

July 24, 2013

Wells Fargo Data Center  
6831 Arctic Boulevard  
Anchorage, Alaska 99518

Attn: Mr. Martin Shields

**RE: JUNE 2013 GROUNDWATER MONITORING, 6831 ARCTIC BOULEVARD,  
ANCHORAGE, ALASKA; ADEC FILE NO. 2100.38.492**

This report presents the results of Shannon & Wilson's June 2013 groundwater monitoring activities conducted at Wells Fargo Data Center, 6831 Arctic Boulevard, Anchorage, Alaska (the Property). The Property is identified by the Alaska Department of Environmental Conservation (ADEC) as File No. 2100.38.492.

The 2013 groundwater monitoring activities were conducted by Shannon & Wilson, Inc. on June 11, 2013. This report summarizes the results of our field activities, laboratory analyses, and conclusions. Authorization to proceed with the project was received on April 1, 2013 in the form of purchase order number 4520105000.

## **SITE AND PROJECT DESCRIPTION**

### Site Description

The project site is located at 6831 Arctic Boulevard, Anchorage, Alaska in the northwest ¼ of the southwest ¼ of Section 6, Township 12 North, Range 3 West, Anchorage (A-8) NW Quadrangle, Seward Meridian. The site topography is flat, with a regional slope to the east and south towards Campbell Creek. A vicinity map showing the project site and surrounding area is included as Figure 1.

### Background

In March 2003, Shannon & Wilson conducted a closure assessment for removal of a 1,000-gallon heating oil underground storage tank (UST) located north of the existing building. Approximately 45 cubic yards of impacted soil were removed and treated at an off-site facility. Diesel range organics (DRO) and benzene concentrations exceeding the applicable cleanup levels were identified in the in-place soil at the former UST location.

A release investigation was performed in June 2004 and included installing three groundwater monitoring wells and collecting soil and groundwater samples. Analytical results indicated that

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DRO and benzene concentrations exceeding the applicable ADEC cleanup levels were present in water and soil samples from Boring B1/Monitoring Well B1MW. Target analytes were either not detected, or were detected at concentrations less than applicable cleanup levels, in soil and groundwater samples from the remaining two borings/monitoring wells.

In July 2008, Shannon & Wilson installed Monitoring Well B4MW. Soil samples collected from a depth of 2 to 4 feet bgs and 8 to 10 feet bgs contained DRO concentrations greater than the ADEC cleanup level, with greater concentrations at the shallower depth (5,910 milligrams per kilogram [mg/kg]). The groundwater sample from Well B4MW contained 1.63 milligrams per liter (mg/L) DRO, which is greater than the ADEC cleanup level of 1.5 mg/L. Monitoring Wells B1MW and B3MW were not sampled due to apparent blockages.

In November 2009, Shannon & Wilson installed Monitoring Wells B5MW and B6MW. Monitoring Wells B1MW and B3MW were decommissioned due to damage. Concentrations of DRO in the shallower soil samples from Boring B5 (collected from 0 to 2.5 feet bgs) and Boring B6 (collected from 0 to 2.5 feet bgs) exceed the ADEC cleanup level. Concentrations of DRO exceed cleanup levels in the November 2009 groundwater samples from Wells B4MW and B5MW.

In September 2010, Shannon & Wilson installed Monitoring Wells B7MW and B8MW. Concentrations of gasoline range organics (GRO), DRO, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene in soil samples collected from Boring B8 exceed ADEC cleanup levels. The DRO (43,100 mg/kg) and naphthalene (32.1 mg/kg) concentrations measured in soil Sample B8S2 also exceed ADEC outdoor inhalation cleanup levels of 12,500 mg/kg and 28 mg/kg, respectively. Groundwater samples from Wells B4MW and B8MW, the two wells adjacent south and west of the former UST, respectively, contained DRO concentrations of 3.24 mg/L and 29.1 mg/L, respectively, which exceed the ADEC DRO cleanup level. In addition, concentrations of 2-methylnaphthalene (0.197 mg/L) from groundwater Sample B8MW exceed the 0.15 mg/L ADEC cleanup level. However, the DRO concentration in downgradient Well B6MW is less than the cleanup level, indicating that DRO has not migrated downgradient to or beneath the building structure.

In September 2011, Shannon & Wilson installed Monitoring Wells B9MW, B10MW, and B11MW in an attempt to delineate the groundwater contamination plume west and south of the former UST excavation. The DRO concentration in the smear zone soil sample from Boring B11 (collected from 4 to 6 feet bgs, 309 mg/kg) exceeded the ADEC Method 2 cleanup level. DRO-impacted groundwater was present in the wells in the immediate vicinity south (Well B4MW), west (B8MW), and southwest (Well B10MW) of the former UST excavation. In October 2011, two soil gas points, Soil Gas Probes SGP-1 and SGP-2, were installed and sampled in

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conjunction with the site characterization activities. The results of the soil gas sampling indicated that concentrations of target analytes were not present in the soil gas near the northeast corner of the structure's loading dock area. Due to seasonal fluctuations in groundwater levels at the site, groundwater was encountered in Soil Gas Probe SGP-2 and therefore could not be sampled.

Following site improvements conducted since the September 2011 sampling event and a winter 2012 excavation associated with a waterline break, a Shannon & Wilson representative visited the site on September 9, 2012 to evaluate the well status. Monitoring Wells B9MW, B10MW, and B11MW, were found to be in good condition and were not destroyed. Monitoring Wells B2MW and B4MW through B8MW appeared to have been destroyed or paved over during the 2012 excavation activities. Samples from Wells B9MW, B10MW, and B11MW were collected on October 25 and 26, 2012. The groundwater samples were analyzed for GRO, DRO, BTEX, and polynuclear aromatic hydrocarbons (PAH). None of the groundwater samples contained concentrations of GRO, DRO, BTEX, and PAHs above ADEC cleanup levels

#### Purpose and Objectives

The overall project purpose is to progress towards Cleanup Complete with Institutional Controls status with the ADEC. The project objective was to obtain current groundwater quality data in the vicinity of the presumed source area and to determine if there a need for additional wells and/or sampling.

### **FIELD ACTIVITIES**

Groundwater monitoring of Wells B9MW, B10MW, and B11MW was performed on June 11, 2013. A sampling attempt was made on May 7, 2013 but the water inside the wells was frozen and unable to be sampled. The water monitoring field effort consisted of depth to water and sample collection at three monitoring wells.

#### Groundwater Sampling

Groundwater samples were collected from Wells B9MW, B10MW, and B11MW on June 11, 2013. Depth-to-water measurements were taken with an electronic water level indicator prior to purging and sampling each individual well. The wells were purged and sampled using low-flow groundwater sampling methods with a submersible pump and disposable tubing. Purging was used to reduce the effect of stagnant well casing water on chemical concentrations and to obtain a groundwater sample that was representative of the surrounding water-bearing formation. The submersible pump was placed 2 feet from the well bottom, within the screened interval to avoid sediment disturbance. The pump rate was set at 0.1 to 0.2 liter per minute (L/min) with a goal of

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limiting the sustained water drawdown to a maximum of 4 inches. The drawdown was determined using an electronic water probe that was checked regularly throughout the purging/sampling process. During the purging process, field personnel monitored water quality parameters and purge volume at three to five minute intervals. Water quality parameters were considered stable when three consecutive measurements showed that pH was within 0.1 units, conductivity was within 3 percent, temperature was within 1 degree Celsius, and turbidity was within 10 percent or three consecutive readings of less than 10 NTUs. Following parameter stabilization, a groundwater sample was collected. Analytical samples were collected in decreasing order of volatility by transferring water directly from the pump tubing into laboratory-supplied containers. Depth to water measurements and final water quality parameters are summarized in Table 1.

For quality control purposes, one field duplicate sample, designated Sample B12MW, was collected from Well B10MW. The groundwater samples were transferred into laboratory-supplied containers in order from most volatile to least volatile and placed into chilled coolers for delivery to the project laboratory. Copies of the field notes are included as Attachment 1.

Purgewater from the monitoring wells was contained in two labeled 55-gallon drum and was stored at the Shannon & Wilson's Anchorage office.

### **LABORATORY ANALYSES**

The groundwater samples were analyzed for GRO by Alaska (AK) Method 101; DRO by AK 102; benzene, toluene, ethylbenzene and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8260B; and PAH by EPA Method 8270D SIMS. One trip blank sample accompanied the analytical sample containers from and to the laboratory during the sampling event, and was tested for GRO and BTEX. The laboratory reports are provided in Attachment 2.

### **INVESTIGATION DERIVED WASTE**

Investigation derived waste (IDW) from this project consisted of two 55-gallon drums of purge water. Because sample concentrations were less than cleanup levels, the buckets were discharged to the ground surface on July 10, 2013.

### **DISCUSSION OF ANALYTICAL RESULTS**

The reported contaminant concentrations in the groundwater were compared to the cleanup levels listed in Table C of 18 AAC 75.345 (April 2012). The analytical sample results and cleanup levels are listed in Table 2. A summary of historical groundwater data is included in Table 3.

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Four groundwater samples, including one field duplicate, were submitted to SGS for analytical testing. GRO was detected in the samples from each of the three wells during the June 2013 sampling event. In addition, benzene, xylene, and six PAHs were detected in one or more samples. None of the groundwater samples contained concentrations of GRO, DRO, BTEX, and PAHs above ADEC cleanup levels.

Based on data from the last three sampling events, GRO and DRO concentrations appear to be decreasing in Monitoring Well B10MW.

### QUALITY ASSURANCE SUMMARY

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQO). Field quality control samples included one field duplicate sample and one trip blank. Internal laboratory controls to assess data quality for this project include surrogates, method blanks, and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to determine precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the Case Narrative section of their Laboratory Analysis Report (See Attachment 2).

One duplicate sample set, comprising Samples B10MW and B12MW, was collected to assess sample homogeneity and analytical precision. DRO and RRO were detected in both samples and the relative percent difference for each detected analyte was within the DQO of 30 percent for water.

One laboratory-prepared trip blank accompanied the sample containers during transport to and from the project site. There were no detections in the trip blank indicating that the samples were not cross contaminated by these compounds during the sample handling, storage, or testing process.

Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist, which is included in Attachment 2. DRO was detected in the method blank at an estimated concentration of 0.201 mg/L. Because both the method blank and project samples contained estimated (J-flagged) DRO, DRO was considered not detected in each of the three sampled wells. The affected samples are reported at non-detect at the limit of quantitation and flagged with a "B" in Tables 2 and 4. No other non-conformances that would adversely affected data quality or usability were found.

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## CONCLUSIONS AND RECOMMENDATIONS

The June 2013 groundwater monitoring event included analytical groundwater sampling of three wells. This was the third consecutive sampling event where the concentrations reported in Monitoring Wells B9MW and B11MW did not exceed applicable ADEC cleanup levels, and the second consecutive sampling event where concentrations in Well B10MW did not exceed applicable cleanup levels. It is also noted that the historical direction of groundwater flow is towards the southeast where there are no current groundwater monitoring wells. However, Shannon & Wilson's December 2010 report *Site Characterization, 6831 Arctic Boulevard, Anchorage, Alaska 99518; ADEC File Number 2100.38.492* reported that prior to its destruction, there were no analyte detections in the downgradient Monitoring Well B6MW, indicating that DRO had not migrated downgradient to or beneath the building structure. Although elevated concentration may still be present adjacent to the former tank in the approximate locations of former Wells B1MW, B4MW, and B8MW, the plume appears to be contained on site and there is no present evidence that the plume has expanded. Moreover, the extent of the plume appears to be bound to the west, southwest, and south by the three remaining monitoring wells, which have indicated stable or declining contaminant concentrations. It is our recommendation that this site be considered for Corrective Action Complete with Institutional Controls status.

## CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our clients and their representatives in the study of this site. The findings we have presented within this report are based on the limited sampling and analyses that we conducted. They should not be construed as a definite conclusion regarding the site's groundwater conditions. Therefore, the sampling and analyses performed can provide you with only our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised.

Shannon & Wilson has prepared the documents in Attachment 3, "Important Information About Your Geotechnical/Environmental Report", to assist you and others in understanding the use and limitations of our reports. You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study, except with your permission or as required by law.

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Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

We appreciate the opportunity to be of service. Please call Shayla Marshall or the undersigned at (907) 561-2120 with questions or comments concerning this report.

Sincerely,

SHANNON & WILSON, INC.



Dane Palmer, E.I.T.  
Environmental Engineer I



Matthew Henry, P.E.  
Vice President

- Encl: Table 1 – Groundwater Sampling Log  
Table 2 – Summary of Groundwater Analytical Results  
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Anchorage, Alaska and ADEC Laboratory Data Review Checklist  
Attachment 3 – Important Information About Your Geotechnical/Environmental Report

**TABLE 1**  
**GROUNDWATER SAMPLING LOG**

	Monitoring Well Number		
	B9MW	B10MW	B11MW
<b>Water Level Measurement Data</b>			
Date Water Level Measured	6/11/2013	6/11/2013	6/11/2013
Time Water Level Measured	10:05	10:15	10:10
Surveyed TOC Elevation (ft)	97.65	97.63	95.64
Height of TOC above ground surface (ft)	-0.6	-0.7	-0.6
Measured Depth to Water (ft below TOC)	4.85	4.36	4.56
Depth to Water below ground surface (ft)	5.45	5.06	5.16
Water Level Elevation (ft)	92.80	93.27	91.08
<b>Development/Sampling Data</b>			
Date Sampled	6/11/2013	6/11/2013	6/11/2013
Time Sampled	11:20	13:40	12:30
Measured Depth to Water (ft below TOC)	4.85	4.36	4.56
Total Depth of Well (ft below TOC)	7.70	8.55	9.15
Water Column in Well (ft)	2.85	4.19	4.59
Gallons per Foot	0.16	0.16	0.16
Water Column Volume (gallons)	0.46	0.67	0.73
Total Volume Pumped (gallons)	1.72	1.20	1.06
Sampling Method	Proactive Pump	Proactive Pump	Proactive Pump
Diameter of Well Casing	2-inch	2-inch	2-inch
<b>Water Quality Data</b>			
Temperature (°C)	7.5	10.1	7.7
Specific Conductance (µS/cm)	520	530	204
pH (Standard Units)	6.25	6.44	6.30
Turbidity (NTU)	13.6	7.42	438
<b>Remarks</b>			

Notes: Water quality parameters were measured with a Hanna field water quality instrument and Hach Turbidimeter.

Survey was conducted by Shannon & Wilson on November 15, 2011.

TOC = top of casing

°C = degrees Celsius

ft = feet

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

NTU = nephelometric turbidity units



**TABLE 2**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS**

Parameter Tested	Method*	Cleanup Level (mg/L)**	Sample ID Number^ and Water Depth in Feet BTOC (See Table 1, Figure 2, and Attachment 2)					Quality WTB
			Monitoring Wells				Quality	
			B9MW 4.85	B10MW 4.36	B12MW~ 4.36	B11MW 4.56		
Gasoline Range Organics (GRO) - mg/L	AK 101	2.2	<b>0.0404 J</b>	<b>0.0498 J</b>	<b>0.0499 J</b>	<b>0.0712 J</b>	<0.0620	
Diesel Range Organics (DRO) - mg/L	AK 102	1.5	<0.577 B	<0.903 B	<0.836 B	<0.653 B	-	
Aromatic Volatile Organics (BTEX)								
Benzene - mg/L	EPA 8021B	0.005	<b>0.00204</b>	<b>0.00378</b>	<b>0.00379</b>	<0.000300	<0.000300	
Toluene - mg/L	EPA 8021B	1	<0.000620	<0.000620	<0.000620	<0.000620	<0.000620	
Ethylbenzene - mg/L	EPA 8021B	0.7	<0.000620	<0.000620	<0.000620	<0.000620	<0.000620	
Xylenes (total) - mg/L	EPA 8021B	10	<0.00186	<0.00186	<0.00186	<b>0.000570 J</b>	<0.00186	
Polynuclear Aromatic Hydrocarbons (PAHs)								
1-Methylnaphthalene - mg/L	EPA 8270D SIMS	0.15	<0.0000300	<b>0.00183</b>	<b>0.00166</b>	<0.0000300	-	
2-Methylnaphthalene - mg/L	EPA 8270D SIMS	0.15	<0.0000300	<b>0.000323</b>	<b>0.000287</b>	<0.0000300	-	
Acenaphthene - mg/L	EPA 8270D SIMS	2.2	<0.0000300	<b>0.000914</b>	<b>0.000752</b>	<0.0000300	-	
Fluorene - mg/L	EPA 8270D SIMS	1.5	<0.0000300	<b>0.00145</b>	<b>0.00124</b>	<0.0000300	-	
Naphthalene - mg/L	EPA 8270D SIMS	0.73	<0.0000620	<b>0.000770</b>	<b>0.000648</b>	<0.0000620	-	
Phenanthrene - mg/L	EPA 8270D SIMS	11	<0.0000300	<b>0.000679</b>	<b>0.000615</b>	<0.0000300	-	
Other PAHs - mg/L	EPA 8270D SIMS	Varies	ND	ND	ND	ND	-	

## Notes:

\* See Attachment 2 for compounds tested, methods, and laboratory reporting limits

\*\* Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (April 2012)

^ = sample ID No. preceded by "16828-" on the chain of custody form

mg/L = milligrams per liter

J = estimated concentration detected at a concentration less than the reporting limit

&lt;0.000620 = analyte not detected; laboratory limit of detection 0.000620 mg/L

**0.00204** = analyte detected

BTOC = below top of casing

ND = individual analytes not detected

~ = duplicate of B10MW

B = analyte concentration potentially affected by method blank contamination. See the Laboratory Data Review Checklist for details.

