: 07/24/2012 1030
Date Received: 07/25/2012 1430

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

Analysis Method:	NWTPH-Dx	Analysis Batch:	580-116544	Instrument ID:	SEA012
Prep Method:	3520C	Prep Batch:	580-116441	Lab File ID:	CF00833.D
Dilution:	1.0			Initial Weight/Volume:	1040 mL
Analysis Date:	08/01/2012 0124			Final Weight/Volume:	5 mL
Prep Date:	07/30/2012 1020			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	80		50 - 150

34144

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

	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)		Comments
1-	MW-6- 072412	na	water	7/24/12	1535	10	X	X	X	X		
2-	MW-7- 072412	na	water	7/24/12	1355	10	X	X	X	X		Analyze per SAP/QAPP
3-	MW-8- 072412	na	water	7/24/12	1030	10	X	X	X	X		provided under separate cover.
	OW-1	~~na~~	~~water~~				X	X	X	X		well not sampled
3-	MW- 8 - 072412 MS	na	water	7/24/12	1035	10	X	X	X	X		Do not dispose of samples
3-	MW- 8 - 072412 MSD	na	water	7/24/12	1040	10	X	X	X	X		without written authorization
4-	Trip Blank	na	DI water	na	na	4	X		X			

Analyses / Tests

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

from SAIC.

VOCs include:

BTEX, EDB, EDC, MTBE

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Michael Pagel	Signature: Cathy Granfield	Signature:	Signature:
Date/Time: 7/25/2012 @	Date/Time: 7/25/12 14:30	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: TA-Sea	Affiliation:	Affiliation:

08/24/2012

Page 489 of 491

Appendix C
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

BLAINE MINI MART
3rd QTR 2012 GROUNDWATER MONITORING

Prepared for:

SAIC
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

Prepared by:

EcoChem, Inc.
1011 Western Avenue, Suite 1011
Seattle, Washington 98104

EcoChem Project: C4149-2

September 7, 2012

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, 3rd QTR 2012 Sampling – Blaine, Washington. All data received a full (EPA Stage 4) level of review. A complete list of samples is provided in the **Sample Index**.

Test America, 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)	SW8260C	Julie Holder	Christine Ransom
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 Confirmational Sampling - Sampling and Analysis Plan and Quality Assurance Project Plan* (April 2011) 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**. No data were qualified for any reason. All data, as reported, are acceptable for use.

Data Validation Worksheets will be kept on file at EcoChem, Inc.

Sample Index
Blaine Mini Mart - Groundwater Monitoring 3rd QTR 2012

Sample ID	Laboratory ID	MTBE/BTEX	Naphthalenes	DRO	GRO
MW-6 072412	580-34144-1	✓	✓	✓	✓
MW-7 072412	580-34144-2	✓	✓	✓	✓
MW-8 072412	580-34144-3	✓	✓	✓	✓
TRIP BLANK	580-34144-4	✓			✓

DATA VALIDATION REPORT
Blaine Mini Mart - Groundwater Monitoring 3rd QTR 2012
Volatile Organic Compounds by Method 8260C

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 Test America, Tacoma, Washington. Refer to the **Sample Index** for a list of samples that were reviewed.

SDG	Number of Samples	Validation Level
580-34144	3 Groundwater & 1 Trip Blank	EPA Stage 4

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.

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

✓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.

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.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

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) percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD and 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 Water Monitoring 3rd QTR 2012
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 Test America, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-34144	3 Groundwater	EPA Stage 4

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.

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

✓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.

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.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

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) percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD and 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 3rd QTR 2012
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 Test America, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-34144	3 Groundwater	EPA Stage 4

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.

- ✓ 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
- ✓ Reported Results
- 1 Calculation Verification

✓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.

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.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

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 3rd QTR 2012
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 Test America, Tacoma, Washington. Refer to the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
580-34144	3 Groundwater & 1 Trip Blank	EPA Stage 4

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.

- ✓ Sample Receipt, Preservation, and Holding Times
- ✓ Initial Calibration (ICAL)
- 1 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
- 1 Calculation Verification

✓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.

Continuing Calibration

The continuing calibration (CCAL) percent difference (%D) value for gasoline range organics (GRO) in the CCAL analyzed 7/30/2012 @ 21:08 was greater than the control limit of 20% and indicated an increase in instrument response. This CCAL was associated with the Trip Blank. Gasoline range organics were not detected in the Trip Blank; no action was necessary based on the potential high bias.

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.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

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.

No data were qualified for any reason. All data, as reported, 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-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 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