

# BGES, INC.

ENVIRONMENTAL CONSULTANTS

**FORMER HANNA CAR CARE CENTER  
180 MULDOON ROAD  
ANCHORAGE, ALASKA**

**GROUNDWATER MONITORING  
REPORT**

**MAY 2015**

**Submitted to:** Mr. Tony Kim  
601 West Parks Highway  
Wasilla, Alaska 99654-6923

**Submitted by:** BGES, INC.  
1042 East 6<sup>th</sup> Avenue  
Anchorage, Alaska 99501  
Ph: (907) 644-2900  
Fax: (907) 644-2901

**TABLE OF CONTENTS**

---

1.0 INTRODUCTION .....	1
2.0 BACKGROUND .....	1
3.0 PREVIOUS SITE WORK .....	2
4.0 MARCH 2015 SAMPLING AND ANALYSIS .....	3
5.0 EVALUATION OF LABORATORY DATA.....	5
6.0 HISTORICAL LABORATORY DATA .....	6
7.0 LABORATORY DATA QUALITY REVIEW.....	6
8.0 CONCLUSIONS AND RECOMMENDATIONS .....	7
9.0 EXCLUSIONS AND CONSIDERATIONS .....	9

**FIGURES (Located at End of report)**

---

Figure 1	Property Vicinity Map
Figure 2	Monitoring Well Location and Sample Results (March 2015)
Figure 3	Groundwater Elevation Map & Flow Direction (June 2010)
Figure 4	Former UST Locations and Approximate Extent of Excavation (1999)
Figure 5	GRO/Benzene Concentrations in Saturated Zone Soil (2003)
Figure 6	DRO Concentrations in Saturated Zone Soil (2003)

**TABLES (Located at End of Report)**

---

Table 1	Monitoring Well Sampling Data (March 2015)
Table 2	Groundwater Monitoring Analytical Results (March 2015)
Table 3	Historical Groundwater Monitoring Data

**APPENDICES (Located at End of Report)**

---

Appendix A	Field Notes
Appendix B	Site Photographs
Appendix C	Groundwater Monitoring Logs
Appendix D	Laboratory Analytical Data
Appendix E	Graphs of Historical Contaminant Concentrations in Monitoring Well MW7
Appendix F	Laboratory Data Review Checklist

---

**ACRONYMS**

---

ADEC	-	Alaska Department of Environmental Conservation
AK	-	Alaska Method
AWWU	-	Anchorage Water & Wastewater Utility
BGES	-	Braunstein Geological and Environmental Services
BTEX	-	Benzene, Toluene, Ethylbenzene, and Xylenes
C	-	Celsius
DRO	-	Diesel Range Organics
EPA	-	Environmental Protection Agency
GRO	-	Gasoline Range Organics
LOQ	-	Limit of Quantitation
mg/L	-	Milligrams per Liter
ml/min	-	Milliliters per minute
QC	-	Quality Control
QP	-	Qualified Person
RPD	-	Relative Percent Difference
RS&E	-	Restoration Science & Engineering
SGS	-	SGS North America, Inc.
UST	-	Underground Storage Tank

## 1.0 INTRODUCTION

BGES, Inc. (BGES) was retained by Mr. Tony Kim, owner of the former Hanna Car Care Center, to conduct groundwater sampling at the former Hanna Car Care Center site located at 180 Muldoon Road in Anchorage, Alaska; hereafter referred to as the site (Figure 1). The purpose of this sampling was to assess the groundwater quality at the site. The fieldwork for this round of sampling was performed during March of 2015, in general accordance with our emailed authorization dated March 20, 2015. The site is an active contaminated site [Alaska Department of Environmental Conservation (ADEC) Hazard Identification Number: 23821; Event Identification Number: 95; File Number: 2100.26.204; and Reckey Number: 1989210016401].

## 2.0 BACKGROUND

The property is located in the northeast portion of Anchorage, Alaska (Figure 1). The property has operated for many years as a service station and a car wash. Fuel is no longer dispensed at the site, and the former fuel tanks were removed in 1999. A one-story building that currently serves as an auto repair shop and laundromat is located on the property. The general layout of the site is shown on Figure 2.

Numerous previous assessments have been performed by various environmental consulting firms at the site. The most recent assessments include a 2003 Site Assessment performed by Restoration Science and Engineering (RS&E) that was designed to evaluate the magnitude and extent of hydrocarbon contamination at the site. A subsequent report prepared in 2003 by RS&E, issued as a follow-up to their 2003 Site Assessment report, presented remedial options for the site. The recommended approach was to construct an air sparge/vapor extraction system. A design was then prepared for this system.

BGES was contracted in 2004 to perform a Phase I Environmental Site Assessment, which evaluated current (at that time) site conditions and summarized previous assessment work. BGES reviewed the previous assessment work performed at the site, including the recommended remedial option and associated remedial design, and provided recommended modifications to the proposed course of action. BGES recommended that another round of groundwater sampling be performed prior to determining a future course of action or implementing the proposed remediation program at the site, since groundwater sampling had not been conducted for

approximately one year. BGES performed groundwater monitoring activities in April of 2004. Ongoing groundwater monitoring activities were conducted between 2004 and the March of 2015.

In response to the report associated with the October of 2014 groundwater-monitoring event, the ADEC requested that an additional groundwater-sampling event take place to consider the site for a “cleanup complete with institutional controls” status. This report documents the results of the latest round of groundwater sampling completed in March of 2015.

### 3.0 PREVIOUS SITE WORK

RS&E and Northern Petroleum Services personnel removed four registered underground storage tanks (USTs) and five unregistered USTs in the fall/winter of 1999 at the site. Nine USTs were reported to be removed, cleaned and properly disposed of through Newell Recycling. Soil samples that exhibited concentrations of petroleum hydrocarbons in excess of the ADEC Method 2 migration to groundwater cleanup criteria, were collected from the following locations: beneath the east and west ends [approximate depth of 14.5 feet below grade (bg)] of former UST Number 9; beneath the east end (depth of 10.5 feet bg) of former UST Number 5; beneath the west end (depth of 13 feet bg) of former UST Number 7; and from the east sidewall (depth of 7 feet bg) adjacent to former UST Number 8. Excavation activities included the removal of approximately 640 gallons of fluid (water and product mixture) from the USTs and approximately 142 cubic yards of contaminated soils. RS&E reported that 22 cubic yards of the 142 cubic yards of contaminated soils were transported off-site and placed in long-term storage cells at the Hanna Car Care Center Dimond location. Approximately 120 cubic yards of contaminated soil were also stockpiled at the Muldoon property and the method of disposal was not reported by RS&E.

RS&E conducted a soil and groundwater characterization at the site during the winter and spring of 2003. The objective of the investigation was to delineate the horizontal and vertical extent of hydrocarbon-impacted soils and groundwater. Concentrations of benzene, the contaminant of concern for the site, were detected above cleanup levels in the smear zone for Soil Borings BH-5, BH-6 and Monitoring Wells MW-8, MW-9 and MW-10. Monitoring Wells MW-8 and MW-9 were advanced outside the UST excavation limits and adjacent to the north property boundary. Monitoring Well MW-10 was advanced within the UST excavation limits, approximately 25 feet

southeast of Soil Boring BH-4. Soil Borings BH-4 and BH-5 were advanced outside the limits of the excavation and approximately 20 feet northeast and 30 feet southeast of Monitoring Well MW-6, respectively. Elevated concentrations of gasoline range organics (GRO), diesel range organics (DRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in remaining soils; and grab groundwater samples were collected from within the excavations.

Groundwater sampling was performed by RS&E during February of 2003. Monitoring wells MW3 through MW11, and TW1 through TW3 (temporary monitoring wells) were sampled. The results indicated that concentrations of GRO in Monitoring Wells MW7, MW9, and MW10; and benzene in MW7 and MW9; exceeded ADEC cleanup levels. The April 2004 sampling event revealed GRO, DRO, and benzene concentrations in Monitoring Well MW7 that exceeded ADEC cleanup criteria. BGES decommissioned Monitoring Wells MW2, MW4, and MW10 by filling them with cement on June 9, 2004.

Since 2004, BGES has performed 12 groundwater sampling events using existing monitoring wells. Only Monitoring Well MW7 has consistently exhibited concentrations of GRO, DRO, and BTEX constituents exceeding the ADEC cleanup criteria, until the groundwater samples collected from Monitoring Well MW7 on October 31, 2014, which exhibited concentrations of these analytes that were below the ADEC cleanup criteria. In 2009, GRO was detected in Monitoring Well MW7 at 2.26 milligrams per liter (mg/L), which slightly exceeded the ADEC cleanup criterion of 2.2 mg/L. In 2010, GRO and benzene were detected in Monitoring Well MW7 at 4.190 mg/L and 0.00821 mg/L, respectively, which exceeded the ADEC cleanup criteria of 2.2 mg/L and 0.005 mg/L, respectively. In October of 2014, samples were collected from Monitoring Wells MW7 and MW26, and Monitoring Well MW7 was the only well to exhibit analyte concentrations above the laboratory's limits of quantitation (LOQs); these concentrations were below the ADEC cleanup criteria. During the most recent sampling event (March 2015), groundwater samples were collected from Monitoring Wells MW7 and MW26, and Monitoring Well MW7 was the only well that exhibited analyte concentrations above the laboratory's LOQs; these concentrations again were below the ADEC cleanup criteria. Details of the March 2015 sampling activities are presented below.

#### **4.0 MARCH 2015 SAMPLING AND ANALYSIS**

BGES collected groundwater samples from Monitoring Wells MW7 and MW26 on March 23,

2015 (Figure 2) in accordance with our email authorization dated March 20, 2015.

Prior to sample collection, the depths to water and the total depths of each accessible well were measured using an electronic water level indicator that was decontaminated prior to its use in each well by washing it in an Alconox (laboratory-grade detergent) solution, followed by a potable water rinse. The depth to water, the total depth of the wells, and the water quality parameters are presented in Table 1. It should also be noted that several of the wells were slightly damaged and/or exhibited evidence of frost-jacking. As such, we were not able to calculate the groundwater flow direction or gradient with any confidence for this sampling event. The groundwater elevations and flow direction calculated during the previous sampling event (June 2010), are represented on Figure 3 for reference. The water elevation measured in Monitoring Well MW26 was not utilized in developing the groundwater elevation contours, since the measurement was slightly anomalous. The groundwater flow direction was to the northwest at a relatively shallow gradient of approximately 0.001 foot per linear foot.

Prior to the collection of groundwater samples, the casing volume for each well was calculated. Groundwater was purged from each well utilizing a positive displacement bladder pump. The groundwater samples were collected from Monitoring Wells MW7 and MW26 after the water quality parameters stabilized in accordance with the ADEC Field Sampling Guidance (May 2010). During the purging activities, the stabilization parameters (pH, conductivity, oxidation-reduction potential, dissolved oxygen, and temperature) were monitored, utilizing a YSI Professional 556 Pro Multi-Parameter water quality meter and flow-through cell. During the purging and sampling activities, the bladder pump intake was set within the top six inches of the groundwater surface and the pumping rate utilized during the purging activities was approximately 150 milliliters per minute (ml/min). After completion of the purging activities, the portions of the groundwater samples scheduled for volatile analyses were collected first by filling laboratory-supplied containers that were preserved with hydrochloric acid. Care was exercised to ensure that no headspace was created within the laboratory vials, and that none of the preservative spilled from the vials destined for volatile analyses. One duplicate water sample was collected from Monitoring Well MW7 (labeled MW27-0323) and was submitted “blindly” to the laboratory for analyses. The field data gathered during purging is listed in Table 1.