- = not applicable or sample not tested for this analyte

**TABLE 3**  
**SUMMARY OF HISTORICAL GROUNDWATER DATA**

Monitoring Well	Date	Water Depth (Feet BTOC)	Parameter Tested and Cleanup Level (in mg/L)					
			GRO 1.3	DRO 1.5	Benzene 0.005	Toluene 1.0	Ethylbenzene 0.7	Xylenes 10.0
B1MW	6/6/2004	3.92	0.243	1.65	0.00616	<0.00200	0.0132	0.0340
	5/13/2005	3.78	0.239	13.2	0.000531	<0.00200	0.00340	0.00428
	6/12/2006 <sup>^</sup>	5.14	-	782	0.0118	<0.00200	0.00834	0.01014
	6/28/2007	4.79	-	8.11	0.00196	<0.00200	<0.00200	0.00253
	7/17/2008	-	No water, well possibly damaged					
	5/21/2009	-	Blockage in well Well decommissioned November 2, 2009					
B2MW	6/6/2004	3.81	<0.0900	<0.337	<0.000500	<0.00200	<0.00200	<0.00200
	5/13/2005	3.67	<0.0900	<0.330	<0.000500	<0.00200	<0.00200	<0.00200
	6/12/2006 <sup>^</sup>	5.22	-	0.451	<0.000500	<0.00200	<0.00200	<0.00200
	6/28/2007 <sup>^</sup>	5.04	-	0.505	<0.000500	<0.00200	<0.00200	<0.00200
	7/17/2008	4.87	-	1.39	-	-	-	-
	5/21/2009	4.80	-	<0.714	-	-	-	-
	11/4/2009	5.25	-	1.16	-	-	-	-
	9/15/2010	4.69	<0.100	<0.769	<0.000500	<0.00200	<0.00200	<0.00200
	9/12/2011	-	Well paved over during site improvements					
	B3MW	6/6/2004	4.67	<0.0900	0.504	<0.000500	<0.00200	<0.00200
5/13/2005		3.68	<0.0900	0.922	<0.000500	<0.00200	<0.00200	<0.00200
6/12/2006 <sup>^</sup>		5.56	-	0.481	<0.000500	<0.00200	<0.00200	<0.00200
6/29/2007		5.26	-	0.410	<0.000500	<0.00200	<0.00200	<0.00200
7/17/2008		5.46	Insufficient water volume for sample collection					
5/21/2009		-	Blockage in well Well decommissioned November 2, 2009					
B4MW	7/17/2008 <sup>^</sup>	5.80	0.121	1.63	<0.000500	0.00287	<0.00200	0.00259
	5/22/2009 <sup>^</sup>	5.91	<0.100	3.93	<0.00113	<0.00200	<0.00200	0.00512 J
	11/4/2009 <sup>^</sup>	5.84	<0.100	2.22	0.00143	<0.00200	<0.00200	<0.00200
	9/15/2010	5.42	<0.100	3.24	0.00216	<0.00200	<0.00200	<0.00200
	9/15/2011	5.51	0.0390 J	3.66	0.00342	<0.000620	<0.000620	0.000810 J
	10/25/2012	-	Well removed during winter 2012					
B5MW	11/5/2009	5.51	<0.100	2.23	<0.000500	<0.00200	<0.00200	<0.00200
	9/15/2010	4.91	<0.100	1.19	<0.000500	<0.00200	<0.00200	<0.00200
	9/15/2011	5.12	<0.0600	1.33	0.000400 J	0.000560 J	<0.000620	<0.00186
	10/25/2012	-	Well removed during winter 2012					
B6MW	11/5/2009	6.39	<0.100	<0.952	<0.000500	<0.00200	<0.00200	<0.00200
	9/15/2010	6.11	<0.100	<0.714	<0.000500	<0.00200	<0.00200	<0.00200
	9/15-16/2011	6.05	<0.0600	<0.338 B	<0.000300	<0.000620	<0.000620	<0.00186
10/25/2012	-	Well removed during winter 2012						
B7MW	9/15/2010	5.97	<0.100	<0.769	<0.000500	<0.00200	<0.00200	<0.00200
	9/13/2011	5.22	<0.0600	<0.192 B	<0.000300	<0.000620	<0.000620	<0.00186
	10/25/2012	-	Well removed during winter 2012					
B8MW	9/15/2010 <sup>^</sup>	3.99	0.558	29.1	0.00262	0.00251	0.0246	0.0939
	9/15/2011	4.21	0.415	3.74	0.00330	0.00146	0.0172	0.107
	10/25/2012	-	Well removed during winter 2012					
B9MW	9/12/2011	3.88	<0.0600	0.240 J	0.000150 J	<0.000620	<0.000620	<0.00186
	10/25/2012	4.81	0.0318 J	0.256 J	0.00234	<0.000620	<0.000620	<0.00186
	6/11/2013	4.85	0.0404 J	<0.577 B	0.00204	<0.000620	<0.000620	<0.00186
B10MW	9/13/2011 <sup>^</sup>	4.00	0.250	3.69	0.0331	0.00134	0.0202	0.0312
	10/25/2012 <sup>^</sup>	4.45	0.0585 J	1.18	0.00171	<0.000620	0.000990 J	0.00155 J
	6/11/2013 <sup>^</sup>	4.36	0.0499 J	<0.903 B	0.00379	<0.000620	<0.000620	<0.00186
B11MW	9/14/2011	4.33	<0.0600	0.273 J	<0.000300	0.000330 J	<0.000620	<0.00186
	10/26/2012	4.50	<0.0620	0.952	<0.000300	<0.000620	<0.000620	<0.00186
	6/11/2013	4.56	0.0712 J	<0.653 B	<0.000300	<0.000620	<0.000620	0.000570 J

## Notes:

<sup>^</sup> = higher analytical result of the sample and duplicate

**0.243** = analyte detected

**1.65** = reported concentration exceeds the regulated cleanup level

BTOC = below top of casing

mg/L = milligrams per liter

<0.00200 = analyte not detected; laboratory reporting limit of was 0.00200 mg/L

B = analyte concentration potentially affected by method blank contamination. See the Laboratory Data Review Checklist for details.

J = estimated concentration detected at a concentration less than the reporting limit

- = not analyzed for this parameter

**TABLE 4**  
**QUALITY CONTROL DATA**

Parameter	Primary Sample	Duplicate Sample	Precision (RPD)	Precision DQO
<b>Monitoring Well B10MW Groundwater Samples</b>				
Gasoline Range Organics (GRO) - mg/L	B10MW 0.0498 J	B12MW 0.0499 J	0%	30%
Diesel Range Organics (DRO) - mg/L	<0.903 B	<0.836 B	NA	30%
Aromatic Volatile Organics (BTEX)				
Benzene - mg/L	0.00378	0.00379	0%	30%
Toluene - mg/L	<0.000620	<0.000620	NA	30%
Ethylbenzene - mg/L	<0.000620	<0.000620	NA	30%
Xylenes - mg/L	<0.00186	<0.00186	NA	30%
Polynuclear Aromatic Hydrocarbons (PAHs)				
1-Methylnaphthalene - mg/L	0.00183	0.00166	10%	30%
2-Methylnaphthalene - mg/L	0.000323	0.000287	12%	30%
Acenaphthene - mg/L	0.000914	0.000752	19%	30%
Fluorene - mg/L	0.00145	0.00124	16%	30%
Naphthalene - mg/L	0.000770	0.000648	17%	30%
Phenanthrene - mg/L	0.000679	0.000615	10%	30%

## Notes:

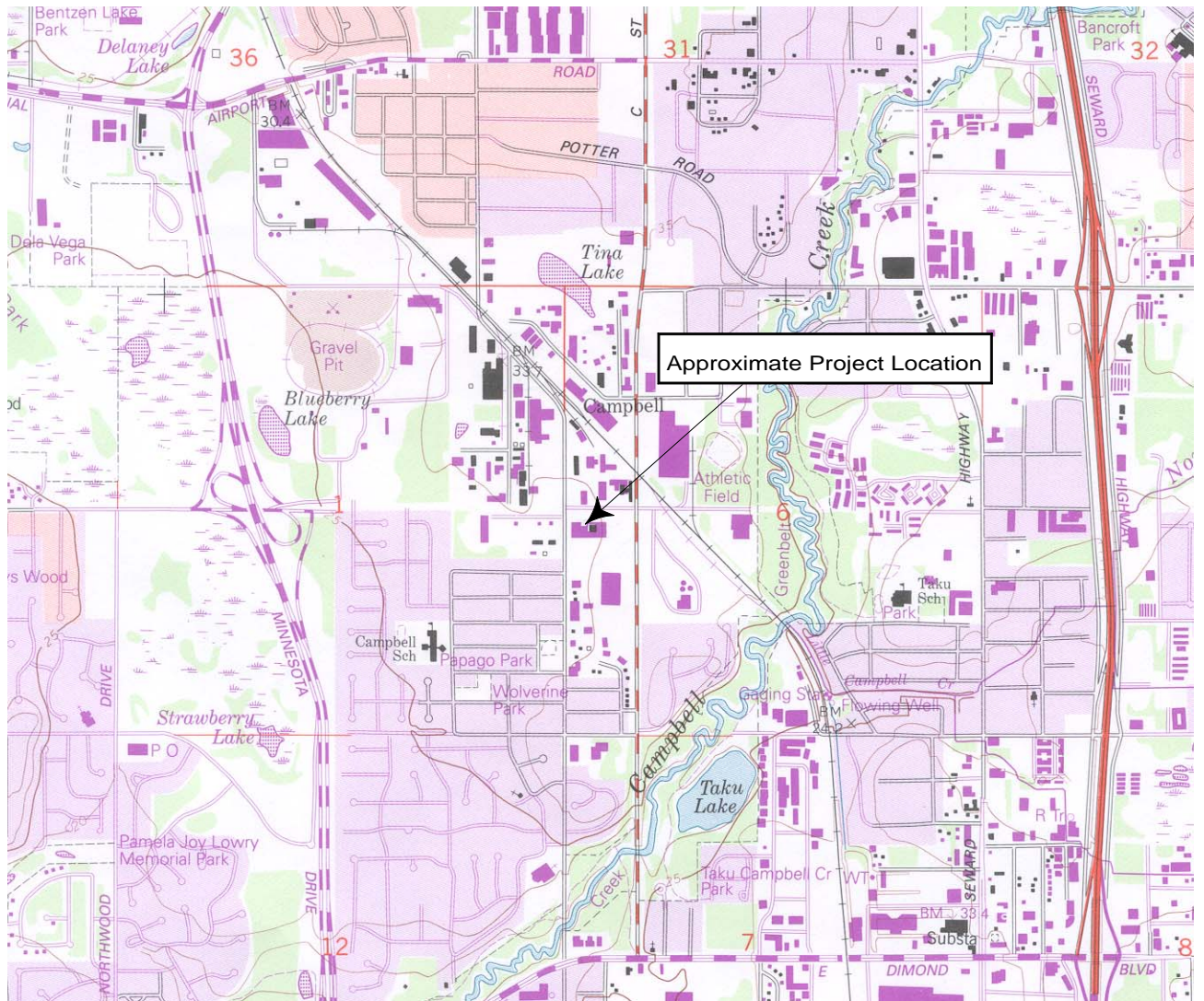
mg/L = milligrams per liter

RPD = relative percent difference

NA = RPDs were not calculated due to non-detect results or results below laboratory reporting limits