The sample containers were labeled, placed in chilled coolers, and transported to SGS North

America, Inc. (SGS), an ADEC-approved laboratory for analysis, under chain of custody protocol. As a quality control measure, a trip blank sample accompanied the water samples scheduled for volatile analyses during the entire sampling and handling process.

Investigation-derived waste generated (purge water) was containerized in two five-gallon buckets, which are currently stored inside the facility. The buckets were clearly labeled with contact information for Mr. Kim and a description of the contents (potentially-contaminated water). In addition, Mr. Kim was notified of the importance of maintaining the integrity of these wastes until the analytical results were received and permission to dispose of the water was received from the ADEC. Copies of field notes are included in Appendix A; photos taken during groundwater monitoring activities are included in Appendix B; and copies of groundwater monitoring logs are included in Appendix C.

## 5.0 EVALUATION OF LABORATORY DATA

Laboratory analysis of the water samples was performed by SGS, an ADEC-approved laboratory. The analytical results for water samples are listed in Table 2 and a copy of the laboratory data is included in Appendix C. The analytical results for the water samples were compared to the ADEC Method 2 Cleanup Criteria listed in Alaska Administrative Code 75.345—Table C for groundwater.

The water samples were analyzed at SGS by the following methods: GRO by Alaska Method (AK) 101; DRO by AK 102; and BTEX by Environmental Protection Agency (EPA) Method 8021B.

The water samples collected from the site were labeled, for example, MW7-0323, where the prefix MW7 indicates the monitoring well from which the water sample was collected; and 0323 indicates the month and day the sample was collected. For brevity in the text and in the associated figures, these samples are referred to as MW7, with the date omitted.

Water Samples MW7 and MW27 (duplicate of MW7) contained concentrations of GRO at 0.307 and 0.245 mg/L, respectively, which are an order of magnitude below the applicable ADEC cleanup criterion of 2.2 mg/L for GRO. Water Samples MW7 and MW27 exhibited concentrations of benzene at 0.00186 and 0.00137 mg/L, respectively, which are below the



applicable ADEC cleanup criterion of 0.005 mg/L for benzene. Water Samples MW7 and MW27 exhibited concentrations of ethylbenzene at 0.00282 and 0.00211 mg/L, respectively, which are well below the applicable ADEC cleanup criterion of 0.7 mg/L for ethylbenzene. Water Samples MW7 and MW27 exhibited concentrations of total xylenes at 0.00503 mg/L (estimated) and 0.00364 mg/L (estimated), respectively, which are well below the applicable ADEC cleanup criterion of 10.0 mg/L for total xylenes.

Water Sample MW26 exhibited concentrations of all analytes below their respective LOQs, which were all below the applicable ADEC cleanup criteria.

Analytical results for the groundwater samples are listed in Table 2; the laboratory data are included in Appendix D, and the monitoring well locations are shown on Figure 2.

## **6.0 HISTORICAL LABORATORY DATA**

The only monitoring well that has exhibited contaminant concentrations exceeding ADEC cleanup criteria is Monitoring Well MW7. During the current sampling event, Monitoring Well MW7 exhibited concentrations of GRO, benzene, ethylbenzene, and total xylenes that were below the applicable ADEC cleanup criteria. All other analytes were non-detectable, below the LOQs. The historical laboratory data trends of Monitoring Well MW7 are summarized in Table 3 and shown on the graphs in Appendix E.

## **7.0 LABORATORY DATA QUALITY REVIEW**

Data quality was reviewed in accordance with ADEC guidance and standard industry practices. An ADEC laboratory data review checklist was completed for the laboratory work order, and this checklist is included in Appendix F. Sample analyses were provided by SGS of Anchorage, Alaska. All samples were hand-delivered to SGS by BGES personnel under chain of custody protocol.

### **Work Order 1151032**

The samples contained the proper preservatives for the requested analyses and no unusual sample conditions were noted by the laboratory. Trip blanks accompanied all volatile samples through the entirety of the sampling process and delivery to the laboratory. The case narrative for this work order noted that there were no quality control (QC) failures identified by SGS.

The temperature of the sample cooler that contained the water samples was measured at the laboratory at the time of receipt to be 2.4 degrees Celsius (°C) in Cooler Identification Number 1. The temperature in the cooler was within the prescribed optimal temperature range of 4°C +/- 2 °C.

Water Sample MW27 was a duplicate of Water Sample MW7 and was collected to evaluate sampling precision. The relative percent differences (RPDs) could not be calculated for DRO or toluene, because these analytes were not detected above the laboratory's LOQs. The RPDs for GRO, benzene, ethylbenzene, and total xylenes ranged from 14 to 20 percent and thus were below the acceptable limit of 30 percent, which indicates acceptable sampling precision for this water sampling event.

A laboratory data review checklist is provided in Appendix F.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

As described above, water samples were collected on March 23, 2015. The samples were analyzed to evaluate the current conditions of groundwater on the site. Water Samples MW7 and MW27 exhibited concentrations of GRO, benzene, ethylbenzene, and total xylenes below the applicable ADEC cleanup criteria. All other analytes in these samples, and all analytes in Monitoring Well MW26, were non-detectable below the LOQs; and all LOQs were below the applicable ADEC cleanup criteria.

The groundwater flow direction, as measured historically, was generally to the north-northwest.

All analyte concentrations in Monitoring Well MW26 have declined to non-detectable levels during the previous six (including the current sampling round) sampling events. It is therefore recommended that permission be requested from the ADEC to remove Monitoring Well MW26 from the sampling program.

All analyte concentrations in Monitoring Well MW7 have declined to levels below the applicable ADEC cleanup criteria for two consecutive monitoring events. Based on these results, it is recommended that a copy of this report be provided to the ADEC for their review and for their opinion regarding the appropriateness of discontinuing groundwater sampling at this time; and for the qualification of this site for closure with institutional controls. If the ADEC agrees that termination of the groundwater monitoring at this site is appropriate, then it is

recommended that a work plan for decommissioning the monitoring wells be prepared and presented to the ADEC for their review and approval.

Based on the information from the RS&E UST Removal and Site Characterization Report (April 1999) and the RS&E Soil and Groundwater Site Characterization Report (March 2003), which are briefly discussed above in Section 3.0, potentially-contaminated soil may be present within and outside the USTs excavation limits at the site.

The former locations of the USTs and associated piping, and the approximate limits of the 1999 excavation surrounding the former UST system are presented on Figure 4. The depth of the excavation under the former tanks ranged from approximately 12 to 14 feet bg and the depth of the excavation under the former dispenser islands ranged from 6.5 to 10.5 feet bg. The locations where previous soil samples were collected from the sidewalls and the base of the excavation are presented on Figure 4.

After the excavation of contaminated soils during 1999, the remaining benzene contamination in soils was found in the smear zone near former UST Numbers 5 through 9 along the eastern property boundary. The benzene contamination extended to and beyond the northern property boundary, at depths ranging from approximately 15 to 24 feet bg, which was below the depth of the former excavation (Figure 5). These benzene concentrations were observed in soil samples collected during the 2003 site characterization activities. In addition, the greatest GRO and benzene contamination concentrations were observed near MW7 in soils beneath the former excavation (Figure 5). Remaining DRO contamination was observed in the immediate vicinity of MW7 during the 2003 site characterization activities and remaining DRO contamination was also present at the base of the excavation beneath former UST Numbers 5 and 8 (Figure 6). The remaining contamination present during the 2003 site characterization activities are presented on Figures 5 and 6. The approximate location of the former excavation is also presented on these figures.

It is recommended that a copy of this report be provided to the ADEC for their review and for their opinion regarding the appropriateness for granting this site the status of "Cleanup Complete with Institutional Controls". It is also recommended that permission be requested from the ADEC to spread the purge water on site from the October of 2014 and the March of 2015 sampling events, or dispose of it via the sanitary sewer upon receiving permission from Anchorage Water and Wastewater Utility (AWWU).

**9.0 EXCLUSIONS AND CONSIDERATIONS**

This report presents facts, observations, and inferences based on conditions observed during the period of our project activities, and only those conditions that were evaluated as part of our scope of work. Our conclusions are based solely on our observations made in the local vicinities of the monitoring wells, which provide an indication of the environmental condition of the groundwater in the general vicinity of these wells at the site. In addition, changes to site conditions may have occurred since we completed our project activities. These changes may be from the actions of man or nature. Changes in regulations may also impact the interpretation of site conditions. BGES will not disclose our findings to any parties other than our client as listed above, except as directed by our client, or as required by law.

The field work was conducted by Kris Shippen, Environmental Scientist of BGES. Mr. Shippen is a Qualified Person (QP) as defined by the ADEC, and has conducted numerous site characterization in Anchorage and throughout Alaska. Trevor Crosby, Environmental Scientist II of BGES of BGES, prepared this report. Mr. Crosby is a QP as defined by the ADEC, and has conducted numerous site characterizations in Anchorage and throughout Alaska. This report was reviewed by Jayne Martin, Senior Environmental Scientist of BGES. Ms. Martin is a QP as defined by the ADEC, and has more than 25 years of environmental and geological consulting experience and has conducted and managed hundreds of site characterization and remediation efforts throughout Alaska and the lower 48 states.

Prepared By:



Trevor Crosby  
Environmental Scientist II

Reviewed By:



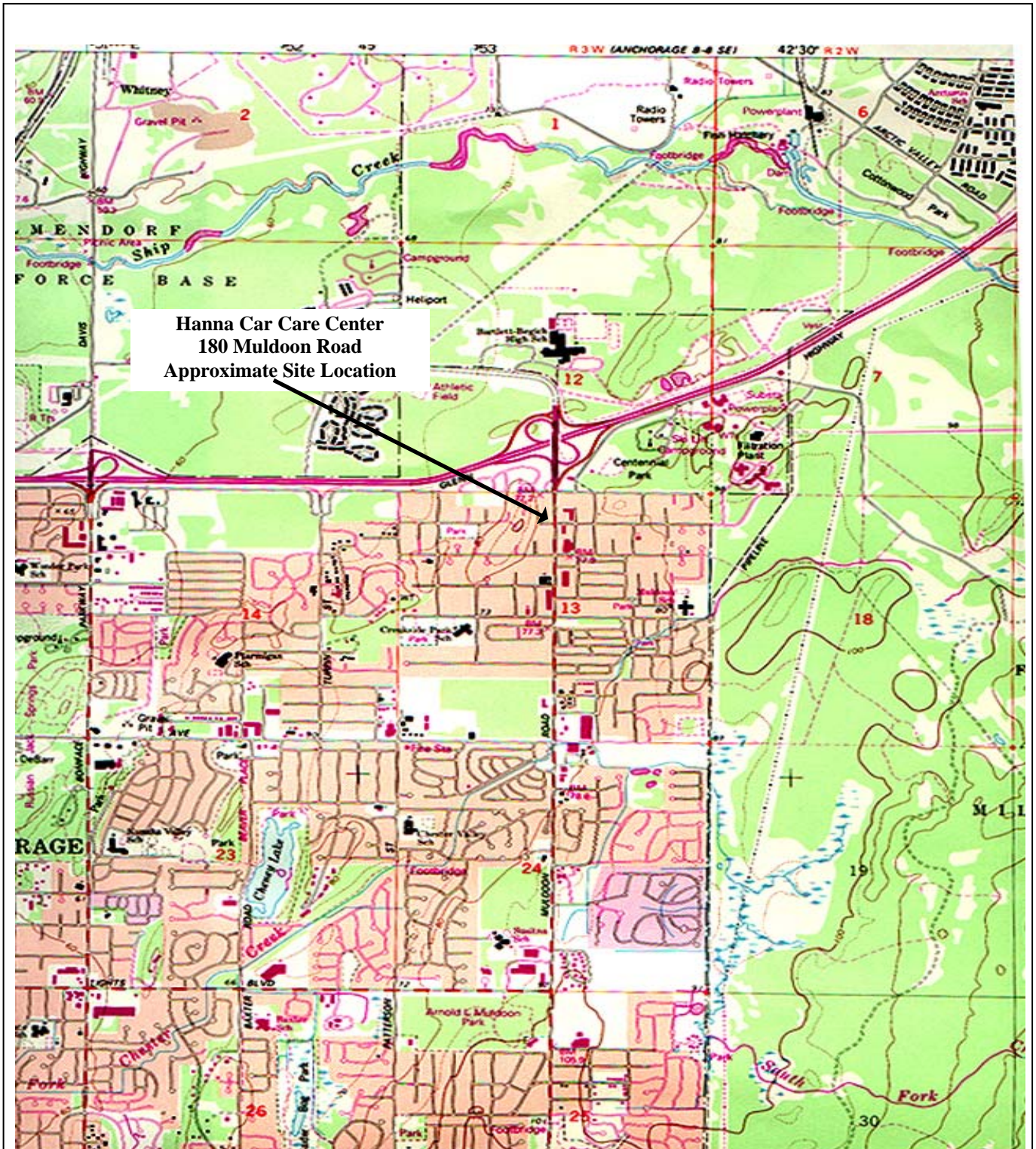
Jayne Martin  
Senior Environmental Scientist