DQO = data quality objective

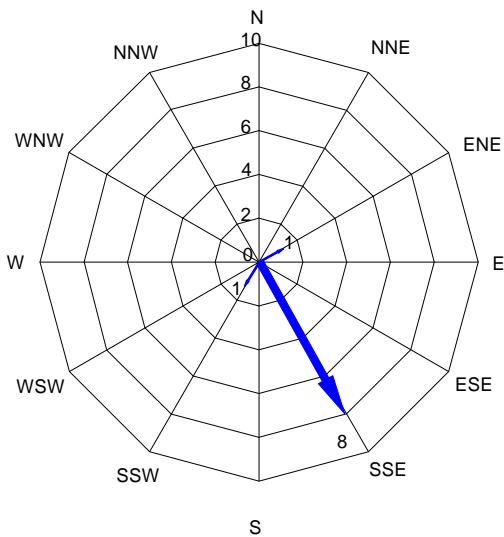
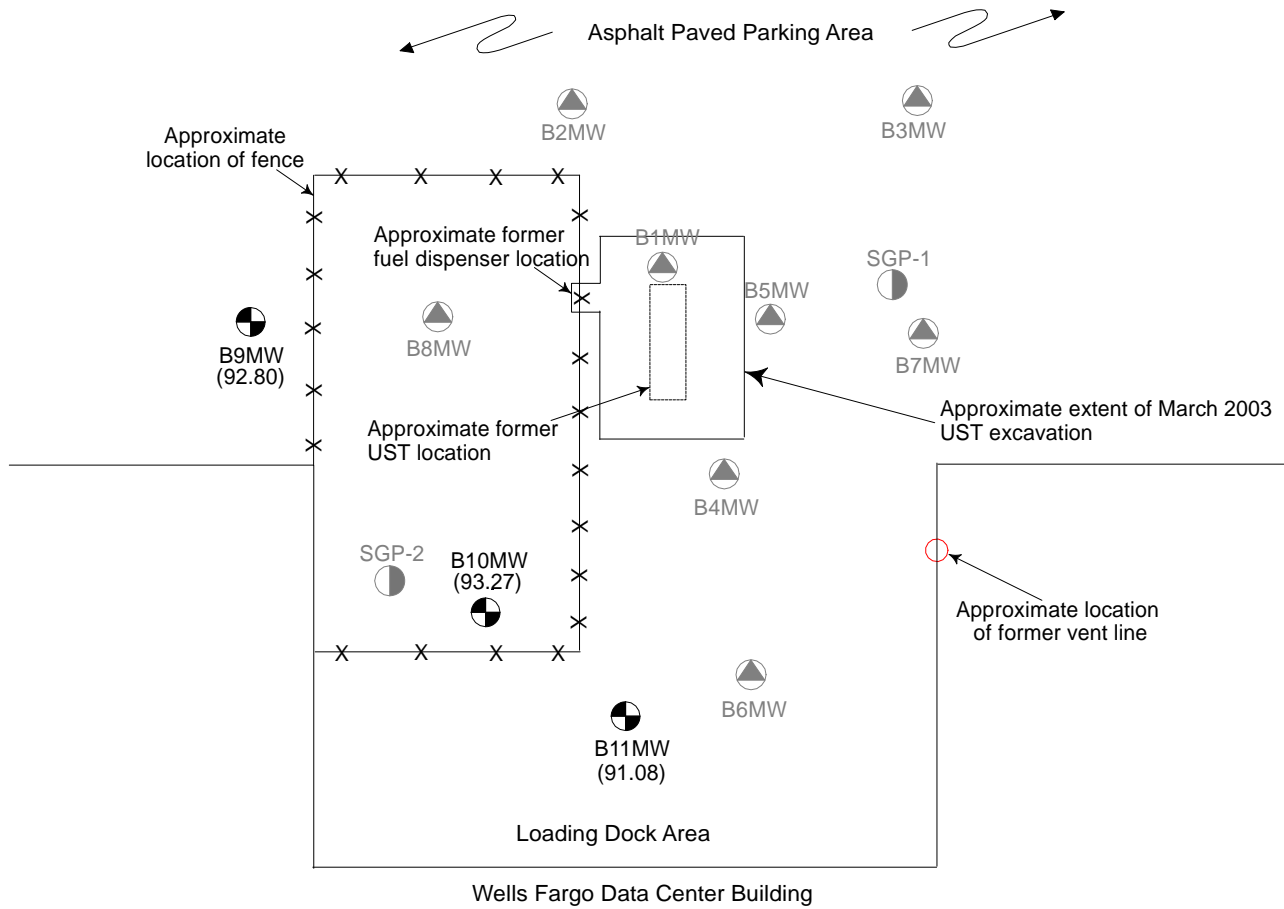
B = analyte concentration potentially affected by method blank contamination. See the Laboratory Data Review Checklist for details.



Elevation in Meters  
Contour Interval 5 Meters  
Taken from Anchorage A-8 NW (1994)  
U.S. Geological Survey Quadrangle



6831 Arctic Boulevard Anchorage, Alaska	
<b>VICINITY MAP</b>	
July 2013	32-1-16828-011
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	<b>Fig. 1</b>



**Rose/Star Groundwater Flow Diagram**

Number of times groundwater has flowed in a particular direction during nine monitoring events since 2004.

Note - 2013 Data not included in this rose diagram due to inconclusive data

**LEGEND**

- Approximate location of Monitoring Well B9MW and approximate groundwater elevation based on the October 12, 2012 depth to water measurements and the November 15, 2011 survey.
- Approximate location of former Soil Gas Point SGP-1
- Approximate location of well that was decommissioned or paved over during site improvements



6831 Arctic Boulevard Anchorage, Alaska	
<b>SITE PLAN</b>	
July 2013	32-1-16828-011
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	<b>Fig. 2</b>

**ATTACHMENT 1**  
**FIELD NOTES**



- 805: Arrive on site to see if wells are frozen  
Talk with Wells Fargo rep.  
She did not know how to get into gate
- 815: Gate to well MW10 is open.  
Well is not frozen
- 830: Return to SIW to get sampling equipment.
- 955: Arrive on site  
Check depth to water  
Begin purging B9MW  
See sampling logs for details.
- 1415: Off site  
Purge water is stored at Shannon & Wilson in 2 5-gallon buckets.



# LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 16828-011 Location: 6831 Arctic Blvd. Weather: 65°F Sun  
 Well No.: B9MW  
 Date: 6/11/13 ~~May 7, 2013~~ Time Started: \_\_\_\_\_ Time Completed: 1145  
 Develop Date: \_\_\_\_\_ Develop End Time: \_\_\_\_\_ (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1005 Date of Depth Measurement: 6/11/13  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 7.70 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 4.85  
 Water Column in Well: 2.85 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.45 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 6/11/13 ~~May 7, 2013~~ Time Started: 1028 Time Completed: 1120  
 Three Well Volumes: 1.37 (Gallons in Well x 3)  
 Gallons Purged: ~1.75 gal Depth of Pump (generally 2 ft from bottom): 5.5'  
 Max. Drawdown (generally 0.3 ft): \_\_\_\_\_ Pump Rate: 0.1 to 0.2 4/min

Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log)

Time:	Gallons: <i>Liters</i>	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1035	0.5		-	-	8.7	566		6.03		19.6
1040	1.25		4.94	0.09	9.9	549		6.12		17.8
1045	2		-	-	7.4	552		6.23		14.5
1050	2.75		-	-	7.4	558		6.26		12.1
1055	3.5		5.01	0.16	7.3	548		6.22		11.2
1100	4.25		-	-	7.4	531		6.20		12.5

## SAMPLING DATA

Odor: None Color: Yellow/clear  
 Sample Designation: 16828-B9MW Time / Date: 1120 6/11/13  
 QC Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_  
 QA Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_

Evacuation Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Sampling Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Water Quality Instruments Used/Manufacturer/Model Number: Hanna #1, HACH Turbidimeter  
 Calibration Info (Time, Ranges, etc): Hanna #1 at 930 on 6/11/13  
 Remarks: Sampled for GRO/BTEX, DRO, and PAH  
Used limited DRO jars  
 Sampling Personnel: JCT

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23





Shannon & Wilson, Inc.

**LOW-FLOW WATER SAMPLING LOG**

Continued from previous page

Job No: 16828-011 Location: 6831 Arctic Blvd. Site: Wells Fargo Data Center  
 Well No.: B9MW  
 Date: ~~July 7, 2013~~ 6/11/13 AT

Time:	Liters Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1105	5		-	-	7.5	526		6.30		13.6
1110	5.75		-	-	7.5	526		6.28		13.4
1115	6.5		-	-	7.5	520		6.25		13.6

**STABILIZATION PARAMETERS**

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
DEC 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
PA 2010)	5	50	<0.3	±3%	±3%	±10% or <0.5	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.  
 ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.



# LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 16828-011 Location: 6831 Archa Blvd. Weather: 65°F Sun  
 Well No.: B10MW  
 Date: May 7, 2013 <sup>6/11/13</sup> Time Started: \_\_\_\_\_ Time Completed: 1440  
 Develop Date: \_\_\_\_\_ Develop End Time: \_\_\_\_\_ (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1015 Date of Depth Measurement: 6/11/13  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other:  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 8.55 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 4.36  
 Water Column in Well: 4.19 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.67 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: May 7, 2013 <sup>6/11/13</sup> Time Started: 1307 Time Completed: 1420  
 Three Well Volumes: 2 (Gallons in Well x 3)  
 Gallons Purged: \_\_\_\_\_ Depth of Pump (generally 2 ft from bottom): 7.5'  
 Max. Drawdown (generally 0.3 ft): \_\_\_\_\_ Pump Rate: 0.1 to 0.2 4min

Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log)

Time:	Gallons: Liters	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1315	1		-	-	12.0	552		6.13		32.9
1320	1.75		4.55		10.5	520		6.34		10.7
1325	2.5		-	-	10.2	527		6.41		8.53
1330	3.75		-	-	10.1	531		6.46		7.53
1335	4.5		-	-	10.1	530		6.44		7.42

## SAMPLING DATA

Odor: Sulfur Color: Yellow/Clear  
 Sample Designation: 16828-B10MW Time / Date: 1340 6/11/13  
 QC Sample Designation: 16828-B12MW Time / Date: 1400 6/11/13  
 QA Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_

Evacuation Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Sampling Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Water Quality Instruments Used/Manufacturer/Model Number: Hanna #1, Hach Turbidimeter  
 Calibration Info (Time, Ranges, etc): Hanna #1 at 930 on 6/11/13  
 Remarks: Duplicate B12MW. Sampled for GRO/BTEF, DRD, and PAH

Sampling Personnel: JCT  
 WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23



# LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 16828-011 Location: 6831 Archa Blvd Weather: 65°F Sun  
 Well No.: B11 MW  
 Date: May 7, 2013 <sup>6/11/13</sup> Time Started: \_\_\_\_\_ Time Completed: \_\_\_\_\_  
 Develop Date: \_\_\_\_\_ Develop End Time: \_\_\_\_\_ (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1010 Date of Depth Measurement: 6/11/13  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 9.15 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 4.56  
 Water Column in Well: 4.59 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.73 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 6/11/13 Time Started: 1200 Time Completed: \_\_\_\_\_  
 Three Well Volumes: 2.2 (Gallons in Well x 3)  
 Gallons Purged: \_\_\_\_\_ Depth of Pump (generally 2 ft from bottom): 8'  
 Max. Drawdown (generally 0.3 ft): \_\_\_\_\_ Pump Rate: 0.1 to 0.2 L/min

Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log)

Time:	Gallons: Liters	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1205	0.75		-	-	13.0	212		6.52		393
1210	1.5		5.09		8.4	211		6.34		319
1213	2		-	-	7.6	211		6.29		322
1216	2.5		5.27		7.7	207		6.31		379
1219	3		-	-	7.7	206		6.32		402
1222	3.5		-	-	7.6	204		6.33		420

## SAMPLING DATA

Odor: None Color: Brown/Yellow  
 Sample Designation: 16828-B11 MW Time / Date: 1230 6/11/13  
 QC Sample Designation: - Time / Date: \_\_\_\_\_  
 QA Sample Designation: - Time / Date: \_\_\_\_\_

Evacuation Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Sampling Method: Bladder Pump / Submersible Pump / Other: Proactive  
 Water Quality Instruments Used/Manufacturer/Model Number: Hanna #1 Hach Turbiditymeter  
 Calibration Info (Time, Ranges, etc): Hanna #1 at 930 on 6/11/13

Remarks: Sampled for GRO/BTEX, DRO, and PAH

Sampling Personnel: Jack Tracy

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23



Shannon & Wilson, Inc.

LOW-FLOW WATER SAMPLING LOG

Continued from previous page

Job No: 16828-011 Location: 6881 Arche Blvd. Site: Wells Fargo Data Center  
Well No.: B11MW  
Date: ~~May 7, 2013~~ 6/11/13

Time:	Gallons: <i>Liters</i>	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1225	4		5.60		7.7	204		6.30		438

STABILIZATION PARAMETERS

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
PA 2010)	5	50	<0.3	±3%	±3%	±10% or <0.5	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.  
ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

1102010



Page 1 of 1

# CHAIN-OF-CUSTODY RECORD

**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100  
Seattle, WA 98103  
(206) 632-8020

303 Wellesian Way  
Richland, WA 99352  
(509) 946-6309

2355 Hill Road  
Fairbanks, AK 99709  
(907) 479-0600

5430 Fairbanks Street, Suite 3  
Anchorage, AK 99518  
(907) 561-2120

2255 S.W. Canyon Road  
Portland, OR 97201-2498  
(503) 223-6147

1200 17th Street, Suite 1024  
Denver, Co 80202  
(303) 825-3800

Laboratory SBS  
Attn: Steve Crisp

Analysis Parameters/Sample Container Description  
(include preservative if used)

Comp. Grab	GR0 / BTEX	AL 101 / KM S&B	DE0	PAH	ERM B2/10/5 M
------------	------------	-----------------	-----	-----	---------------

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab	GR0 / BTEX	AL 101 / KM S&B	DE0	PAH	ERM B2/10/5 M	Total Number of Containers	Remarks/Matrix
16828 - B7MW		1120	6/11/13	X	X	X	X	X	X	7	Groundwater
16828 - B11MW		1230	6/11/13	X	X	X	X	X	X	7	
16828 - B10MW		1340	6/11/13	X	X	X	X	X	X	7	
16828 - B12MW		1400	6/11/13	X	X	X	X	X	X	7	
16828 - B7B		800	6/11/13	X	X	X	X	X	X	3	Tripe blank

**Project Information**

Project Number: 16828-011  
 Project Name: 6831 Arctic  
 Contact: S&M  
 Ongoing Project? Yes  No   
 Sampler: JGT

**Sample Receipt**

Total Number of Containers  
 COC Seals/Intact? Y/N/NA  
 Received Good Cond./Cold  
 Delivery Method:  
 (attach shipping bill, if any)

<b>Relinquished By: 1.</b> Signature: <u>[Signature]</u> Printed Name: <u>John Tracy</u> Date: <u>6/11/13</u> Company: <u>Shannon &amp; Wilson</u>	<b>Relinquished By: 2.</b> Signature: _____ Printed Name: _____ Date: _____ Company: _____	<b>Relinquished By: 3.</b> Signature: _____ Printed Name: _____ Date: _____ Company: _____
<b>Received By: 1.</b> Signature: _____ Printed Name: _____ Date: _____ Company: _____	<b>Received By: 2.</b> Signature: _____ Printed Name: _____ Date: _____ Company: _____	<b>Received By: 3.</b> Signature: <u>[Signature]</u> Printed Name: <u>Emily Seaton</u> Date: <u>6/11/13</u> Company: <u>SGS</u>

**Instructions**

Requested Turnaround Time: Standard  
 Special Instructions: Level II deliverables

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report  
 Yellow - w/shipment - for consignee files  
 Pink - Shannon & Wilson - Job File

F-19-91/UR 1 of 2: 6.0 / #11 2 of 2: 6.5 / #239 No. 30049

**ATTACHMENT 2**

**RESULTS OF ANALYTICAL TESTING BY**  
**SGS NORTH AMERICA INC. OF ANCHORAGE, ALASKA**  
**AND**  
**ADEC LABORATORY DATA REVIEW CHECKLIST**

## Laboratory Report of Analysis

To: Shannon & Wilson, Inc.  
5430 Fairbanks St., Ste 3  
Anchorage, AK 99518  
(907)433-3246

Report Number: **1132313**

Client Project: **16828-011 6831 Arctic**

Dear Shayla Marshall,

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 five 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 Steve 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  
Environmental Services - Alaska Division  
Project Manager

Steven Crupi  
2013.06.27

15:13:25 -08'00'

---

Steve Crupi  
Project Manager  
steven.crupi@sgs.com

Date

### Case Narrative

SGS Client: **Shannon & Wilson, Inc.**  
SGS Project: **1132313**  
Project Name/Site: **16828-011 6831 Arctic**  
Project Contact: **Shayla Marshall**

Refer to sample receipt form for information on sample condition.

**16828-B11MW (1132313002) PS**

AK102 - The pattern is consistent with a weathered middle distillate.

**16828-B10MW (1132313003) PS**

AK102 - The pattern is consistent with a weathered middle distillate.

**16828-B12MW (1132313004) PS**

AK102 - The pattern is consistent with a weathered middle distillate.

**LCS for HBN 1454565 [XXX/29136 (1152244) LCS**

8270D SIM - LCS/LCSD recovery for chrysene is outside of QC criteria (biased high). This analyte was not detected above the LOQ in the associated samples.

**LCSD for HBN 1454565 [XXX/2913 (1152245) LCSD**

8270D SIM - LCS/LCSD recovery for chrysene is outside of QC criteria (biased high). This analyte was not detected above the LOQ in the associated samples.

\*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: 06/24/2013 4:52:20PM



## 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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<[http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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., 2xDL)
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>
16828-B9MW	1132313001	06/11/2013	06/11/2013	Water (Surface, Eff., Ground)
16828-B11MW	1132313002	06/11/2013	06/11/2013	Water (Surface, Eff., Ground)
16828-B10MW	1132313003	06/11/2013	06/11/2013	Water (Surface, Eff., Ground)
16828-B12MW	1132313004	06/11/2013	06/11/2013	Water (Surface, Eff., Ground)
16828-WTB	1132313005	06/11/2013	06/11/2013	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
8270D SIMS (PAH)	8270 PAH SIM Semi-Vol GC/MS Liq/Liq ext.
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	DRO Low Volume (W)

Print Date: 06/24/2013 4:52:21PM

### Detectable Results Summary

Client Sample ID: **16828-B9MW**

Lab Sample ID: 1132313001

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.438J	mg/L
Benzene	2.04	ug/L
Gasoline Range Organics	0.0404J	mg/L

Client Sample ID: **16828-B11MW**

Lab Sample ID: 1132313002

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.653	mg/L
Gasoline Range Organics	0.0712J	mg/L
o-Xylene	0.570J	ug/L

Client Sample ID: **16828-B10MW**

Lab Sample ID: 1132313003

**Polynuclear Aromatics GC/MS**

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	1.83	ug/L
2-Methylnaphthalene	0.323	ug/L
Acenaphthene	0.914	ug/L
Fluorene	1.45	ug/L
Naphthalene	0.770	ug/L
Phenanthrene	0.679	ug/L
Diesel Range Organics	0.903	mg/L
Benzene	3.78	ug/L
Gasoline Range Organics	0.0498J	mg/L

Client Sample ID: **16828-B12MW**

Lab Sample ID: 1132313004

**Polynuclear Aromatics GC/MS**

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	1.66	ug/L
2-Methylnaphthalene	0.287	ug/L
Acenaphthene	0.752	ug/L
Fluorene	1.24	ug/L
Naphthalene	0.648	ug/L
Phenanthrene	0.615	ug/L
Diesel Range Organics	0.836	mg/L
Benzene	3.79	ug/L
Gasoline Range Organics	0.0499J	mg/L



**Results of 16828-B9MW**

Client Sample ID: **16828-B9MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313001  
Lab Project ID: 1132313

Collection Date: 06/11/13 11:20  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
2-Methylnaphthalene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Acenaphthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Acenaphthylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Benzo(a)Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Benzo[a]pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Benzo[b]Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Benzo[g,h,i]perylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Benzo[k]fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Chrysene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Dibenzo[a,h]anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Fluorene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Indeno[1,2,3-c,d] pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Naphthalene	0.0620	U	0.100	0.0310	ug/L	1	06/13/13 13:27
Phenanthrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
Pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 13:27
<b>Surrogates</b>							
2-Fluorobiphenyl	80.1		50-110		%	1	06/13/13 13:27
Terphenyl-d14	113		50-135		%	1	06/13/13 13:27

**Batch Information**

Analytical Batch: XMS7365  
Analytical Method: 8270D SIMS (PAH)  
Analyst: RTS  
Analytical Date/Time: 06/13/13 13:27  
Container ID: 1132313001-F