Approved By:



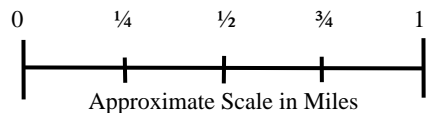
Robert N. Braunstein, C.P.G.  
Principal



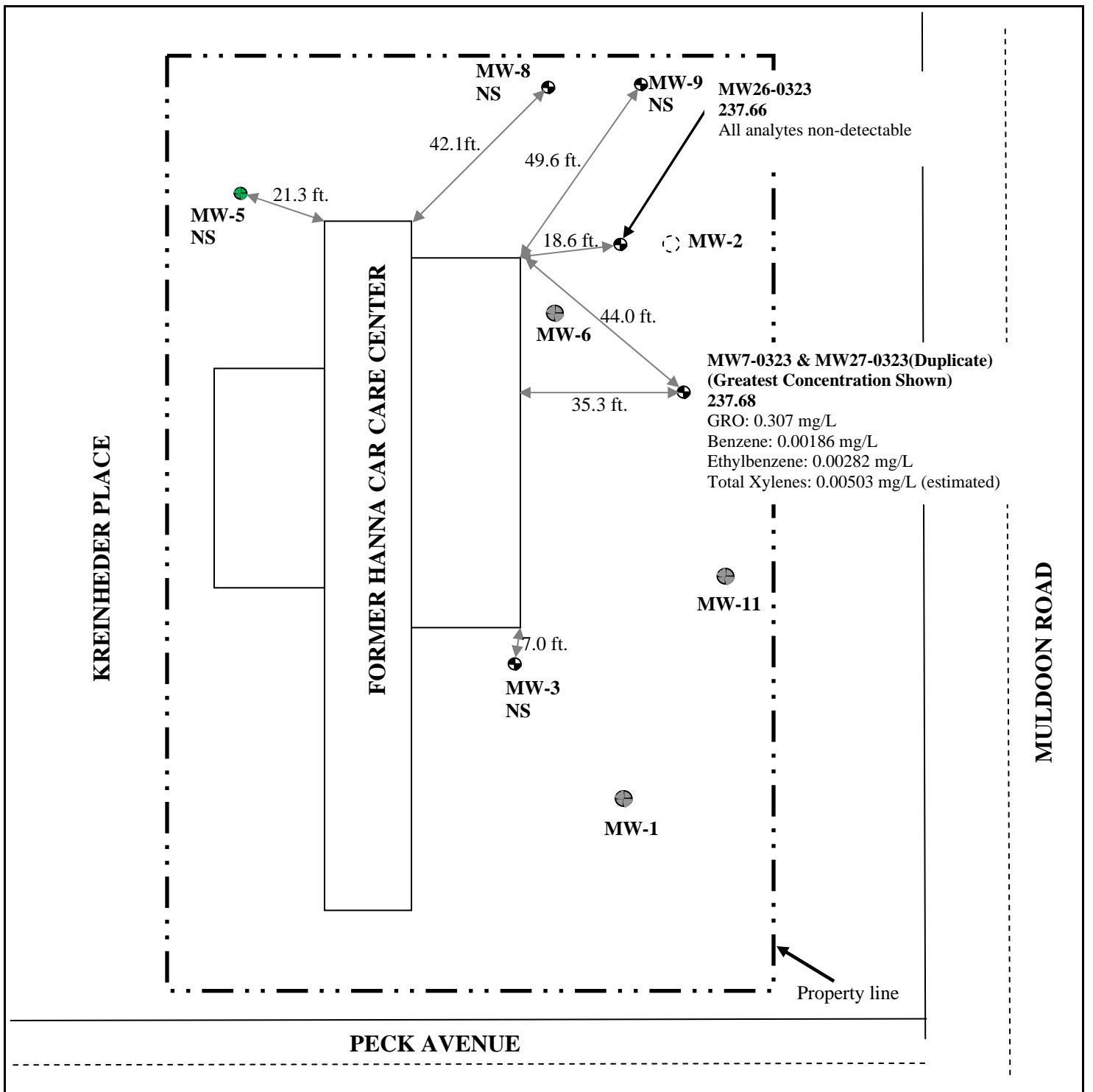


Hanna Car Care Center  
 180 Muldoon Road  
 Approximate Site Location

Source: USGS Map, Anchorage (A-8) NE, Alaska 1972, Revised 1993.



Hanna Car Care Center – 180 Muldoon Rd. Anchorage, Alaska <b>Property Vicinity Map</b>		
<b>BGES, INC.</b>	<b>May 2015</b>	<b>Figure 1</b>



KREINHEDER PLACE

FORMER HANNA CAR CARE CENTER

MULDOON ROAD

PECK AVENUE

Property line



- MW-26 Monitoring well with a groundwater elevation of 238.56 feet
  - MW-2 Monitoring well (decommissioned by BGES; June 2004)
  - ⊙ MW-1 Approximate location of monitoring well (never found)
  - MW-5 Monitoring well (found; could not be accessed due to obstruction)
- mg/L = Milligrams/Liter  
NS = Not Sampled

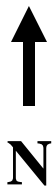
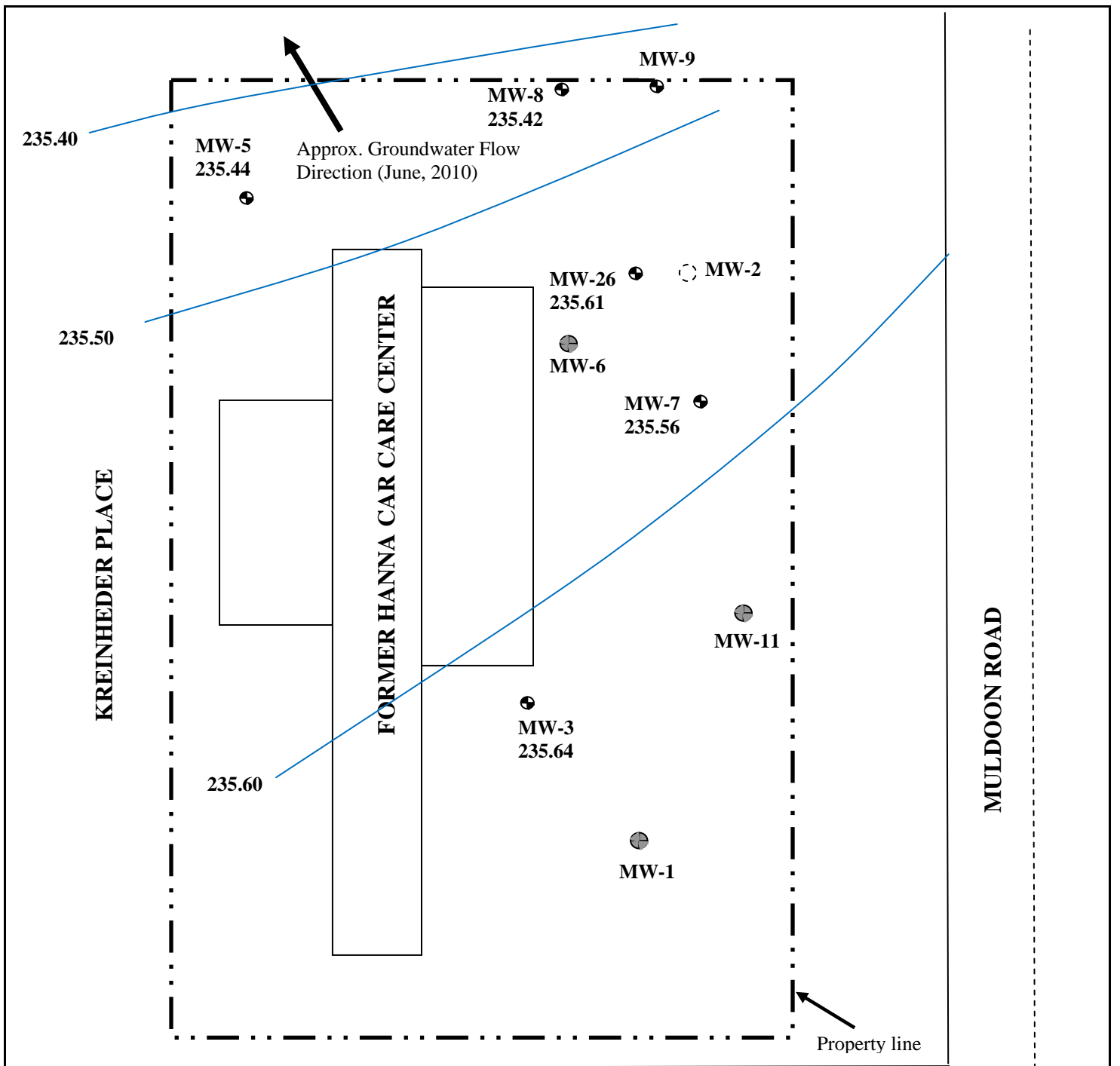


Approximate Scale in Feet

Former Hanna Car Care Center  
180 Muldoon Road  
**Monitoring Well Locations and Sample Results**  
(March 2015)

Figure adapted from Restoration Science and Engineering  
"2003 Soil and Groundwater Site Characterization"  
March 2003

BGES, INC.	May 2015	Figure 2
------------	----------	----------



- MW-26 Monitoring well with a groundwater elevation of 237.44 feet
- MW-2 Monitoring well (abandoned by BGES; June 2004)
- MW-1 Approximate location of monitoring MW-11 well (never found)

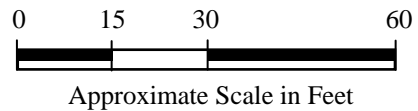


Figure adapted from Restoration Science and Engineering  
 "2003 Soil and Groundwater Site Characterization"  
 March 2003