Prep Batch: XXX29136  
Prep Method: SW3520C  
Prep Date/Time: 06/12/13 09:45  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B9MW**

Client Sample ID: **16828-B9MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313001  
Lab Project ID: 1132313

Collection Date: 06/11/13 11:20  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.438	J	0.577	0.173	mg/L	1	06/20/13 16:12
<b>Surrogates</b>							
5a Androstane	92		50-150		%	1	06/20/13 16:12

**Batch Information**

Analytical Batch: XFC10932  
Analytical Method: AK102  
Analyst: HM  
Analytical Date/Time: 06/20/13 16:12  
Container ID: 1132313001-D

Prep Batch: XXX29164  
Prep Method: SW3520C  
Prep Date/Time: 06/14/13 10:05  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B9MW**

Client Sample ID: **16828-B9MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313001  
Lab Project ID: 1132313

Collection Date: 06/11/13 11:20  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0404	J	0.100	0.0310	mg/L	1	06/12/13 13:17

**Surrogates**

4-Bromofluorobenzene	78.1		50-150		%	1	06/12/13 13:17
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:17  
Container ID: 1132313001-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	2.04		0.500	0.150	ug/L	1	06/12/13 13:17
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:17
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:17
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/12/13 13:17
Toluene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:17

**Surrogates**

1,4-Difluorobenzene	93.5		77-115		%	1	06/12/13 13:17
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:17  
Container ID: 1132313001-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



**Results of 16828-B11MW**

Client Sample ID: **16828-B11MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313002  
Lab Project ID: 1132313

Collection Date: 06/11/13 12:30  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
2-Methylnaphthalene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Acenaphthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Acenaphthylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Benzo(a)Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Benzo[a]pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Benzo[b]Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Benzo[g,h,i]perylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Benzo[k]fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Chrysene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Dibenzo[a,h]anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Fluorene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Indeno[1,2,3-c,d] pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Naphthalene	0.0620	U	0.100	0.0310	ug/L	1	06/13/13 14:41
Phenanthrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
Pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:41
<b>Surrogates</b>							
2-Fluorobiphenyl	83		50-110		%	1	06/13/13 14:41
Terphenyl-d14	111		50-135		%	1	06/13/13 14:41

**Batch Information**

Analytical Batch: XMS7365  
Analytical Method: 8270D SIMS (PAH)  
Analyst: RTS  
Analytical Date/Time: 06/13/13 14:41  
Container ID: 1132313002-F

Prep Batch: XXX29136  
Prep Method: SW3520C  
Prep Date/Time: 06/12/13 09:45  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B11MW**

Client Sample ID: **16828-B11MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313002  
Lab Project ID: 1132313

Collection Date: 06/11/13 12:30  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.653		0.577	0.173	mg/L	1	06/20/13 16:32
<b>Surrogates</b>							
5a Androstane	85.6		50-150		%	1	06/20/13 16:32

**Batch Information**

Analytical Batch: XFC10932  
Analytical Method: AK102  
Analyst: HM  
Analytical Date/Time: 06/20/13 16:32  
Container ID: 1132313002-D

Prep Batch: XXX29164  
Prep Method: SW3520C  
Prep Date/Time: 06/14/13 10:05  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM





**Results of 16828-B11MW**

Client Sample ID: **16828-B11MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313002  
Lab Project ID: 1132313

Collection Date: 06/11/13 12:30  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0712	J	0.100	0.0310	mg/L	1	06/12/13 13:36

**Surrogates**

4-Bromofluorobenzene	83.1		50-150		%	1	06/12/13 13:36
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:36  
Container ID: 1132313002-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	0.300	U	0.500	0.150	ug/L	1	06/12/13 13:36
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:36
o-Xylene	0.570	J	1.00	0.310	ug/L	1	06/12/13 13:36
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/12/13 13:36
Toluene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:36

**Surrogates**

1,4-Difluorobenzene	93.4		77-115		%	1	06/12/13 13:36
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:36  
Container ID: 1132313002-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B10MW**

Client Sample ID: **16828-B10MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313003  
Lab Project ID: 1132313

Collection Date: 06/11/13 13:40  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	1.83		0.0500	0.0150	ug/L	1	06/13/13 14:57
2-Methylnaphthalene	0.323		0.0500	0.0150	ug/L	1	06/13/13 14:57
Acenaphthene	0.914		0.0500	0.0150	ug/L	1	06/13/13 14:57
Acenaphthylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Benzo(a)Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Benzo[a]pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Benzo[b]Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Benzo[g,h,i]perylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Benzo[k]fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Chrysene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Dibenzo[a,h]anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Fluorene	1.45		0.0500	0.0150	ug/L	1	06/13/13 14:57
Indeno[1,2,3-c,d] pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
Naphthalene	0.770		0.100	0.0310	ug/L	1	06/13/13 14:57
Phenanthrene	0.679		0.0500	0.0150	ug/L	1	06/13/13 14:57
Pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 14:57
<b>Surrogates</b>							
2-Fluorobiphenyl	80.3		50-110		%	1	06/13/13 14:57
Terphenyl-d14	111		50-135		%	1	06/13/13 14:57

**Batch Information**

Analytical Batch: XMS7365  
Analytical Method: 8270D SIMS (PAH)  
Analyst: RTS  
Analytical Date/Time: 06/13/13 14:57  
Container ID: 1132313003-F

Prep Batch: XXX29136  
Prep Method: SW3520C  
Prep Date/Time: 06/12/13 09:45  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



### Results of 16828-B10MW

Client Sample ID: **16828-B10MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313003  
Lab Project ID: 1132313

Collection Date: 06/11/13 13:40  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.903		0.577	0.173	mg/L	1	06/20/13 16:52
<b>Surrogates</b>							
5a Androstane	85.2		50-150		%	1	06/20/13 16:52

### Batch Information

Analytical Batch: XFC10932  
Analytical Method: AK102  
Analyst: HM  
Analytical Date/Time: 06/20/13 16:52  
Container ID: 1132313003-D

Prep Batch: XXX29164  
Prep Method: SW3520C  
Prep Date/Time: 06/14/13 10:05  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B10MW**

Client Sample ID: **16828-B10MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313003  
Lab Project ID: 1132313

Collection Date: 06/11/13 13:40  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0498	J	0.100	0.0310	mg/L	1	06/12/13 13:54

**Surrogates**

4-Bromofluorobenzene	82.6		50-150		%	1	06/12/13 13:54
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:54  
Container ID: 1132313003-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	3.78		0.500	0.150	ug/L	1	06/12/13 13:54
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:54
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:54
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/12/13 13:54
Toluene	0.620	U	1.00	0.310	ug/L	1	06/12/13 13:54

**Surrogates**

1,4-Difluorobenzene	93.7		77-115		%	1	06/12/13 13:54
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/12/13 13:54  
Container ID: 1132313003-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B12MW**

Client Sample ID: **16828-B12MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313004  
Lab Project ID: 1132313

Collection Date: 06/11/13 14:00  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
1-Methylnaphthalene	1.66		0.0500	0.0150	ug/L	1	06/13/13 15:13
2-Methylnaphthalene	0.287		0.0500	0.0150	ug/L	1	06/13/13 15:13
Acenaphthene	0.752		0.0500	0.0150	ug/L	1	06/13/13 15:13
Acenaphthylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Benzo(a)Anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Benzo[a]pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Benzo[b]Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Benzo[g,h,i]perylene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Benzo[k]fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Chrysene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Dibenzo[a,h]anthracene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Fluoranthene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Fluorene	1.24		0.0500	0.0150	ug/L	1	06/13/13 15:13
Indeno[1,2,3-c,d] pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
Naphthalene	0.648		0.100	0.0310	ug/L	1	06/13/13 15:13
Phenanthrene	0.615		0.0500	0.0150	ug/L	1	06/13/13 15:13
Pyrene	0.0300	U	0.0500	0.0150	ug/L	1	06/13/13 15:13
<b>Surrogates</b>							
2-Fluorobiphenyl	69.8		50-110		%	1	06/13/13 15:13
Terphenyl-d14	108		50-135		%	1	06/13/13 15:13

**Batch Information**

Analytical Batch: XMS7365  
Analytical Method: 8270D SIMS (PAH)  
Analyst: RTS  
Analytical Date/Time: 06/13/13 15:13  
Container ID: 1132313004-F

Prep Batch: XXX29136  
Prep Method: SW3520C  
Prep Date/Time: 06/12/13 09:45  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



### Results of 16828-B12MW

Client Sample ID: **16828-B12MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313004  
Lab Project ID: 1132313

Collection Date: 06/11/13 14:00  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.836		0.577	0.173	mg/L	1	06/20/13 17:12
<b>Surrogates</b>							
5a Androstane	85.8		50-150		%	1	06/20/13 17:12

### Batch Information

Analytical Batch: XFC10932  
Analytical Method: AK102  
Analyst: HM  
Analytical Date/Time: 06/20/13 17:12  
Container ID: 1132313004-D

Prep Batch: XXX29164  
Prep Method: SW3520C  
Prep Date/Time: 06/14/13 10:05  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:22PM



**Results of 16828-B12MW**

Client Sample ID: **16828-B12MW**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313004  
Lab Project ID: 1132313

Collection Date: 06/11/13 14:00  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0499	J	0.100	0.0310	mg/L	1	06/12/13 14:51

**Surrogates**

4-Bromofluorobenzene	80.3		50-150		%	1	06/12/13 14:51
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/12/13 14:51  
Container ID: 1132313004-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	3.79		0.500	0.150	ug/L	1	06/12/13 14:51
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:51
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:51
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/12/13 14:51
Toluene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:51

**Surrogates**

1,4-Difluorobenzene	93.3		77-115		%	1	06/12/13 14:51
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**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/12/13 14:51  
Container ID: 1132313004-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



**Results of 16828-WTB**

Client Sample ID: **16828-WTB**  
Client Project ID: **16828-011 6831 Arctic**  
Lab Sample ID: 1132313005  
Lab Project ID: 1132313

Collection Date: 06/11/13 08:00  
Received Date: 06/11/13 14:17  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/12/13 14:32
<b>Surrogates</b>							
4-Bromofluorobenzene	72.8		50-150		%	1	06/12/13 14:32

**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/12/13 14:32  
Container ID: 1132313005-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	0.300	U	0.500	0.150	ug/L	1	06/12/13 14:32
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:32
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:32
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/12/13 14:32
Toluene	0.620	U	1.00	0.310	ug/L	1	06/12/13 14:32
<b>Surrogates</b>							
1,4-Difluorobenzene	93.5		77-115		%	1	06/12/13 14:32

**Batch Information**

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/12/13 14:32  
Container ID: 1132313005-A

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 06/12/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/24/2013 4:52:22PM





### Method Blank

Blank ID: MB for HBN 1454760 [VXX/24802]  
Blank Lab ID: 1152437

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132313001, 1132313002, 1132313003, 1132313004, 1132313005

### Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0620U	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	72.4	50-150		%

### Batch Information

Analytical Batch: VFC11459  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: ST  
Analytical Date/Time: 6/12/2013 8:17:00AM

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 6/12/2013 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/24/2013 4:52:24PM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1132313 [VXX24802]  
 Blank Spike Lab ID: 1152440  
 Date Analyzed: 06/12/2013 11:44

Spike Duplicate ID: LCSD for HBN 1132313 [VXX24802]  
 Spike Duplicate Lab ID: 1152441  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132313001, 1132313002, 1132313003, 1132313004, 1132313005

### 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	0.925	93	1.00	0.908	91	( 60-120 )	1.90	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	79.7	80	0.0500	80.9	81	( 50-150 )	1.50	

### Batch Information

Analytical Batch: **VFC11459**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890 PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24802**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/12/2013 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

Print Date: 06/24/2013 4:52:25PM



### Method Blank

Blank ID: MB for HBN 1454760 [VXX/24802]  
Blank Lab ID: 1152437

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132313001, 1132313002, 1132313003, 1132313004, 1132313005

### Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	94.9	77-115		%

### Batch Information

Analytical Batch: VFC11459  
Analytical Method: SW8021B  
Instrument: Agilent 7890 PID/FID  
Analyst: ST  
Analytical Date/Time: 6/12/2013 8:17:00AM

Prep Batch: VXX24802  
Prep Method: SW5030B  
Prep Date/Time: 6/12/2013 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/24/2013 4:52:26PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132313 [VXX24802]  
 Blank Spike Lab ID: 1152438  
 Date Analyzed: 06/12/2013 08:54

Spike Duplicate ID: LCSD for HBN 1132313 [VXX24802]  
 Spike Duplicate Lab ID: 1152439  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132313001, 1132313002, 1132313003, 1132313004, 1132313005

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	102	102	100	104	104	( 80-120 )	2.20	(< 20 )
Ethylbenzene	100	110	110	100	112	112	( 75-125 )	2.20	(< 20 )
o-Xylene	100	103	103	100	104	104	( 80-120 )	1.50	(< 20 )
P & M -Xylene	200	220	110	200	225	112	( 75-130 )	2.30	(< 20 )
Toluene	100	108	108	100	111	111	( 75-120 )	2.30	(< 20 )

## Surrogates

1,4-Difluorobenzene	50	101	101	50	102	102	( 77-115 )	0.51	
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## Batch Information

Analytical Batch: **VFC11459**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890 PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24802**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/12/2013 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 1454565 [XXX/29136]  
 Blank Lab ID: 1152243

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1132313001, 1132313002, 1132313003, 1132313004

## Results by 8270D SIMS (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	0.0300U	0.0500	0.0150	ug/L
2-Methylnaphthalene	0.0300U	0.0500	0.0150	ug/L
Acenaphthene	0.0300U	0.0500	0.0150	ug/L
Acenaphthylene	0.0300U	0.0500	0.0150	ug/L
Anthracene	0.0300U	0.0500	0.0150	ug/L
Benzo(a)Anthracene	0.0300U	0.0500	0.0150	ug/L
Benzo[a]pyrene	0.0300U	0.0500	0.0150	ug/L
Benzo[b]Fluoranthene	0.0300U	0.0500	0.0150	ug/L
Benzo[g,h,i]perylene	0.0300U	0.0500	0.0150	ug/L
Benzo[k]fluoranthene	0.0300U	0.0500	0.0150	ug/L
Chrysene	0.0300U	0.0500	0.0150	ug/L
Dibenzo[a,h]anthracene	0.0300U	0.0500	0.0150	ug/L
Fluoranthene	0.0300U	0.0500	0.0150	ug/L
Fluorene	0.0300U	0.0500	0.0150	ug/L
Indeno[1,2,3-c,d] pyrene	0.0300U	0.0500	0.0150	ug/L
Naphthalene	0.0620U	0.100	0.0310	ug/L
Phenanthrene	0.0300U	0.0500	0.0150	ug/L
Pyrene	0.0300U	0.0500	0.0150	ug/L
<b>Surrogates</b>				
2-Fluorobiphenyl	90.6	50-110		%
Terphenyl-d14	119	50-135		%

## Batch Information

Analytical Batch: XMS7365  
 Analytical Method: 8270D SIMS (PAH)  
 Instrument: HP 6890/5973 MS SVQA  
 Analyst: RTS  
 Analytical Date/Time: 6/13/2013 12:38:00PM

Prep Batch: XXX29136  
 Prep Method: SW3520C  
 Prep Date/Time: 6/12/2013 9:45:00AM  
 Prep Initial Wt./Vol.: 1000 mL  
 Prep Extract Vol: 1 mL



**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1132313 [XXX29136]  
 Blank Spike Lab ID: 1152244  
 Date Analyzed: 06/13/2013 12:55

Spike Duplicate ID: LCSD for HBN 1132313 [XXX29136]  
 Spike Duplicate Lab ID: 1152245  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132313001, 1132313002, 1132313003, 1132313004

**Results by 8270D SIMS (PAH)**

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	0.5	0.438	88	0.5	0.417	83	( 47-107 )	4.80	(< 30 )
2-Methylnaphthalene	0.5	0.379	76	0.5	0.337	67	( 45-105 )	11.70	(< 30 )
Acenaphthene	0.5	0.399	80	0.5	0.384	77	( 45-110 )	3.80	(< 30 )
Acenaphthylene	0.5	0.416	83	0.5	0.385	77	( 50-105 )	7.50	(< 30 )
Anthracene	0.5	0.453	91	0.5	0.426	85	( 55-110 )	6.10	(< 30 )
Benzo(a)Anthracene	0.5	0.521	104	0.5	0.500	100	( 55-110 )	4.00	(< 30 )
Benzo[a]pyrene	0.5	0.473	95	0.5	0.469	94	( 55-110 )	0.76	(< 30 )
Benzo[b]Fluoranthene	0.5	0.494	99	0.5	0.527	105	( 45-120 )	6.40	(< 30 )
Benzo[g,h,i]perylene	0.5	0.495	99	0.5	0.479	96	( 40-125 )	3.10	(< 30 )
Benzo[k]fluoranthene	0.5	0.592	118	0.5	0.541	108	( 45-125 )	9.00	(< 30 )
Chrysene	0.5	0.555	111	* 0.5	0.573	115	* ( 55-110 )	3.10	(< 30 )
Dibenzo[a,h]anthracene	0.5	0.495	99	0.5	0.488	98	( 40-125 )	1.30	(< 30 )
Fluoranthene	0.5	0.558	112	0.5	0.561	112	( 55-115 )	0.48	(< 30 )
Fluorene	0.5	0.406	81	0.5	0.386	77	( 50-110 )	5.10	(< 30 )
Indeno[1,2,3-c,d] pyrene	0.5	0.509	102	0.5	0.509	102	( 45-125 )	0.11	(< 30 )
Naphthalene	0.5	0.411	82	0.5	0.375	75	( 40-100 )	9.00	(< 30 )
Phenanthrene	0.5	0.419	84	0.5	0.387	77	( 50-115 )	8.00	(< 30 )
Pyrene	0.5	0.532	106	0.5	0.554	111	( 50-130 )	4.00	(< 30 )
<b>Surrogates</b>									
2-Fluorobiphenyl	0.5	92.2	92	0.5	92.3	92	( 50-110 )	0.05	
Terphenyl-d14	0.5	116	116	0.5	115	115	( 50-135 )	1.00	

**Batch Information**

Analytical Batch: XMS7365  
 Analytical Method: 8270D SIMS (PAH)  
 Instrument: HP 6890/5973 MS SVQA  
 Analyst: RTS

Prep Batch: XXX29136  
 Prep Method: SW3520C  
 Prep Date/Time: 06/12/2013 09:45  
 Spike Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:28PM



**Method Blank**

Blank ID: MB for HBN 1454986 [XXX/29164]  
Blank Lab ID: 1152848

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132313001, 1132313002, 1132313003, 1132313004

**Results by AK102**

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.201J	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane	101	60-120		%

**Batch Information**

Analytical Batch: XFC10932  
Analytical Method: AK102  
Instrument: HP 7890A FID SV E R  
Analyst: HM  
Analytical Date/Time: 6/20/2013 2:33:00PM

Prep Batch: XXX29164  
Prep Method: SW3520C  
Prep Date/Time: 6/14/2013 10:05:00AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:28PM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1132313 [XXX29164]  
 Blank Spike Lab ID: 1152849  
 Date Analyzed: 06/20/2013 15:33

Spike Duplicate ID: LCSD for HBN 1132313 [XXX29164]  
 Spike Duplicate Lab ID: 1152850  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132313001, 1132313002, 1132313003, 1132313004

### 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	20	17.8	89	20	18.7	93	( 75-125 )	4.70	(< 20 )
<b>Surrogates</b>									
5a Androstane	0.4	94.6	95	0.4	101	101	( 60-120 )	6.70	

### Batch Information

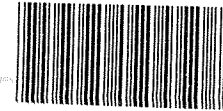
Analytical Batch: **XFC10932**  
 Analytical Method: **AK102**  
 Instrument: **HP 7890A FID SV ER**  
 Analyst: **HM**

Prep Batch: **XXX29164**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **06/14/2013 10:05**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 06/24/2013 4:52:29PM