Hanna Car Care Center  
 180 Muldoon Road  
**Groundwater Elevation Map & Flow Direction**  
 (June 2010)

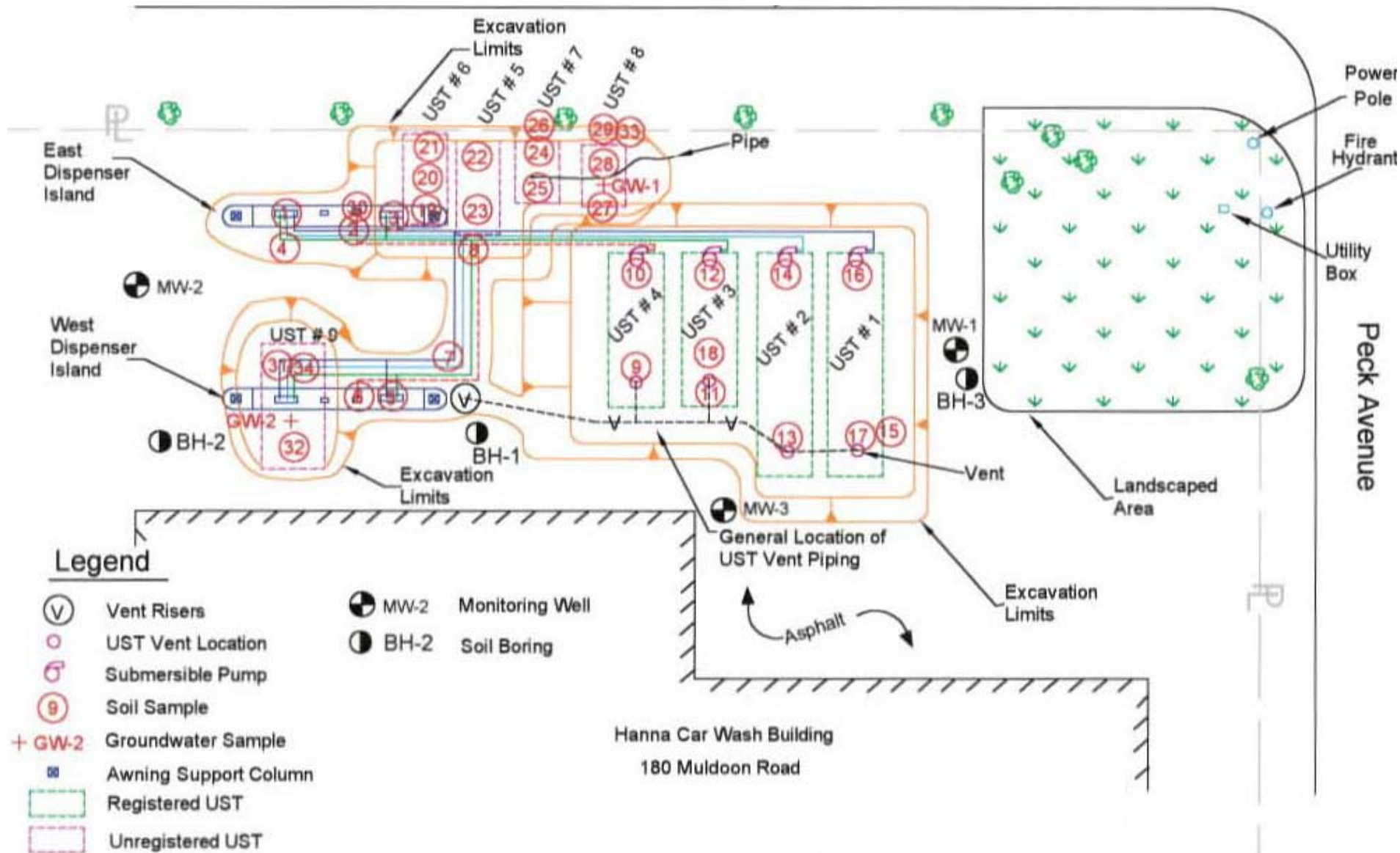
BGES, INC.

May 2015

Figure 3



Muldoon Road

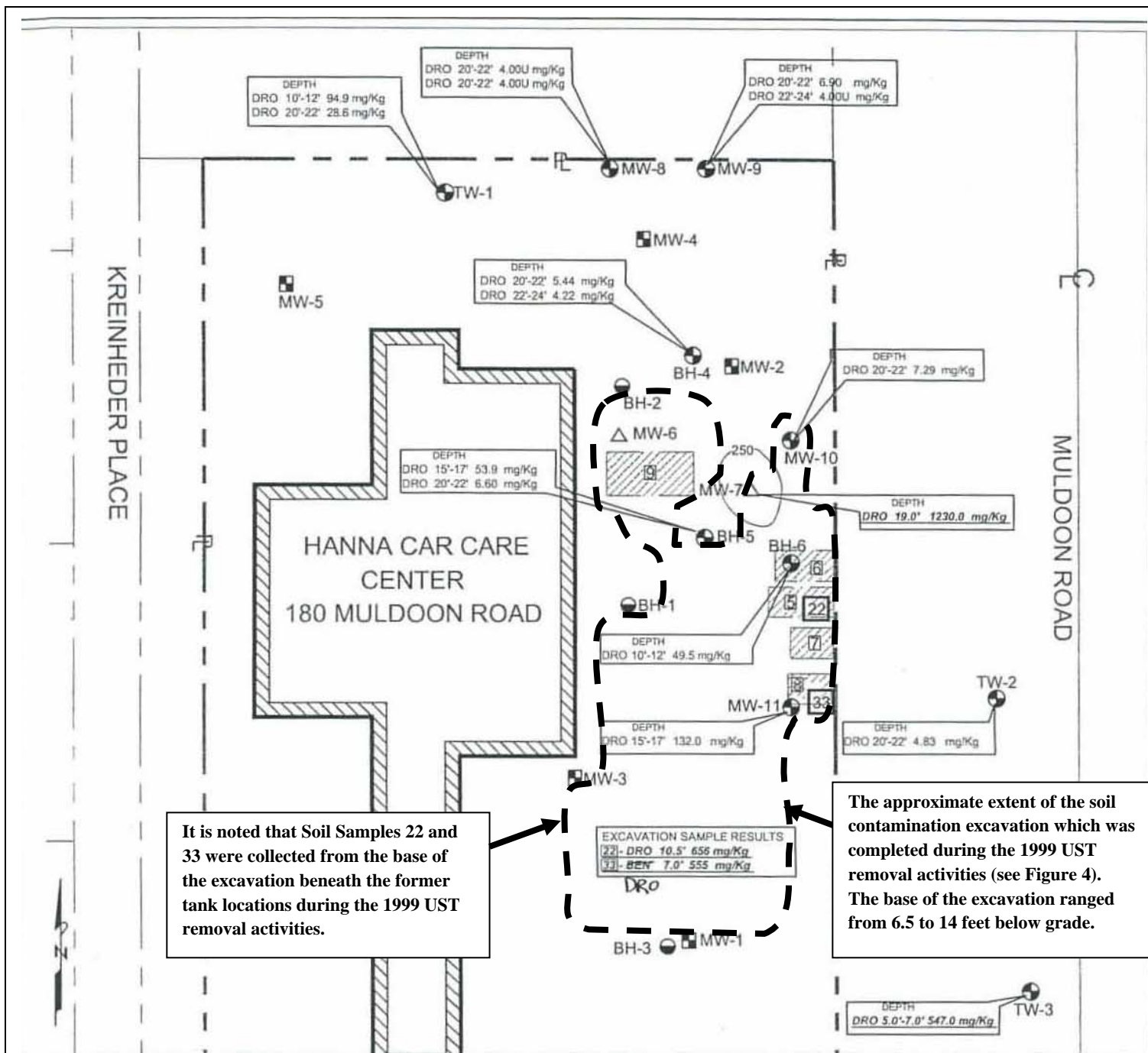


Former Hanna Car Care Center  
 180 Muldoon Road  
**Former UST Locations and  
 Approximate Extent of Excavation (1999)**

Figure adapted from Restoration Science and Engineering  
 "UST Removal and Site Characterization" April 2000.







It is noted that Soil Samples 22 and 33 were collected from the base of the excavation beneath the former tank locations during the 1999 UST removal activities.

The approximate extent of the soil contamination excavation which was completed during the 1999 UST removal activities (see Figure 4). The base of the excavation ranged from 6.5 to 14 feet below grade.

**EXCAVATION SAMPLE RESULTS**  
22 - ***DRO 10.5' 655 mg/Kg***  
33 - ***DRO 7.0' 555 mg/Kg***  
 DRO

**LEGEND**

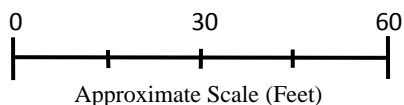
- - - INDICATES INFERRED ZONE OF DRO CONCENTRATIONS ABOVE THE METHOD 2 SOIL CLEANUP LEVEL
- - - APPROXIMATE PROPERTY LINE BOUNDARY
- DRO - DIESEL RANGE ORGANICS
- MW-9 - MONITORING WELL INSTALLED BY RSE 02/03
- TW-1 - TEMPORARY MONITORING WELL INSTALLED BY RSE 02/03
- BH-1 - SOIL BORING ADVANCED BY RSE 02/03
- △ MW-5 - MONITORING WELL INSTALLED BY RSE 03/01
- BH-1 - SOIL BORING ADVANCED BY HARTCROWSER, 12/89
- MW-1 - MONITORING WELL INSTALLED BY HARTCROWSER, 1989 TO 1991
- - UST EXCAVATION SAMPLE LOCATIONS COLLECTED BY RSE 10/30/99 AND 11/05/99
- ▨ - FORMER UST LOCATION

**NOTES**

1. HYDROCARBON CONTAMINANT CONCENTRATIONS PRESENTED OBTAINED BY RSE DURING 02/05/03 THROUGH 02/07/03 SOIL SAMPLING AND PRIOR SITE WORK IN 1999 AND 2001 (RSE 2000, 2001)
2. U QUALIFIER INDICATES SAMPLE CONCENTRATION BELOW THE METHOD DETECTION LIMIT. THE NUMBER PRECEEDING THE U QUALIFIER IS THE METHOD DETECTION LIMIT.
3. BOLD ITALICIZED AND UNDERLINED VALUES EXCEED THE APPLICABLE SOIL METHOD 2 CLEANUP LEVELS OF 250 mg/Kg FOR DRO

Figure adapted from Restoration Science and Engineering "2003 Soil and Groundwater Site Characterization" March 2003

Hanna Car Care Center  
 180 Muldoon Road  
**DRO Concentrations in Saturated Zone Soil (2003)**



**TABLE 1  
FORMER HANNA CAR CARE CENTER  
180 MULDOON ROAD  
ANCHORAGE, ALASKA  
MONITORING WELL SAMPLING DATA (MARCH 2015)**

<b>Well Number</b>	<b>MW3</b>	<b>MW5</b>	<b>MW7</b>	<b>MW8</b>	<b>MW9</b>	<b>MW26</b>
Date Sampled	N/A	N/A	03/23/15	N/A	N/A	03/23/15
Date of Depth and Elevation Measurement	03/23/15	N/A	03/23/15	03/23/15	03/23/15	03/23/15
Time of Depth to Water Measurement	9:56	N/A	11:17	10:58	10:54	10:15
Time Sample Collected	N/A	N/A	15:16	N/A	N/A	13:15
Top of Casing Elevation (feet)	250.94	N/A	250.66	251.03	N/A	250.92
Depth to Water (feet below top of casing)	13.29	N/A	12.98	13.46	13.45	13.26
Water Elevation (feet)	237.65	N/A	237.68	237.57	N/A	237.66
Total Depth of Well (feet below top of casing)	17.55	N/A	19.43	24.10	23.57	22.70
Well Casing Diameter (Inches)	2	N/A	2	2	2	2
Standing Water Well Volume (gallons)	0.70	N/A	1.05	1.74	1.65	1.54
Purge Volume-Actual (gallons)	N/A	N/A	2.0	N/A	N/A	2.5
Temperature (degrees Celsius)	N/A	N/A	5.78/5.87/5.59	N/A	N/A	3.95/3.92/3.92/3.89/3.87
pH (standard units)	N/A	N/A	5.80/5.86/5.82	N/A	N/A	5.12/5.11/5.15/5.20/5.24
Conductivity (millisiemens per centimeter)	N/A	N/A	188/188/187	N/A	N/A	198/196/196/197/196
Dissolved Oxygen	N/A	N/A	29.8/29.1/29.3	N/A	N/A	77.4/71.4/68.1/66.2/64.0
Oxidation Reduction Potential (ORP)	N/A	N/A	143.0/138.0/137.4	N/A	N/A	194.7/192.9/188.7/183.4/181.8
<b>Notes:</b> Values separated by / indicate readings for successive well volumes removed Sampler: K. Shippen Field parameters measured with a YSI 556 water quality meter and flow-through cell. N/A = Not Available Weather conditions on March 23, 2015 were clear and 28°F.		Well could not be accessed because it is currently located under the corner of a temporary storage structure.	Duplicate sample MW27-0323 was collected at 15:16. The water sample was collected after the water quality parameters stabilized in accordance with the ADEC field sampling guidance (May 2010).			The water sample was collected after the water quality parameters stabilized in accordance with the ADEC field sampling guidance (May 2010).

**TABLE 2**  
**FORMER HANNA CAR CARE CENTER**  
**180 MULDOON ROAD**  
**ANCHORAGE, ALASKA**  
**GROUNDWATER MONITORING ANALYTICAL RESULTS (MARCH 2015)**

Sample No.	Parameter	Results (mg/L)	LOQ (mg/L)	ADEC Cleanup Criteria (mg/L) <sup>1</sup>	Analytical Method
<b>MW7-0323</b>	Gasoline Range Organics	0.307	0.100	2.2	AK101
	Diesel Range Organics	ND	0.600	1.5	AK102
	Benzene	0.00186	0.000500	0.005	SW 8021B
	Toluene	ND	0.00100	1.0	SW 8021B
	Ethylbenzene	0.00282	0.00100	0.7	SW 8021B
	Xylenes (Total)	0.00503 J	0.00300	10	SW 8021B
<b>MW26-0323</b>	Gasoline Range Organics	ND	0.100	2.2	AK101
	Diesel Range Organics	ND	0.600	1.5	AK102
	Benzene	ND	0.000500	0.005	SW 8021B
	Toluene	ND	0.00100	1.0	SW 8021B
	Ethylbenzene	ND	0.00100	0.7	SW 8021B
	Xylenes (Total)	ND	0.00300	10	SW 8021B
<b>MW27-0323</b>					
(Duplicate of MW7-0323)					
RPD = 14%	Gasoline Range Organics	0.245	0.100	2.2	AK101
	Diesel Range Organics	ND	0.600	1.5	AK102
RPD = 19%	Benzene	0.00137	0.000500	0.00500	SW 8021B
	Toluene	ND	0.00100	1.0	SW 8021B
RPD = 18%	Ethylbenzene	0.00211	0.00100	0.7	SW 8021B
RPD = 20 %	Xylenes (Total)	0.00364 J	0.00300	10	SW 8021B
<sup>1</sup> Groundwater cleanup criteria from ADEC 18 Alaska Administrative Code 75.345, Table C (October 1, 2014). ADEC = Alaska Department of Environmental Conservation; mg/L = milligrams per liter LOQ = limit of quantitation; ND = not detectable; RPD = relative percent difference; J = Estimated Value					

**TABLE 3  
FORMER HANNA CAR CARE CENTER  
180 MULDOON ROAD, ANCHORAGE, ALASKA  
HISTORICAL GROUNDWATER MONITORING DATA**

Sample Name	Parameter	Results (mg/L)												Analytical Method	ADEC Groundwater Cleanup Level (mg/L) <sup>1</sup>
		Date Collected	4/13/2004	9/20/2004	6/20/2005	1/4/2006 <sup>2</sup>	6/13/2006	12/6/2006 <sup>3</sup>	10/17/2007	5/14/2008	7/1/2009	6/10/2010	10/31/2014		
MW-6	GRO	0.119	0.166	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	AK101	2.2
	DRO	NA	<0.306	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	AK102	1.5
	Benzene	<0.000500	<0.000500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SW8021B	0.005
	Toluene	<0.00200	<0.00200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SW8021B	1.0
	Ethylbenzene	<0.00200	<0.00200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SW8021B	0.7
	Total Xylenes	<0.00200	<0.00200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SW8021B	10.0
MW-26	GRO	0.770	NA	<0.090	<0.090	<0.100	<0.100	<0.0500	<0.0500	<0.0500	<0.0500	<0.100	<0.100	AK101	2.2
	DRO	NA	NA	<0.303	<0.300	<0.345	<0.312	<0.397	<0.400	NA	NA	<0.600	<0.600	AK102	1.5
	RRO	NA	NA	<0.505	<0.500	<0.575	<0.519	<0.397	<0.400	NA	NA	NA	NA	AK103	1.1
	Benzene	0.00433	NA	<0.0005	<0.0005	0.00167	<0.000500	<0.000500	<0.000500	<0.000500	<0.00500	<0.000500	<0.000500	SW8021B	0.005
	Toluene	<0.00200	NA	<0.00200	<0.00200	<0.002	<0.002	<0.000500	<0.000500	<0.00100	<0.00500	<0.00100	<0.00100	SW8021B	1.0
	Ethylbenzene	<0.00200	NA	<0.00200	<0.00200	<0.002	<0.002	<0.000500	<0.000500	<0.00100	<0.00500	<0.0010	<0.0010	SW8021B	0.7
	Total Xylenes	0.00515	NA	<0.00200	<0.00200	0.00380	<0.002	<0.00150	<0.00150	<0.00300	<0.00280	<0.00300	<0.00300	SW8021B	10.0
MW-7	GRO	<b>6.440</b>	<b>7.630</b>	<b>2.690</b>	<b>3.56J</b>	<b>3.340</b>	<b>2.20J</b>	2.06 J	<b>2.690</b>	<b>2.26 J</b>	<b>4.190</b>	0.135	0.307	AK101	2.2
	DRO	<b>4.18</b>	<b>2.49</b>	0.952	0.725J	1.38	1.07	0.868	0.807	0.804 J	1.42	<0.694	<0.694	AK102	1.5
	RRO	NA	NA	<0.510	<0.549	<0.556	<0.517	<0.391	<0.397	NA	NA	NA	NA	AK103	1.1
	Benzene	<b>0.0158</b>	<b>0.0342</b>	<b>0.00711</b>	<b>0.0151J</b>	<b>0.0118</b>	<b>0.0222J</b>	<b>0.0131</b>	0.00100	0.00099 J	<b>0.00821</b>	0.00104	0.00186	SW8021B	0.005
	Toluene	<0.0200	0.0140	0.00403	0.00447J	0.00225	0.00940J	0.00162	0.00376	0.00108 J	0.00498	<0.00100	<0.00100	SW8021B	1.0
	Ethylbenzene	0.234	0.292	0.082	0.092J	0.1020	0.144J	0.0568	0.0944	0.0345 J	0.110	0.00151	0.00282	SW8021B	0.7
	Total Xylenes	0.547	0.600	0.158	0.15547J	0.18087	0.23627J	0.0864	0.1770	0.0529 J	0.169	<0.00300	0.00503 J	SW8021B	10.0
MW-8	GRO	<0.0900	0.319	0.113	0.102J	<0.100	<0.100	<0.0500	<0.0500	NA	NA	NA	NA	AK101	2.2
	DRO	NA	<0.313	<0.306	<0.323J	<0.319	<0.309	<0.391	<0.397	NA	NA	NA	NA	AK102	1.5
	RRO	NA	NA	<0.510	<0.538	<0.532	<0.515	<0.391	<0.397	NA	NA	NA	NA	AK103	1.1
	Benzene	0.000653	0.00234	0.000606	0.000994	0.00122	<0.000500	<0.000500	<0.000500	NA	NA	NA	NA	SW8021B	0.005
	Toluene	<0.00200	<0.00200	<0.00200	<0.00200J	<0.002	<0.002	<0.000500	<0.000500	NA	NA	NA	NA	SW8021B	1.0
	Total Xylenes	<0.00200	<0.00200	<0.00200	<0.00200J	<0.002	<0.002	<0.00150	<0.00150	NA	NA	NA	NA	SW8021B	10.0
MW-9	GRO	<0.0900	0.711	<0.090	<0.090	0.111	<0.100	0.0656	0.0594	NA	NA	NA	NA	AK101	2.2
	DRO	NA	0.404	<0.303	<0.300	<0.323	<0.311	<0.391	<0.403	NA	NA	NA	NA	AK102	1.5
	RRO	NA	NA	<0.505	<0.500	<0.538	<0.518	<0.391	<0.403	NA	NA	NA	NA	AK103	1.1
	Benzene	<0.000500	0.00356	0.000593	<0.0005	0.001080	<0.000500	<0.000500	<0.000500	NA	NA	NA	NA	SW8021B	0.005
	Toluene	<0.00200	<0.00200	<0.00200	<0.00200	<0.002	<0.002	<0.000500	<0.000500	NA	NA	NA	NA	SW8021B	1.0
	Total Xylenes	<0.00200	<0.00200	<0.00200	<0.00200	0.00221	<0.002	<0.00150	<0.00150	NA	NA	NA	NA	SW8021B	10.0

<sup>1</sup> = Groundwater cleanup criteria based on 18 Alaska Administrative Code 75.345, Table C (October 2014).

<sup>2</sup> = Sample MW-26 was collected on 1/05/06 and samples MW-7 and MW-8 were collected on 1/10/06

<sup>3</sup> = Sample MW-7 was collected on 12/7/06

mg/L = milligrams per liter; GRO = Gasoline Range Organics; DRO = Diesel Range Organics; RRO = Residual Range Organics; NA = Not Analyzed  
J = data are considered to be estimates.

**APPENDIX A**  
**FIELD NOTES**



6 3/23/15

28° Clear

09:25 BGES arrives on site

- 1- check GW levels in all wells
- 2- Sample MW 26
- 3- Sample MW 7 and collect Duplicates
- 4- Submit samples for DRD, GPO, BTEX

MW#	DTW	TDW	Time of measurement	Notes
3	13.29	17.55	09:56	Well plug very rusted
7	12.98	19.43	11:17	Ice and dirt under CI cap
8	13.46	24.10	10:58	
9	13.45	23.57	10:54	Ice under CI cap
26	13.26	22.70	10:15	Ice under CI cap
5	Not accessible (under corner of temporary structure)			

12:00 Begin Purging MW 26

13:15 Collect Sample MW 26-0323

14:19 Begin Purging MW 7

15:16 collect Samples MW 7-0323 and  
MW 27-0323

16:49 Leave site

**APPENDIX B**  
**SITE PHOTOGRAPHS**





**Photo 1. Monitoring Well MW7 (Facing west)**



**Photo 2. Monitoring Well MW26 (Facing west)**



**Photo 3. Monitoring Well MW8 and MW9 (Facing SW)**



**Photo 4. Monitoring Well MW3 (Facing north)**

<p>Hanna Car Care Center          180 Muldoon Road          Anchorage, Alaska  <b>Site Photographs</b></p>		
<p><b>BGES, Inc.</b></p>	<p><b>May 2015</b></p>	<p><b>Figure A-1</b></p>

**APPENDIX C**  
**GROUNDWATER MONITORING LOGS**

Well Number: MW7  
Date of Sampling Event: 3/23/15

Weather Conditions 45° Clear  
Time of Depth to Water Measurement: 11:17  
Date of Depth to Water Measurement: 3/23/15

Total Depth of Well (feet below TOC): 19.43  
Depth to Water (feet below TOC): 12.98  
Water Column (feet): 6.45

Type of Sampling Equipment:  
MPSO bladder pump controller QED 1.75" bladder pump w/ teflon bladders, YSI 556 w/F low temp cell  
Teflon lined bonded poly tubing

Volume of well (gals) 1.05

=0.1632 X Water Column (For 2-inch well)  
=0.6528 X Water Column (For 4-inch well)  
=1.4688 X Water Column (For 6-inch well)

Time Purging Began: 14:20  
Time of Sampling: 15:16  
Volume purged 2.94

**PURGE A MINIMUM OF THREE WELL VOLUMES**

Temperature (°C) 5.78  
Conductivity 188  
pH 5.80  
ORP 143.0  
Volume Purged 1 gal  
Depth To Water 12.99  
Time of Measurement 1500

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Depth of Bladder intake: 13.48

Temperature (°C) 5.57  
Conductivity 188  
pH 5.86  
ORP 138.0  
Volume Purged 1.1 gal  
Depth To Water 12.99  
Time of Measurement 1505

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Purge Rate: ~150 mL/min

Temperature (°C) 5.59  
Conductivity 187  
pH 5.82  
ORP 137.4  
Volume Purged 1.1 gal  
Depth To Water 12.97  
Time of Measurement 1510

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Sample Rate: ~150 mL/min

Sample ID:  
MW7-0323  
MW27-0323 (Duplicate)

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Additional Notes:  
3 well volumes were not purged because the well parameters stabilized



Well Number: MW 26  
Date of Sampling Event: 3/23/15

Weather Conditions: 34° clear  
Time of Depth to Water Measurement: 10:15  
Date of Depth to Water Measurement: 3/23/15

Total Depth of Well (feet below TOC): 22.70  
Depth to Water (feet below TOC): 13.26  
Water Column (feet): 9.44

Type of Sampling Equipment:  
MP 50 bladder pump Controller  
QED 1.75" bladder pump w/Teflon bladders  
YSI 556 w/Flowthrough Cell, Teflon lined bonded  
poly tubing  
=0.1632 X Water Column (For 2-inch well)  
=0.6528 X Water Column (For 4-inch well)  
=1.4688 X Water Column (For 6-inch well)

Volume of well (gals) 1.54 gal

Time Purging Began: 12:00  
Time of Sampling: 13:15  
Volume purged 2.5 gal

**PURGE A MINIMUM OF THREE WELL VOLUMES**

Temperature (°C) 3.95  
Conductivity 198  
pH 5.12  
ORP 194.7  
Volume Purged ~1 gal  
Depth To Water 13.26  
Time of Measurement 12:49

Temperature (°C) 3.87  
Conductivity 196  
pH 5.24  
ORP 181.8  
Volume Purged 1.9 gal  
Depth To Water 13.27  
Time of Measurement 13:08

Depth of Bladder intake: 13.76

DO% 77.4  
Temperature (°C) 3.92  
Conductivity 196  
pH 5.11  
ORP 192.9  
Volume Purged 1.1 gal  
Depth To Water 13.26  
Time of Measurement 12:54

DO% 64.0  
Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Purge Rate: ~150 mL/min

Temperature (°C) 3.92  
Conductivity 196  
pH 5.15  
ORP 188.7  
Volume Purged 1.2 gal  
Depth To Water 13.25  
Time of Measurement 12:58

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Sample Rate: ~150 mL/min

Temperature (°C) 3.89  
Conductivity 197  
pH 5.20  
ORP 183.4  
Volume Purged 1.5 gal  
Depth To Water 13.26  
Time of Measurement 13:03

Temperature (°C) \_\_\_\_\_  
Conductivity \_\_\_\_\_  
pH \_\_\_\_\_  
ORP \_\_\_\_\_  
Volume Purged \_\_\_\_\_  
Depth To Water \_\_\_\_\_  
Time of Measurement \_\_\_\_\_

Sample ID: MW26-0323

Additional Notes: 3 well volumes were not purged because well parameters stabilized

**APPENDIX D**  
**LABORATORY ANALYTICAL DATA**

## Laboratory Report of Analysis

To: BGES Inc.  
1042 E 6th Avenue  
Anchorage, AK 99501  
(907) 644-2900

Report Number: **1151032**

Client Project: **Hanna Car Care**

Dear Jayne Martin,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.



SGS North America Inc.  
Environmental Services - Alaska Division  
Project Manager

Victoria Pennick  
2015.04.09  
08:23:45 -08'00'

Victoria Pennick  
Project Manager  
Victoria.Pennick@sgs.com

Date

Print Date: 04/08/2015 8:43:03AM

## Case Narrative

SGS Client: **BGES Inc.**  
SGS Project: **1151032**  
Project Name/Site: **Hanna Car Care**  
Project Contact: **Jayne Martin**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 04/08/2015 8:43:04AM

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV	Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
MW7-0323	1151032001	03/23/2015	03/24/2015	Water (Surface, Eff., Ground)
MW26-0323	1151032002	03/23/2015	03/24/2015	Water (Surface, Eff., Ground)
MW27-0323	1151032003	03/23/2015	03/24/2015	Water (Surface, Eff., Ground)
Trip Blank	1151032004	03/23/2015	03/24/2015	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	Diesel Range Organics (W)

Print Date: 04/08/2015 8:43:06AM

### Detectable Results Summary

Client Sample ID: **MW7-0323**

Lab Sample ID: 1151032001

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzene	1.86	ug/L
Ethylbenzene	2.82	ug/L
Gasoline Range Organics	0.307	mg/L
P & M -Xylene	5.03	ug/L

Client Sample ID: **MW27-0323**

Lab Sample ID: 1151032003

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzene	1.37	ug/L
Ethylbenzene	2.11	ug/L
Gasoline Range Organics	0.245	mg/L
P & M -Xylene	3.64	ug/L



Results of **MW7-0323**

Client Sample ID: **MW7-0323**  
Client Project ID: **Hanna Car Care**  
Lab Sample ID: 1151032001  
Lab Project ID: 1151032

Collection Date: 03/23/15 15:16  
Received Date: 03/24/15 08:57  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.600 U	0.600	0.180	mg/L	1		04/05/15 16:56
<b>Surrogates</b>							
5a Androstane	79.6	50-150		%	1		04/05/15 16:56

**Batch Information**

Analytical Batch: XFC11775  
Analytical Method: AK102  
Analyst: MCM  
Analytical Date/Time: 04/05/15 16:56  
Container ID: 1151032001-D

Prep Batch: XXX32855  
Prep Method: SW3520C  
Prep Date/Time: 04/03/15 12:04  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 04/08/2015 8:43:08AM



Results of MW7-0323

Client Sample ID: MW7-0323
Client Project ID: Hanna Car Care
Lab Sample ID: 1151032001
Lab Project ID: 1151032

Collection Date: 03/23/15 15:16
Received Date: 03/24/15 08:57
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 0.307, 0.100, 0.0310, mg/L, 1, 03/25/15 13:55

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 106, 50-150, %, 1, 03/25/15 13:55

Batch Information

Analytical Batch: VFC12324
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/25/15 13:55
Container ID: 1151032001-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene, 95.3, 77-115, %, 1, 03/25/15 13:55

Batch Information

Analytical Batch: VFC12324
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/25/15 13:55
Container ID: 1151032001-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:08AM

## Results of MW26-0323

Client Sample ID: **MW26-0323**  
 Client Project ID: **Hanna Car Care**  
 Lab Sample ID: 1151032002  
 Lab Project ID: 1151032

Collection Date: 03/23/15 13:15  
 Received Date: 03/24/15 08:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.600 U	0.600	0.180	mg/L	1		04/05/15 17:06
<b>Surrogates</b>							
5a Androstane	72.5	50-150		%	1		04/05/15 17:06

## Batch Information

Analytical Batch: XFC11775  
 Analytical Method: AK102  
 Analyst: MCM  
 Analytical Date/Time: 04/05/15 17:06  
 Container ID: 1151032002-D

Prep Batch: XXX32855  
 Prep Method: SW3520C  
 Prep Date/Time: 04/03/15 12:04  
 Prep Initial Wt./Vol.: 1000 mL  
 Prep Extract Vol: 1 mL

Print Date: 04/08/2015 8:43:08AM



Results of MW26-0323

Client Sample ID: MW26-0323
Client Project ID: Hanna Car Care
Lab Sample ID: 1151032002
Lab Project ID: 1151032

Collection Date: 03/23/15 13:15
Received Date: 03/24/15 08:57
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 0.100 U, 0.100, 0.0310, mg/L, 1, 03/25/15 14:14

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 87.6, 50-150, %, 1, 03/25/15 14:14

Batch Information

Analytical Batch: VFC12324
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/25/15 14:14
Container ID: 1151032002-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene, 97.7, 77-115, %, 1, 03/25/15 14:14

Batch Information

Analytical Batch: VFC12324
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/25/15 14:14
Container ID: 1151032002-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:08AM

## Results of MW27-0323

Client Sample ID: **MW27-0323**  
 Client Project ID: **Hanna Car Care**  
 Lab Sample ID: 1151032003  
 Lab Project ID: 1151032

Collection Date: 03/23/15 15:16  
 Received Date: 03/24/15 08:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.600 U	0.600	0.180	mg/L	1		04/05/15 17:16
<b>Surrogates</b>							
5a Androstane	77.5	50-150		%	1		04/05/15 17:16

## Batch Information

Analytical Batch: XFC11775  
 Analytical Method: AK102  
 Analyst: MCM  
 Analytical Date/Time: 04/05/15 17:16  
 Container ID: 1151032003-D

Prep Batch: XXX32855  
 Prep Method: SW3520C  
 Prep Date/Time: 04/03/15 12:04  
 Prep Initial Wt./Vol.: 1000 mL  
 Prep Extract Vol: 1 mL

Print Date: 04/08/2015 8:43:08AM



Results of MW27-0323

Client Sample ID: MW27-0323
Client Project ID: Hanna Car Care
Lab Sample ID: 1151032003
Lab Project ID: 1151032

Collection Date: 03/23/15 15:16
Received Date: 03/24/15 08:57
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: Gasoline Range Organics, 0.245, 0.100, 0.0310, mg/L, 1, 03/25/15 14:33

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 4-Bromofluorobenzene, 104, 50-150, %, 1, 03/25/15 14:33

Batch Information

Analytical Batch: VFC12324
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/25/15 14:33
Container ID: 1151032003-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 1,4-Difluorobenzene, 98.5, 77-115, %, 1, 03/25/15 14:33

Batch Information

Analytical Batch: VFC12324
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/25/15 14:33
Container ID: 1151032003-A

Prep Batch: VXX27046
Prep Method: SW5030B
Prep Date/Time: 03/25/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:08AM





**Results of Trip Blank**

Client Sample ID: **Trip Blank**  
Client Project ID: **Hanna Car Care**  
Lab Sample ID: 1151032004  
Lab Project ID: 1151032

Collection Date: 03/23/15 13:15  
Received Date: 03/24/15 08:57  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		03/25/15 11:04

**Surrogates**

4-Bromofluorobenzene	87	50-150		%	1		03/25/15 11:04
----------------------	----	--------	--	---	---	--	----------------

**Batch Information**

Analytical Batch: VFC12324  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 03/25/15 11:04  
Container ID: 1151032004-A

Prep Batch: VXX27046  
Prep Method: SW5030B  
Prep Date/Time: 03/25/15 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.500 U	0.500	0.150	ug/L	1		03/25/15 11:04
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		03/25/15 11:04
o-Xylene	1.00 U	1.00	0.310	ug/L	1		03/25/15 11:04
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		03/25/15 11:04
Toluene	1.00 U	1.00	0.310	ug/L	1		03/25/15 11:04

**Surrogates**

1,4-Difluorobenzene	99.1	77-115		%	1		03/25/15 11:04
---------------------	------	--------	--	---	---	--	----------------

**Batch Information**

Analytical Batch: VFC12324  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 03/25/15 11:04  
Container ID: 1151032004-A

Prep Batch: VXX27046  
Prep Method: SW5030B  
Prep Date/Time: 03/25/15 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:08AM

## Method Blank

Blank ID: MB for HBN 1705665 [VXX/27046]

Blank Lab ID: 1258045

QC for Samples:

1151032001, 1151032002, 1151032003, 1151032004

Matrix: Water (Surface, Eff., Ground)

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0319J	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	87.5	50-150		%

## Batch Information

Analytical Batch: VFC12324

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: ST

Analytical Date/Time: 3/25/2015 9:30:00AM

Prep Batch: VXX27046

Prep Method: SW5030B

Prep Date/Time: 3/25/2015 8:00:00AM

Prep Initial Wt./Vol.: 5 mL

Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:10AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1151032 [VXX27046]  
 Blank Spike Lab ID: 1258048  
 Date Analyzed: 03/25/2015 10:26

Spike Duplicate ID: LCSD for HBN 1151032 [VXX27046]  
 Spike Duplicate Lab ID: 1258049  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1151032001, 1151032002, 1151032003, 1151032004

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	0.953	95	1.00	0.989	99	( 60-120 )	3.60	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	91.2	91	0.0500	94	94	( 50-150 )	3.10	

## Batch Information

Analytical Batch: **VFC12324**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX27046**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **03/25/2015 08:00**  
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1705665 [VXX/27046]

Blank Lab ID: 1258045

QC for Samples:

1151032001, 1151032002, 1151032003, 1151032004

Matrix: Water (Surface, Eff., Ground)

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	99.5	77-115		%

## Batch Information

Analytical Batch: VFC12324  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 3/25/2015 9:30:00AM

Prep Batch: VXX27046  
 Prep Method: SW5030B  
 Prep Date/Time: 3/25/2015 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 04/08/2015 8:43:14AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1151032 [VXX27046]  
 Blank Spike Lab ID: 1258046  
 Date Analyzed: 03/25/2015 10:07

Spike Duplicate ID: LCSD for HBN 1151032 [VXX27046]  
 Spike Duplicate Lab ID: 1258047  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1151032001, 1151032002, 1151032003, 1151032004

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	111	111	100	108	108	( 80-120 )	2.50	(< 20 )
Ethylbenzene	100	106	106	100	104	104	( 75-125 )	1.70	(< 20 )
o-Xylene	100	108	108	100	108	108	( 80-120 )	0.31	(< 20 )
P & M -Xylene	200	216	108	200	214	107	( 75-130 )	0.94	(< 20 )
Toluene	100	109	109	100	105	105	( 75-120 )	3.80	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50	109	109	50	108	108	( 77-115 )	1.10	

## Batch Information

Analytical Batch: VFC12324  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST

Prep Batch: VXX27046  
 Prep Method: SW5030B  
 Prep Date/Time: 03/25/2015 08:00  
 Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1706271 [XXX/32855]

Blank Lab ID: 1258853

QC for Samples:

1151032001, 1151032002, 1151032003

Matrix: Water (Surface, Eff., Ground)

## Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.300U	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane	83.1	60-120		%

## Batch Information

Analytical Batch: XFC11775

Analytical Method: AK102

Instrument: HP 6890 Series II FID SV D R

Analyst: MCM

Analytical Date/Time: 4/5/2015 4:17:00PM

Prep Batch: XXX32855

Prep Method: SW3520C

Prep Date/Time: 4/3/2015 12:04:53PM

Prep Initial Wt./Vol.: 1000 mL

Prep Extract Vol: 1 mL

Print Date: 04/08/2015 8:43:17AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1151032 [XXX32855]  
 Blank Spike Lab ID: 1258854  
 Date Analyzed: 04/05/2015 16:27

Spike Duplicate ID: LCSD for HBN 1151032 [XXX32855]  
 Spike Duplicate Lab ID: 1258855  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1151032001, 1151032002, 1151032003

## Results by AK102

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	5	4.15	83	5	4.22	84	( 75-125 )	1.50	(< 20 )
<b>Surrogates</b>									
5a Androstane	0.1	93.3	93	0.1	97.3	97	( 60-120 )	4.20	

## Batch Information

Analytical Batch: **XFC11775**  
 Analytical Method: **AK102**  
 Instrument: **HP 6890 Series II FID SV D R**  
 Analyst: **MCM**

Prep Batch: **XXX32855**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **04/03/2015 12:04**  
 Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL











## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1151032001-A	HCL to pH < 2	OK			
1151032001-B	HCL to pH < 2	OK			
1151032001-C	HCL to pH < 2	OK			
1151032001-D	HCL to pH < 2	OK			
1151032001-E	HCL to pH < 2	OK			
1151032002-A	HCL to pH < 2	OK			
1151032002-B	HCL to pH < 2	OK			
1151032002-C	HCL to pH < 2	OK			
1151032002-D	HCL to pH < 2	OK			
1151032002-E	HCL to pH < 2	OK			
1151032003-A	HCL to pH < 2	OK			
1151032003-B	HCL to pH < 2	OK			
1151032003-C	HCL to pH < 2	OK			
1151032003-D	HCL to pH < 2	OK			
1151032003-E	HCL to pH < 2	OK			
1151032004-A	HCL to pH < 2	OK			
1151032004-B	HCL to pH < 2	OK			
1151032004-C	HCL to pH < 2	OK			

### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

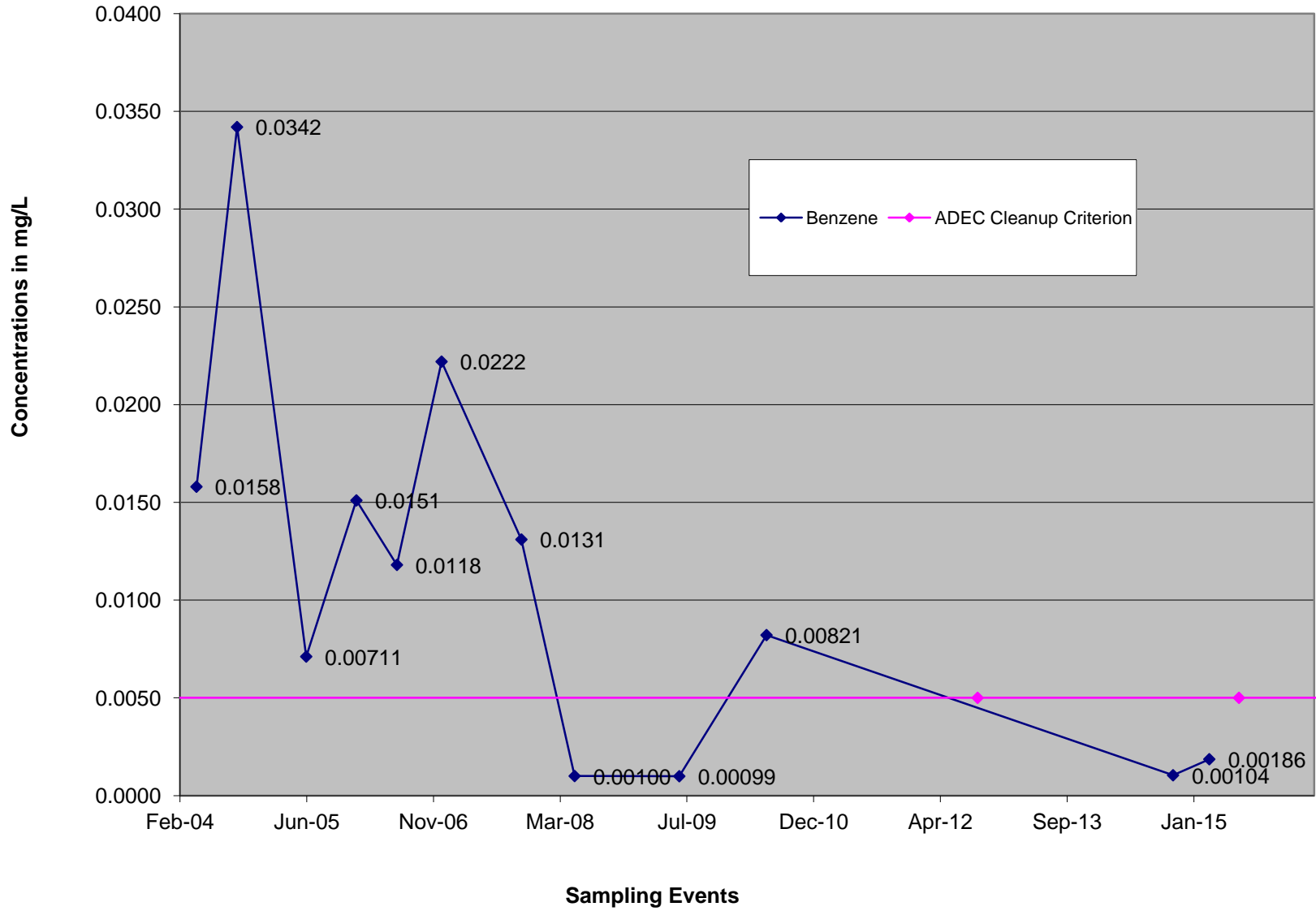
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

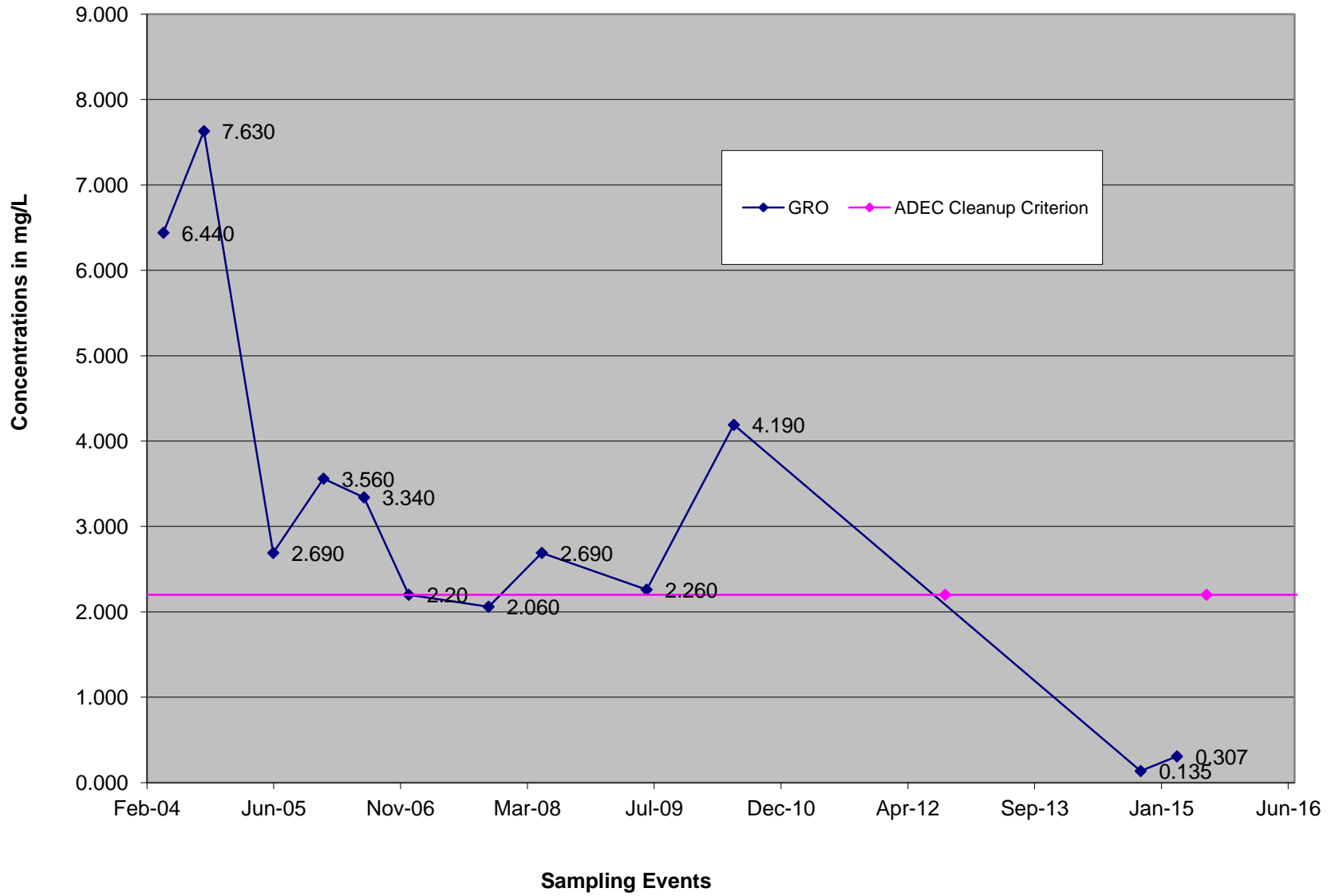
BU - The container was received with headspace greater than 6mm.

**APPENDIX E**  
**GRAPHS OF HISTORICAL CONTAMINANT CONCENTRATIONS IN MW7**

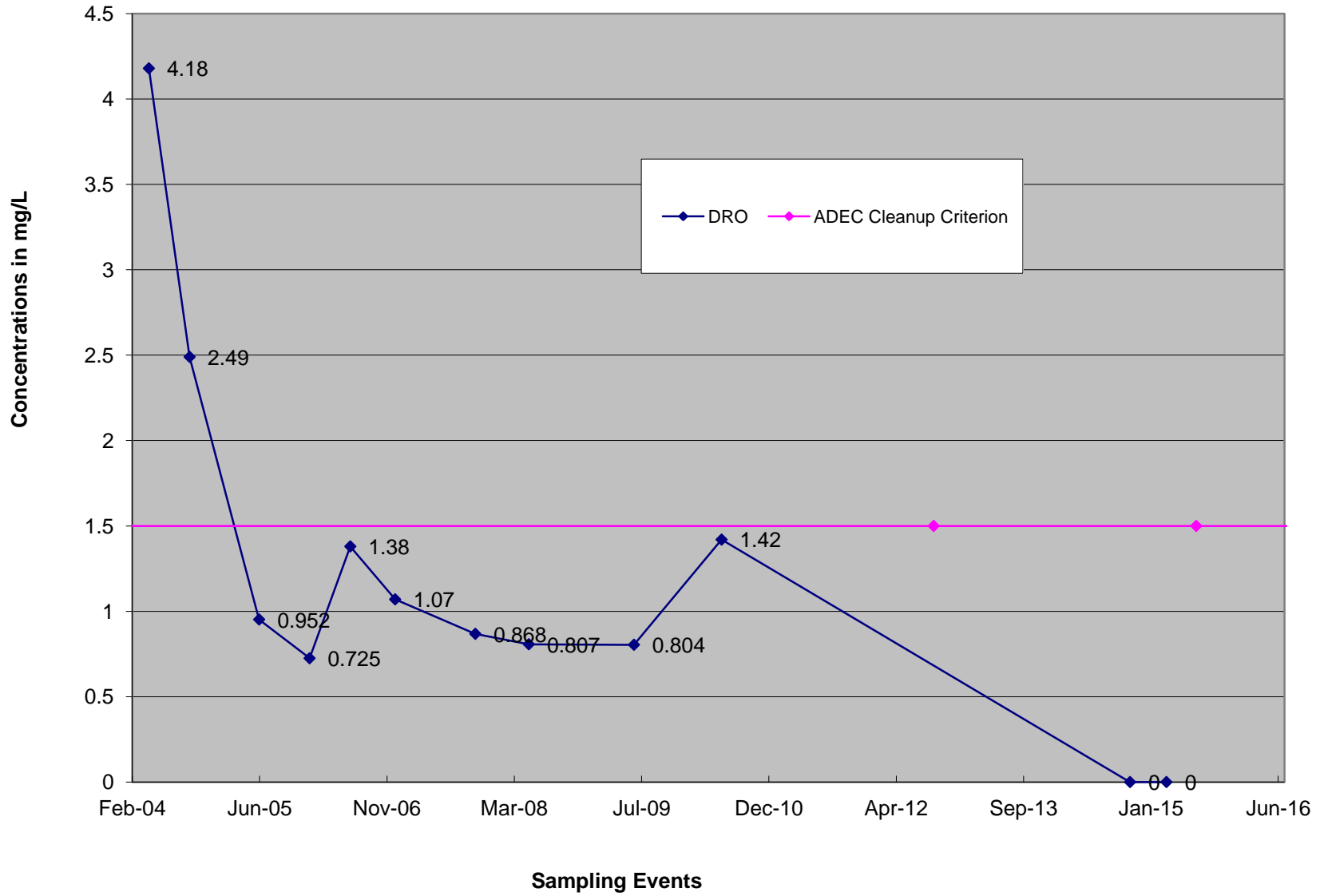
### Monitoring Well MW-7



### Monitoring Well MW-7



### Monitoring Well MW-7





**APPENDIX F**  
**LABORATORY DATA REVIEW CHECKLIST**

## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC Hazard ID:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
 Yes    No    NA (Please explain.)    Comments:

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
Yes    No     NA (Please explain.)    Comments:

**Samples were not transferred to a network laboratory.**

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
 Yes    No    NA (Please explain.)    Comments:

- b. Correct analyses requested?  
 Yes    No    NA (Please explain.)    Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
 Yes    No    NA (Please explain.)    Comments:

**The temperature of the sample cooler that contained the water samples was measured at the laboratory at the time of receipt to be 2.4 degrees Celsius (C) in Cooler Identification Number 1. The temperature in the cooler was within the prescribed optimal temperature range of 4 degrees Celsius +/- 2 degrees.**

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
 Yes    No     NA (Please explain.)                      Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
Yes    No     NA (Please explain.)                      Comments:

**No irregularities or abnormalities with respect to sample containers were reported.**

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
Yes    No     NA (Please explain.)                      Comments:

**No irregularities were reported or observed.**

- e. Data quality or usability affected? (Please explain.)                      Comments:

N/A

4. Case Narrative

- a. Present and understandable?  
 Yes    No     NA (Please explain.)                      Comments:

- b. Discrepancies, errors or QC failures identified by the lab?  
Yes     No     NA (Please explain.)                      Comments:

**The laboratory did not identify any laboratory data QC failures for this work order.**

- c. Were all corrective actions documented?  
Yes    No     NA (Please explain.)                      Comments:

**No discrepancies, errors, or QC failures were identified by the laboratory.**

- d. What is the effect on data quality/usability according to the case narrative?  
Yes    No     NA (Please explain.)                      Comments:

**No discrepancies, errors, or QC failures were identified by the laboratory.**

Comments:

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes No  NA (Please explain.) Comments:

b. All applicable holding times met?

Yes No  NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?

Yes No  NA (Please explain.) Comments:

**No soil samples were analyzed as part of this work order.**

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

Yes No  NA (Please explain.) Comments:

e. Data quality or usability affected?

**N/A**

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes No  NA (Please explain.) Comments:

ii. All method blank results less than PQL?

Yes No  NA (Please explain.) Comments:

iii. If above PQL, what samples are affected?

Comments:

**N/A**

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

Yes No  NA (Please explain.) Comments:

**The laboratory did not identify any laboratory data QC failures for this work order.**

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes    No    NA (Please explain.)                      Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes    No     NA (Please explain.)                      Comments:

**Analysis for metals was not part of the approved scope of work for this project.**

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes    No    NA (Please explain.)                      Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes    No    NA (Please explain.)                      Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes    No     NA (Please explain.)                      Comments:

**The laboratory did not identify any laboratory data QC failures for this work order.**

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

N/A

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?  
 Yes    No    NA (Please explain.)                      Comments:

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?  
And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other  
analyses see the laboratory report pages)  
 Yes    No    NA (Please explain.)                      Comments:

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data  
flags clearly defined?  
Yes    No     NA (Please explain.)                      Comments:

**The laboratory did not identify any laboratory data QC failures for this work order**

- iv. Data quality or usability affected? (Use the comment box to explain.)  
Comments:

**N/A**

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  
(If not, enter explanation below.)  
 Yes    No    NA (Please explain.)                      Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?  
(If not, a comment explaining why must be entered below)  
 Yes    No    NA (Please explain.)                      Comments:

**All water samples for volatiles analysis were transported in the same cooler.**

- iii. All results less than PQL?  
 Yes    No    NA (Please explain.)                      Comments:

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes No NA (Please explain.)

Comments:

ii. Submitted blind to lab?

Yes No NA (Please explain.)

Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2) / 2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes No NA (Please explain.)

Comments:

**Water Sample MW27-0323 was a duplicate of Water Sample MW7-0323 and was collected to evaluate sampling precision. The relative percent differences (RPDs) could not be calculated for DRO or toluene, because these analytes were not detected above about the laboratory's LOQs. The RPDs for GRO, benzene, ethylbenzene, and total xylenes ranged from 14 to 20 percent and thus were below the acceptable limit of 30 percent, which indicates acceptable sampling precision for this water sampling event.**

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

N/A



f. Decontamination or Equipment Blank (If not used explain why).

Yes No  NA (Please explain.) Comments:

**Not applicable. A decontamination or equipment blank was not part of our approved scope of work.**

i. All results less than PQL?

Yes No  NA (Please explain.) Comments:

**Not applicable. A decontamination or equipment blank was not part of our approved scope of work.**

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes No  NA (Please explain.) Comments:

**Not applicable for this project.**