1132313



**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

**CHAIN-OF-CUSTODY RECORD**

Laboratory: SGS  
Attn: Steve Crupi

400 N. 34th Street, Suite 100  
Seattle, WA 98103  
(206) 632-8020

2043 Westport Center Drive  
St. Louis, MO 63146-3564  
(314) 699-9660

303 Wellsian Way  
Richland, WA 99352  
(509) 946-6309

2355 Hill Road  
Fairbanks, AK 99709  
(907) 479-0600

5430 Fairbanks Street, Suite 3  
Anchorage, AK 99518  
(907) 561-2120

2255 S.W. Canyon Road  
Portland, OR 97201-2498  
(503) 223-6147

1200 17th Street, Suite 1024  
Denver, Co 80202  
(303) 825-3800

**Analysis Parameters/Sample Container Description**  
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Analysis Parameters/Sample Container Description							Total Number of Containers	Remarks/Matrix
				Comp.	Grab	GR0/BTEX	AL101/EPA 821B	DR0	AL102	PAH		
16828-B9MW	① A-G	1120	6/11/13	X	X	X	X				7	Groundwater ↓
16828-B11MW	② A-G	1230	6/11/13	X	X	X	X				7	
16828-B10MW	③ A-G	1340	6/11/13	X	X	X	X				7	
16828-B12MW	④ A-G	1400	6/11/13	X	X	X	X				7	
16828-WTB	⑤ A-C	800	6/11/13		X						3	Trip blank

Project Information	Sample Receipt
Project Number: <u>16828-011</u>	Total Number of Containers: _____
Project Name: <u>6831 Arctic</u>	COC Seals/Intact? Y/N/NA: _____
Contact: <u>SIM</u>	Received Good Cond./Cold: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: _____
Sampler: <u>JCT</u>	(attach shipping bill, if any)

Instructions
Requested Turnaround Time: <u>Standard</u>
Special Instructions: <u>Level II deliverables</u>

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report  
Yellow - w/shipment - for consignee files  
Pink - Shannon & Wilson - Job File

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>[Signature]</u> Time: <u>1417</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Mike Tracy</u> Date: <u>6/11/13</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: <u>Shannon &amp; Wilson</u>	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: <u>[Signature]</u> Time: <u>1417</u>
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: <u>Emily Secret</u> Date: <u>6/11/13</u>
Company: _____	Company: _____	Company: <u>SGS</u>



## SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	Yes No <u>N/A</u> Yes No <u>N/A</u>	<u>absent</u>
Temperature blank compliant* (i.e., 0-6°C after CF)? * Note: Exemption permitted for chilled samples collected less than 8 hours ago. Cooler ID: <u>1</u> @ <u>6.0</u> w/ Therm.ID: <u>4</u> Cooler ID: <u>2</u> @ <u>6.5</u> w/ Therm.ID: <u>239</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Note: If non-compliant, use form FS-0029 to document affected samples/analyses. If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled." If temperature(s) <0°C, were all sample containers <u>ice free</u> ?	Yes <u>No</u> N/A Yes No <u>N/A</u> Yes No <u>N/A</u>	<u>samples collected w/i 8 hrs</u>
Delivery method (specify all that apply): <u>Client</u> USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	Note ABN/tracking # See Attached or <u>N/A</u> Yes No <u>N/A</u>	
→ For samples received with payment, note amount (\$) and cash / check / CC (circle one) or note: → For samples received in FBKS, ANCH staff will verify all criteria are reviewed.		<u>N/A</u> SRF Initiated by: <u>HLC</u> <u>N/A</u>
Were samples received within hold time? Note: Refer to form F-083 "Sample Guide" for hold time information. Do samples match COC* (i.e., sample IDs, dates/times collected)? * Note: Exemption permitted if times differ <1hr; in that case, use times on COC. Were analyses requested unambiguous?	<u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No N/A	
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): <u>Bubble Wrap</u> Separate plastic bags Vermiculite Other:	<u>Yes</u> No N/A	
Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB?	<u>Yes</u> No N/A <u>Yes</u> No <u>N/A</u>	
Were proper containers (type/mass/volume/preservative*) used? * Note: Exemption permitted for waters to be analyzed for metals. Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<u>Yes</u> No N/A <u>Yes</u> No N/A	
For special handling (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No <u>N/A</u>	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant? If pH was adjusted, were bottles flagged (i.e., stickers)?	<u>Yes</u> No N/A Yes No <u>N/A</u>	
For RUSH/SHORT Hold Time, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No <u>N/A</u>	
For SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	Yes No <u>N/A</u>	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No <u>N/A</u>	SRF Completed by: <u>HLC</u> PM = <u>N/A</u>
Was PEER REVIEW of sample numbering/labeling completed?	Yes No <u>N/A</u>	Peer Reviewed by: <u>N/A</u>
Additional notes (if applicable):		

Note to Client: Any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

## LABORATORY DATA REVIEW CHECKLIST

**Completed by:** Dane Palmer

**Title:** Environmental Engineer, E.I.T.

**Date:** 07/09/2013

**CS Report Name:** June 2013 Groundwater Monitoring, 6831 Arctic Boulevard, Anchorage Alaska; ADEC File No. 2100.38.492

**Laboratory Report Date:** 06/27/2013

**Consultant Firm:** Shannon & Wilson, Inc.

**Laboratory Name:** SGS North America Inc.

**Laboratory Report Number:** 1132313

**ADEC File Number:** 2100.38.492

**ADEC RecKey Number:** NA

(NOTE: NA = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

### 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:

### 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 blanks in Coolers 1 of 2 and 2 of 2 were  $6^{\circ} \text{C}$  and  $6.5^{\circ} \text{C}$ , respectively. Samples were delivered to the laboratory within 8 hours of first sample time.*
- 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: *Laboratory receipt does not note any improper sample conditions.*
- d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes** / **No** / **NA** (please explain)  
Comments: *No discrepancies were noted.*
- e. Data quality or usability affected? Please explain.  
Comments: *Data quality was not affected by the out of range cooler temperatures. If the samples are delivered to the laboratory within 8 hours of the first sample time, it is acceptable to submit samples at temperatures above  $6^{\circ} \text{C}$ .*

### **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 Case Narrative states that LCS/LCSD recoveries for chrysene are outside of QC criteria (biased high). Chrysene was not detected in the associated samples.*
- c. Were corrective actions documented? **Yes** / **No** / **NA** (please explain)  
Comments:
- d. What is the effect on data quality/usability, according to the case narrative?  
Comments: *Data quality was not affected. The affected analyte was not detected in the project samples.*

## 5. Sample 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:
- d. Are the reported LOQs 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? Please explain. **NA**  
Comments:

## 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 LOQ? **Yes** / No / NA (please explain)  
Comments: *DRO was detected in the method blank at an estimated (J-flagged) concentration (0.201 mg/L).*
- iii. If above LOQ, what samples are affected?  
Comments: *Project Samples B9MW, B10MW, B11MW, and B12MW were affected.*
- iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?  
**Yes** / No / NA (please explain)  
Comments: *Affected samples are flagged with a "B" in Tables 2 and 4.*
- v. Data quality or usability affected? Please explain.  
Comments: *Project Samples B9MW, B10MW, B11MW, and B12MW were affected and are considered not detected at the limit of quantitation.*

**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:
- 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: *LCS/LCSD percent recoveries for chrysene exceed laboratory limits.*
- iv. Precision – All relative percent differences (RPDs) 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: *Project samples were not affected.*
- vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes** / No / **NA** (please explain)  
Comments:
- vii. Data quality or usability affected? Please explain. **NA**  
Comments: *Data quality was not affected. Chrysene was not detected in the project samples.*

**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:

iv. Data quality or usability affected? Please explain. **NA**

Comments:

**d. Trip Blank** - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.)  
Water and Soil

i. One trip blank reported per matrix, analysis and cooler? (If not, enter explanation below.) **Yes / No / NA** (please explain)

Comments: *One trip blank was submitted with the project samples. Only one cooler was delivered.*

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment stating why must be entered below.) **Yes / No / NA** (please explain)

Comments: *The COC does not indicate which cooler the trip blank was transported in; however only one cooler was used.*

iii. All results less than LOQ? **Yes / No / NA** (please explain)

Comments:

iv. If above LOQ, what samples are affected? **NA**

Comments:

v. Data quality or usability affected? Please explain. **NA**

Comments:

**e. Field Duplicate**

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

**Yes / No / NA** (please explain)

Comments: *Sample B12MW was the water field duplicate for Sample B10MW.*

ii. Submitted blind to the lab? **Yes / No / NA** (please explain)

Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs? (Recommended: 30% for water, 50% for soil) **Yes / No / NA** (please explain)

Comments:

iv. Data quality or usability affected? Please explain. **NA**

Comments:

**f. Decontamination or Equipment Blank** (if not applicable)

Yes / **No** / NA (please explain)

Comments: *Equipment blanks were not part of the project scope. Dedicated disposable tubing was used, and the sampling pump was decontaminated between wells.*

**i.** All results less than LOQ? Yes / No / **NA** (please explain)

Comments:

**ii.** If above LOQ, what samples are affected? **NA**

Comments:

**iii.** Data quality or usability affected? Please explain.

Comments:

**7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-specific, etc.)**

**a.** Defined and appropriate? **Yes** / No / NA (please explain)

Comments: *A key is provided on Page 3 of the laboratory report.*



**ATTACHMENT 3**  
**IMPORTANT INFORMATION ABOUT YOUR**  
**GEOTECHNICAL/ENVIRONMENTAL REPORT**



Date: July 2013  
To: Wells Fargo Data Center  
Re: 6831 Arctic Boulevard, Anchorage, AK

## **Important Information About Your Geotechnical/Environmental Report**

### **CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.**

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

### **THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.**

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

### **SUBSURFACE CONDITIONS CAN CHANGE.**

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

### **MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.**

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

## **A REPORT'S CONCLUSIONS ARE PRELIMINARY.**

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

## **THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.**

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

## **BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.**

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

## **READ RESPONSIBILITY CLAUSES CLOSELY.**

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the  
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland