

July 26, 2019

City of Palmer
Public Works Department
1316A S. Bonanza Street
Palmer, Alaska 99645

Attn: Mr. Chris Nall

**RE: RELEASE INVESTIGATION, 1316 S. BONANZA STREET, PALMER, ALASKA;
ADEC FILE NO. 2245.26.009**

This letter presents the results of Shannon & Wilson's Release Investigation activities conducted at 1316 S. Bonanza Street, Palmer, Alaska. A vicinity map showing the project site and surrounding area is included as Figure 1.

The project was conducted in material accordance with our April 25, 2019 work plan which was approved by Ms. Chelsy Passmore of the Alaska Department of Environmental Conservation (ADEC) in a letter dated May 9, 2019.

BACKGROUND

In September 1991, Gilfilian Engineering, Inc. removed one 1,500-gallon diesel underground storage tank (UST), two 1,500-gallon gasoline USTs, one gasoline dispenser, one diesel dispenser, and associated piping from the eastern portion of the property. Buried piping connected the USTs to the gasoline and diesel dispensers approximate 30 feet to the west. Three pipe joints were observed at the half-way point of the piping approximately 15 to 17 feet from the USTs.

The UST excavation measured approximately 30 feet by 14 feet with a maximum depth of 22 feet below ground surface (bgs). Soil was excavated to approximately 2 feet bgs beneath the length of the product piping, and a maximum of 7 feet bgs beneath the three pipe joints where samples were collected. Additionally, soil beneath the gasoline and diesel dispensers was excavated to approximately 6 feet bgs where samples were collected. Excavated soil mostly consisted of silty sand with gravel. Analytical soil samples collected from beneath the gasoline USTs, the gasoline dispenser, and one of the piping joints exceeded the current ADEC migration to groundwater Method Two cleanup level for benzene.

Approximately 120 cubic yards of impacted soil was stockpiled on a 10-mil plastic liner on the southwest corner of the Property. Four samples were collected from the stockpile. The fate of the stockpile is currently unknown.

In a letter dated October 3, 2018, Ms. Chelsey Passmore of the ADEC requested a work plan for additional site characterization in order to further delineate the horizontal and vertical extent of contamination. The purpose of this project is to address the ADEC's requests and the goal is to receive conditional closure.

PROJECT ACTIVITIES

The project included advancing two soil borings, collecting analytical soil samples, and reporting. Geotek Alaska Inc. (Geotek) provided the equipment and personnel to advance the borings. SGS North America Inc. (SGS) provided chemical analysis of the soil samples. A Shannon & Wilson representative was present during field activities to identify the boring locations, log subsurface materials, and screen and sample subsurface soil.

Prior to advancing the soil borings, the utility locate center and City of Palmer was contacted to mark buried utilities within the project area. The locations of the borings and general site features are shown on Figure 2. Site photographs are included in Attachment 1, boring logs are included in Attachment 2, and field notes are included in Attachment 3.

Soil Borings

Two soil borings, designated Borings B1 and B2, were advanced by Geotek on June 7, 2019 using a track-mounted Geoprobe® 8040DT direct push drill rig equipped with 2.25-inch outside diameter direct push samplers (Photos 1 through 4). Boring B1 was advanced in the location of the former UST array. Boring B2 was advanced in the approximate location of the former gasoline dispenser. Boring B1 and B2 were advanced to 60 and 30 feet bgs, respectively, which were the maximum depths presented in our work plan.

Starting at 20 feet bgs in Boring B1 and 5 feet in Boring B2, soil samples were recovered on a continuous basis using 5-foot bgs macrocore sampling sleeves. Each sampling sleeve was removed from the sampling device and split down the long axis. The soil sections were visually subdivided into 2.5-foot intervals for field screening purposes, if practicable based on sample recovery length. Immediately following retrieval and opening of the samplers, analytical samples and field screening samples were collected. The analytical sample jars for volatile analyses were collected first, followed by the non-volatile analytical sample jars, and finally the

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field screening sample. The soil samples were “screened” for volatile organic vapors using a Thermo Instruments OVM 580B photoionization detector

(PID) and an Alaska Department of Environmental Conservation (ADEC) approved headspace screening technique. The PID was calibrated before screening activities with 100 parts per million (ppm) isobutylene standard gas. The field screening samples were collected in re-sealable plastic bags by filling them with freshly exposed soil to one-half of their volumes, sealing the top, warmed to at least 40 degrees Fahrenheit, and screened between 10 to 60 minutes of collection. Screening was accomplished by inserting the PID sampling probe into the air space above the soil in the bag. The results of the field screening are included in Table 1.

Three analytical soil samples, including a duplicate, were collected from Boring B1. One sample was also collected from Boring B2. The samples were collected from the sample intervals with the highest PID headspace readings. The analytical soil samples tested for volatile constituents were collected using methanol preservation. In accordance with the method, at least 25 grams of soil were quickly placed into a laboratory supplied 4-ounce jar that had been pre-weighed. Afterward, 25 milliliters of reagent grade methanol was added to submerge the soil. The methanol extracts the hydrocarbons from the soil at the time of sampling, thereby reducing the possible loss of volatile constituents prior to sample analysis. The samples were transferred to the appropriate laboratory-supplied jars using decontaminated stainless-steel spoons, and transferred to the laboratory in a cooler with ice packs using chain-of-custody procedures.

SUBSURFACE CONDITIONS

The soil encountered during drilling generally consisted of poorly-graded gravel with sand to poorly graded sand with gravel from the surface to the bottom of the borings. Boring B2 had a silt layer from approximately 5 to 7.5 feet bgs. Groundwater was not encountered during drilling. Boring logs are included as Attachment 2.

LABORATORY ANALYSES

The four soil samples, including one duplicate sample, were analyzed for gasoline range organics (GRO) by Alaska Method (AK) 101 and benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B. In addition, the sample with the highest PID reading (Sample B1S12) was analyzed for volatile organic compounds (VOCs) by EPA Method 8260C, in lieu of BTEX, and polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270D. One methanol trip blank accompanied the soil samples and was analyzed for GRO by AK 101 and VOCs by EPA Method 8260C.

DISCUSSION OF ANALYTICAL RESULTS

The analytical soil sample results were compared to the ADEC cleanup levels presented in the October 2018, 18 Alaska Administrative Code (AAC) 75 regulations. The applicable soil criteria consist of the most stringent ADEC Method Two cleanup levels listed in Tables B1 and B2 of 18 AAC 75.341, for the “under 40-inch (precipitation) zone. The analytical soil sample results are summarized in Tables 2. The analytical laboratory report is included as Attachment 4.

Soil Samples

Concentrations of GRO (maximum of 0.819 J milligrams per kilogram [mg/kg]), benzene (maximum of 0.00471 J mg/kg), toluene (maximum of 0.0423 mg/kg), ethylbenzene (maximum of 0.00997 J mg/kg), and xylenes (maximum of 0.101 mg/kg) were detected in the samples collected from Boring B1. These concentrations are less than the ADEC Method Two cleanup levels of 300 mg/kg, 0.022 mg/kg, 6.7 mg/kg, 0.13 mg/kg, and 1.5 mg/kg, respectively. In addition, Sample B1S12 had estimated concentrations of 1,2,4-trimethylbenzene (0.0372 J mg/kg), 1,3,5-trimethylbenzene (0.0106 J mg/kg), and n-propylbenzene (0.00679 J mg/kg) which are less than the ADEC Method Two cleanup levels of 0.2 mg/kg, 1.3 mg/kg, and 9.4 mg/kg, respectively. The remaining tested analytes were not detected in the soil samples.

Quality Control

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQOs). Internal laboratory controls to assess data quality for this project include surrogates, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to assess precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory report (see Attachment 4).

External quality controls included a duplicate sample and a trip blank. One soil duplicate sample set (Samples B1S4/B1S40) was collected to assess the precision of the sampling and analysis process using the calculated relative percent difference (RPD). The RPDs are within the ADEC recommended DQO of 50 percent for soil. One methanol soil trip blank (Sample STB) accompanied the sample jars, as appropriate, from the laboratory to the site during sampling activities and back again to SGS. Target analytes were not detected in the soil trip blank; therefore, the usability of the groundwater data is considered not adversely affected.

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Shannon & Wilson conducted a limited data assessment to review the laboratory's compliance with precision, accuracy, sensitivity, and completeness to the DQOs. Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist, which is included in Attachment 4. Non-conformances that would adversely affect the quality or usability of the data were noted.

SUMMARY

The project included advancing two soil borings and collecting soil samples. The soil samples did not contain target analytes greater than ADEC cleanup levels. Therefore, we recommend requesting conditional closure from the ADEC for this site.

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of City of Palmer and its representatives in the study of this site. The findings we have presented within this report are based on the limited sampling and analyses that was conducted. They should not be construed as definite conclusions regarding the site's soil. It is possible that our tests missed higher levels of target contaminants, although our intention was to sample areas likely to be impacted and in accordance with our proposal. As a result, the sampling, analyses, and data interpretations can provide you with only our professional judgment as to the environmental characteristics of this site, and in no way guarantee 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.

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.

Shannon & Wilson has prepared the documents in Attachment 5, "Important Information About Your Geotechnical/Environmental Report", to assist you and others in understanding the use and limitations of our report.

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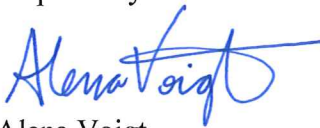
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We appreciate the opportunity to be of service with the characterization of this site. Please contact the undersigned at (907) 561-2120 with questions or comments concerning this report.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:



Alena Voigt
Environmental Scientist

Reviewed by:



Dan McMahon
Senior Associate

Encl: Tables 1 and 2, Figures 1 and 2, and Attachments 1 through 5

TABLE 1
SAMPLE LOCATIONS

Sample Number	Date	Sample Location (See Figure 2 and Attachment 2)	Depth (feet)^	Headspace (ppm) ^^
Soil Samples				
<u>Boring B1</u>				
B1S1	6/7/2019	Boring B1, Sample S1	20-25	0.5
B1S2	6/7/2019	Boring B1, Sample S2	25-27.5	6.4
B1S3	6/7/2019	Boring B1, Sample S3	27.5-30	0.0
* B1S4	6/7/2019	Boring B1, Sample S4	30-35	7.8
* B1S40	6/7/2019	Duplicate of Sample B1S4	30-35	7.8
B1S5	6/7/2019	Boring B1, Sample S5	35-40	2.7
B1S6	6/7/2019	Boring B1, Sample S6	40-42.5	0.2
B1S7	6/7/2019	Boring B1, Sample S7	42.5-45	0.1
B1S8	6/7/2019	Boring B1, Sample S8	45-47.5	1.3
B1S9	6/7/2019	Boring B1, Sample S9	47-5-50	0.1
B1S10	6/7/2019	Boring B1, Sample S10	50-52.5	0.0
B1S11	6/7/2019	Boring B1, Sample S11	52.5-55	4.6
* B1S12	6/7/2019	Boring B1, Sample S12	55-60	16.8
<u>Boring B2</u>				
B2S1	6/7/2019	Boring B2, Sample S1	5-7.5	0.5
B2S2	6/7/2019	Boring B2, Sample S2	7.5-10	0.5
B2S3	6/7/2019	Boring B2, Sample S3	10-12.5	0.5
B2S4	6/7/2019	Boring B2, Sample S4	12.5-15	0.5
B2S5	6/7/2019	Boring B2, Sample S5	15-17.5	0.8
B2S6	6/7/2019	Boring B2, Sample S6	17.5-20	0.5
B2S7	6/7/2019	Boring B2, Sample S7	20-22.5	0.2
* B2S8	6/7/2019	Boring B2, Sample S8	22.5-25	0.9
B2S9	6/7/2019	Boring B2, Sample S9	25-27.5	0.0
B2S10	6/7/2019	Boring B2, Sample S10	27.5-30	0.0
Quality Control Samples				
* STB	6/7/2019	Soil Trip Blank	-	-

Notes:

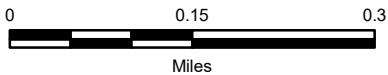
- * = Sample analyzed by the project laboratory (See Table 2).
- ^ = Depth of soil samples are measured below ground surface and groundwater samples were measured from below top of casing.
- ^^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID).
- = Not applicable
- ppm = parts per million
- bgs = below ground surface

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample ID Number^ and Soil Sample Depth in Feet Below Ground Surface (See Table 1, Figure 2, and Attachment 2)				
			Boring Soil Samples				Trip Blank
			B1S4 30-35	B1S40^^ 30-35	B1S12 55-60	B2S8 22.5-25	STB -
PID Headspace Reading - ppm	OVM 580B	-	7.8	7.8	16.8	0.9	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	0.636 J	0.819 J	0.700 J	<1.05	<1.25
Volatile Organic Compounds (VOCs)							
Benzene - mg/kg	EPA 8021B/8260C	0.022	0.00467 J	0.00471 J	0.00445 J	<0.00530	<0.00625
Toluene - mg/kg	EPA 8021B/8260C	6.7	0.0314	0.0284	0.0423	<0.0106	<0.0125
Ethylbenzene - mg/kg	EPA 8021B/8260C	0.13	0.00997 J	0.00839 J	0.0189 J	<0.0106	<0.0125
Xylenes (total) - mg/kg	EPA 8021B/8260C	1.5	0.0987	0.0857	0.101	<0.0317	<0.0375
1,2,4-Trimethylbenzene - mg/kg	EPA 8021B/8260C	0.61	-	-	0.0372 J	-	<0.0251
1,3,5-Trimethylbenzene -mg/kg	EPA 8021B/8260C	0.66	-	-	0.0106 J	-	<0.0125
n-Propylbenzene - mg/kg	EPA 8021B/8260C	9.1	-	-	0.00679 J	-	<0.0125
Other VOC analytes - mg/kg	EPA 8021B/8260C	various	-	-	ND	-	ND
Polynuclear Aromatic Hydrocarbons (PAHs) - mg/kg	EPA 8270D SIM	various	-	-	ND	-	-

Notes:

- * = See Attachment 4 for compounds tested, methods, and laboratory reporting limits
- ** = Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75 (October 2018), for the "under 40 inches (precipitation) zone"
- ^ = Sample ID number preceded by "102919-" on the chain of custody form
- ^^ = Duplicate of Sample B1S4
- PID = Photoionization detector
- ppm = Parts per million
- mg/kg = Milligrams per kilogram
- <1.05 = Analyte not detected; laboratory limit of detection of 1.05 mg/kg
- 0.0314** = Analyte detected
- ND = Analyte not detected
- = Not applicable or sample not tested for this analyte
- J** = Estimated concentration less than the limit of quantitation. See the SGS laboratory report for details.



1316 South Bonanza Street
Palmer, Alaska

VICINITY MAP

July 2019


102919-001

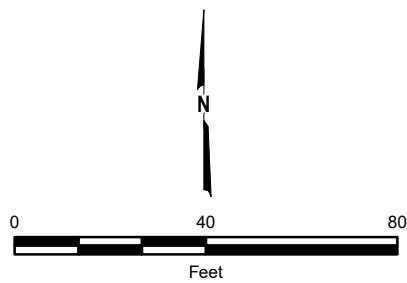
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FIG. 1



Legend

B1  Approximate location of Boring B1.



1316 South Bonanza Street Palmer, Alaska	
SITE PLAN	
April 2019	102919-001
 SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS	FIG. 2

ATTACHMENT 1
SITE PHOTOGRAPHS



Photo 1: Looking south at the advancement of Boring B1. (June 7, 2019)

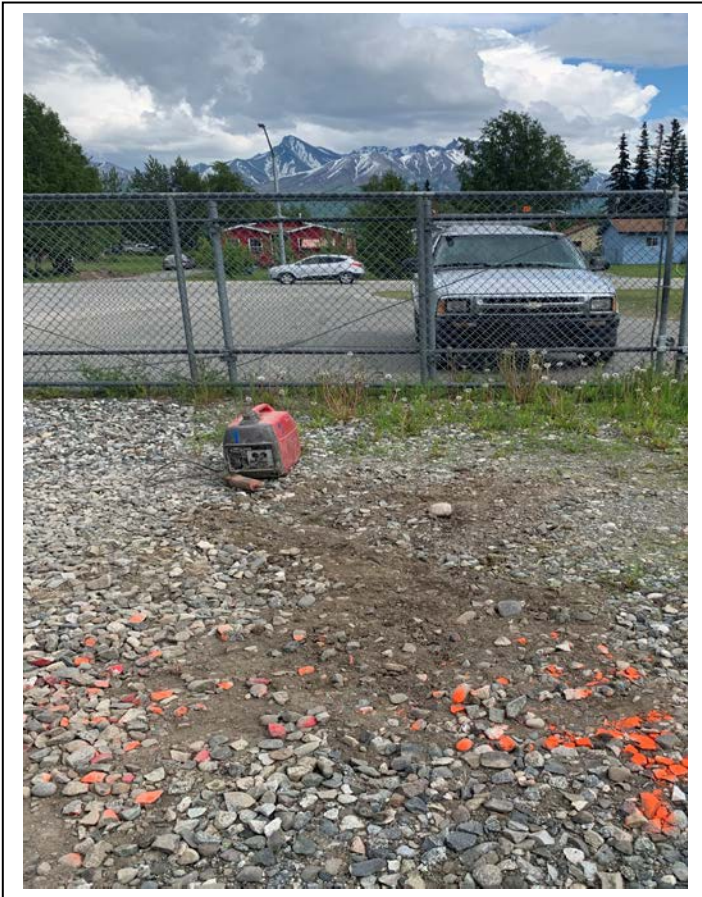


Photo 2: Looking east at the location of Boring B1. (June 7, 2019)

1316 S. Bonanza Street
Palmer, Alaska

PHOTOS 1 AND 2

July 2019

102919-001

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Photo 3: Looking south at the advancement of Boring B2. (June 7, 2019)



Photo 4: Looking west at the location of Boring B2. (June 7, 2019)

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Palmer, Alaska

PHOTOS 3 AND 4

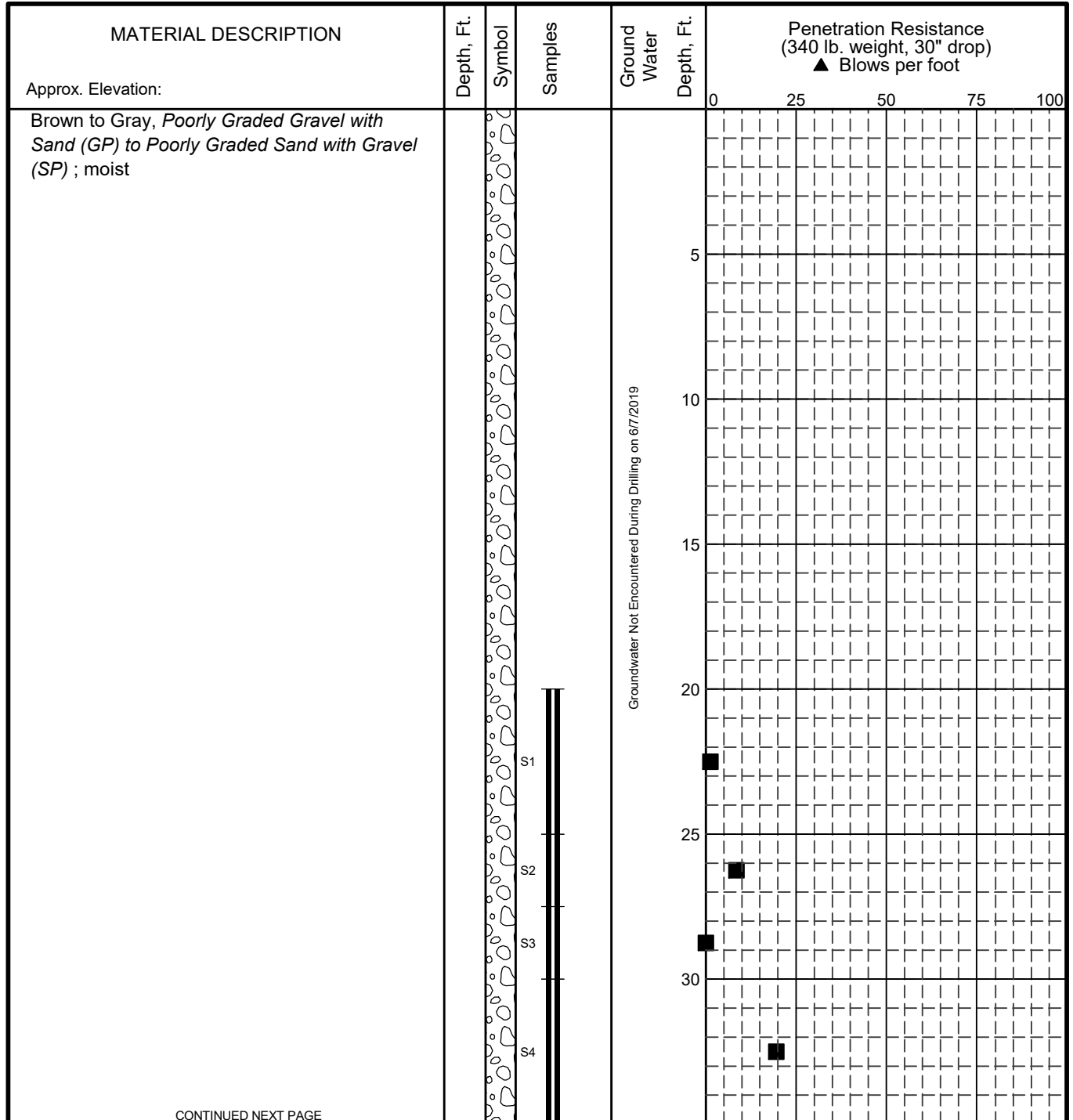
July 2019

102919-001



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ATTACHMENT 2
BORING LOGS



LEGEND

- * Sample not recovered
- II Direct Push

■ PID Reading (ppm)

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.
- USC letter symbol based on visual classification.

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Palmer, Alaska

LOG OF BORING B1

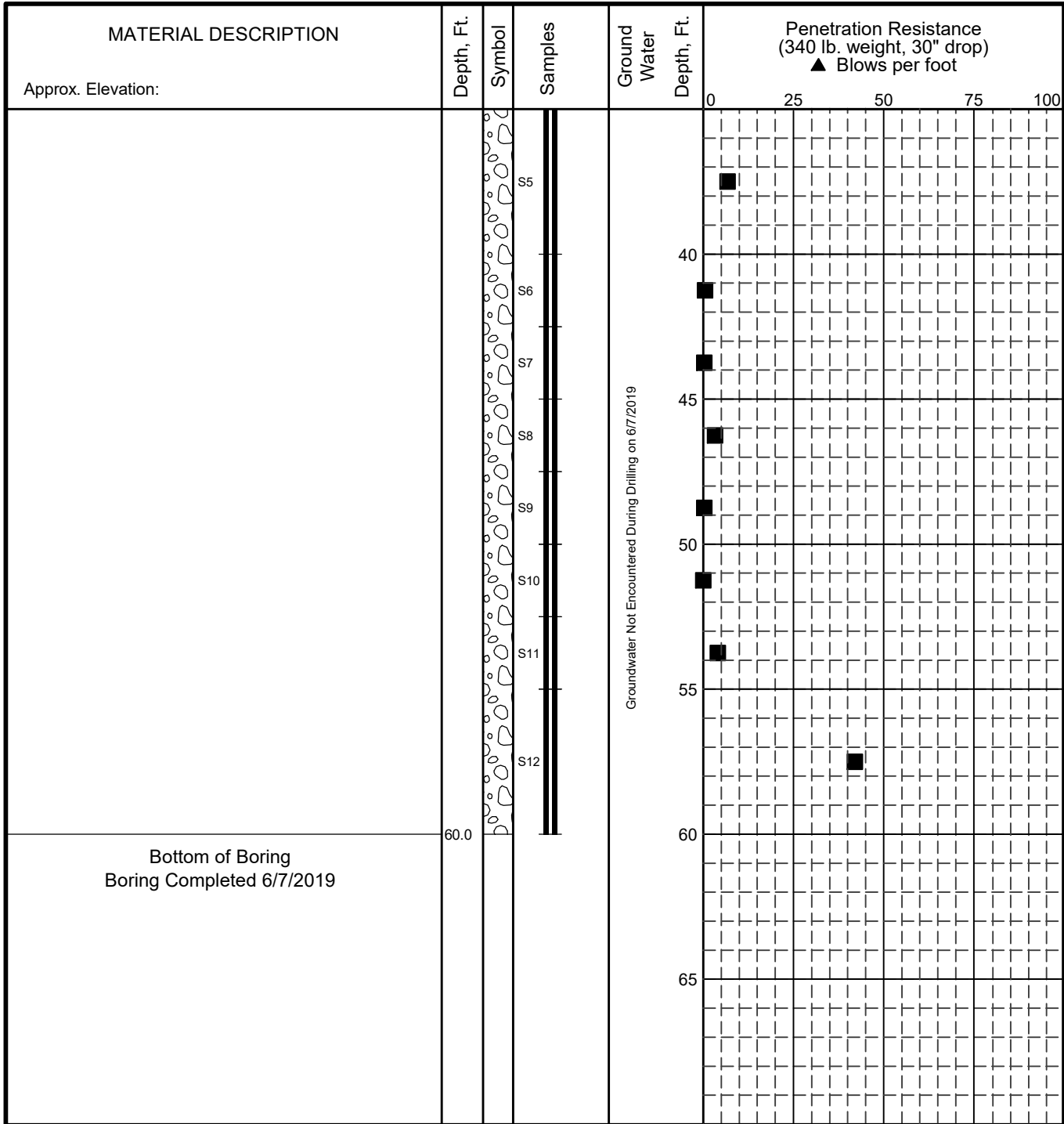
July 2019

102919-001

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FIG. 2-1
Sheet 1 of 2

ENVIRONMENTAL LOG GINT.GPJ S&W GEO1.GDT 7/26/19



LEGEND

- * Sample not recovered
- II Direct Push

■ PID Reading (ppm)

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

1316 South Bonanza Street
Palmer, Alaska

LOG OF BORING B1

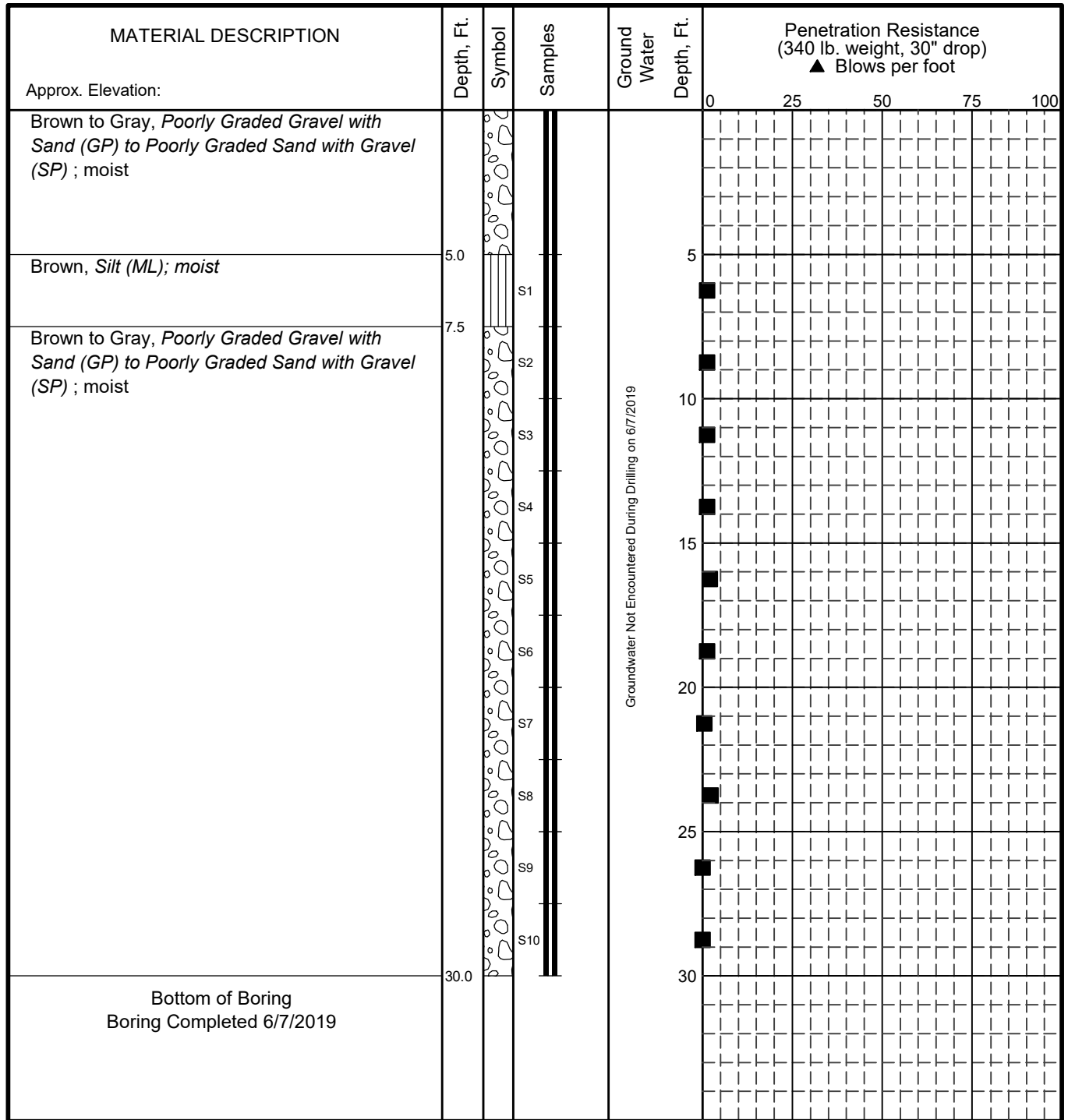
July 2019

102919-001

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FIG. 2-1
Sheet 2 of 2

ENVIRONMENTAL LOG_GINT.GPJ_S&W_GEO1.GDT_7/26/19



Groundwater Not Encountered During Drilling on 6/7/2019

LEGEND

- * Sample not recovered
- II Direct Push

■ PID Reading (ppm)

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

1316 South Bonanza Street
Palmer, Alaska

LOG OF BORING B2

July 2019

102919-001

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FIG. 2-2

ENVIRONMENTAL LOG GINT.GPJ S&W GEO1.GDT 7/26/19

ATTACHMENT 3

FIELD NOTES

DRILL COMPANY/DRILLER: <u>GeoTek Logan + Patrick</u> DRILL RIG EQUIPMENT: <u>Geoprobe 8040BT</u> DRILLING METHOD: <u>Auger w/ Direct push</u> HAMMER TYPE: _____ ROD TYPE/DIA.: _____ HAMMER WEIGHT: <u>340lb</u> HAMMER DROP: _____ CASING SIZE/TYPER: _____ HOLE SIZE: _____	JOB NO: <u>102919-001</u> BORING NO: <u>B1</u> JOB NAME: <u>1316 South Bonanza Street</u> LOGGED BY: <u>ADV</u> LOCATION: <u>1316 South Bonanza Street</u> START DATE: <u>6/7/19</u> END DATE: <u>6/7/19</u> WEATHER DURING DRILLING: <u>64° Sunny</u>
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SAMPLE DATA

TIME DATE	SAMP. NO. TYPE	DEPTH FROM TO	DRIVING RESISTANCE BLOWS / 6 INCH	L. REC. Env. Sample (Y/N)	DRILL ACTION	CONTACTS / GROUNDWATER	PID	CONST. %	FIELD IDENTIFICATION
									[Density/consistency, color, Group Name (USCS); moisture; constituent properties (particle size, plasticity, etc.); organics; structure; other; unit name]
11:05	A1	0	-	-				G	Visual while Augering to 20' Brown; Gravel w/ sand (Fill) moist
6/7	Auger	5	-	-				S	
								F	
11:10	-	5	-	-				G	Brown; Gravel w/ sand (fill) moist
6/7	Auger	10	-	-				S	
								F	
11:15	-	10	-	-				G	Same as above (fill) moist
6/7	Auger	15	-	-				S	
								F	
11:20	-	15	-	-				G	Same as above
6/7	Auger	20	-	-				S	
								F	
11:35	S1	20	-	0.9'				G	Brown sand w/ gravel; moist Trace cobbles (chips)
6/7		25	-	Y				S	
								F	
1143	S2	25		1.6				G	Brown sand w/ gravel
6/7		27.5		Y				S	
								F	
1146	S3	27.5		1.6				G	Brown to dark gray gravel w/ sand moist
6/7		30.		Y				S	
								F	

SUMMARY FIELD LOG OF BORING

DEPTH		USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG
FROM	TO		

COMMENTS (i.e. materials used, visitors, problems, etc.):

Auger to 20' bgs
 Dupli S46 Seeg. 2
 Dup B1 S50 Seeg. 2

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE _____ SAMPLES: _____ Attempted
 DRILLED: _____ Recovered

DRILL/SAMPLE _____ hrs. STANDBY: _____ hrs.
 SETUP/CLEANUP: _____ hrs. WELL INSTALL: _____ hrs.

OTHER: _____

DRILL COMPANY/DRILLER: <u>GeoTEK Logant Patrick</u>	JOB NO: <u>102919-001</u> BORING NO: <u>B1</u>
DRILL RIG EQUIPMENT: <u>Geoprobe 8040BT</u>	JOB NAME: <u>1316 S. Bonanza Street</u>
DRILLING METHOD: <u>Auger w/ Direct push</u>	LOGGED BY: <u>ADV</u>
HAMMER TYPE: _____ ROD TYPE/DIA.: _____	LOCATION: <u>1316 S. Bonanza St</u> ELEV.: _____
HAMMER WEIGHT: <u>340lb</u> HAMMER DROP: _____	START DATE: <u>6/7/19</u> END DATE: <u>6/7/19</u>
CASING SIZE/TYPE: _____ HOLE SIZE: _____	WEATHER DURING DRILLING: <u>66° Sunny</u>

SAMPLE DATA

TIME DATE	SAMP. NO. TYPE	FROM		DRIVING RESISTANCE BLOWS / 6 INCH	L. REC. Env. Sample (Y/N)	DRILL ACTION	CONTACTS / GROUNDWATER	PID	CONST. %	FIELD IDENTIFICATION <small>(Density/consistency, color, Group Name (USCS); moisture; constituent properties particle size, plasticity, etc.); organics; structure; other; unit name)</small>
		DEPTH	TO							
* 11:52	54	30			2.1					Brown to light Gray Gravel w/ sand; chips; moist
6/7		35			4			7.8		Dup B1340 time 1400
12:19	55	35			1.4					Gray Sand w/ Gravel; chips; moist
6/7		40			4			2.7		Dup B1550 time 1500
12:36	56	40			1.3					Gray sand w/ gravel; chips; moist
6/7		42.5			4			0.2		
12:40	57	42.5			1.3					Same as above
6/7		45			4			0.1		
12:50	58	45			1.7					Brown to Gray Gravel w/ sand; chips; moist
6/7		47.5			4			1.3		
12:55	59	47.5			1.7					Same as above
6/7		50			4			0.1		
13:28	S10	50			1					Gray Gravel w/ sand; chips; moist
6/7		52.5			4			0		

SUMMARY FIELD LOG OF BORING

DEPTH		USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG
FROM	TO		

COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE _____ SAMPLES: _____ Attempted
 DRILLED: _____ Recovered

DRILL/SAMPLE _____ hrs. STANDBY: _____ hrs.
 SETUP/CLEANUP: _____ hrs. WELL INSTALL: _____ hrs.

OTHER: _____

DRILL COMPANY/DRILLER: Geo Tek Logant Patrick JOB NO: 102919-001 BORING NO: B1
 DRILL RIG EQUIPMENT: Geoprobe 8040 BT JOB NAME: 1316 S. Bonanza Street
 DRILLING METHOD: Auger w/ Direct Push LOGGED BY: ADV
 HAMMER TYPE: _____ ROD TYPE/DIA.: _____ LOCATION: 1316 S. Bonanza St ELEV.: _____
 HAMMER WEIGHT: 340lb HAMMER DROP: _____ START DATE: 6/7/19 END DATE: 6/7/19
 CASING SIZE/TYPE: _____ HOLE SIZE: _____ WEATHER DURING DRILLING: 69° Sunny

SAMPLE DATA

TIME DATE	SAMP. NO. TYPE	DEPTH FROM TO	DRIVING RESISTANCE BLOWS / 6 INCH	L. REC. Env. Sample (Y/N)	DRILL ACTION	CONTACTS / GROUNDWATER	PID	CONST. %	FIELD IDENTIFICATION [Density/consistency, color, Group Name (USCS); moisture; constituent properties (particle size, plasticity, etc.); organics; structure; other; unit name]
6/7	S11	52.5		1			1.6	G	Same as above
1333		55		Y				S	
								F	
1406	S12	55		1			16.8	G	gray sand w/ gravel; chips; mud
6/7		60		Y				S	Dup 315129 1600
								F	End of boring
								G	
								S	
								F	
								G	
								S	
								F	
								G	
								S	
								F	
								G	
								S	
								F	

SUMMARY FIELD LOG OF BORING

DEPTH		USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG
FROM	TO		

COMMENTS (i.e. materials used, visitors, problems, etc.):
No GW encountered during drilling
Put drill cuttings back in bore hole topped w/ Bentonite to ground surface

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE 60' SAMPLES: _____ Attempted
 DRILLED: _____ Recovered
 DRILL/SAMPLE _____ hrs. STANDBY: _____ hrs.
 SETUP/CLEANUP: _____ hrs. WELL INSTALL: _____ hrs.
 OTHER: _____

BORING: B1 SHEET 3 OF 3

DRILL COMPANY/DRILLER: GeoTech Logant Padwick JOB NO: 102919-001 BORING NO: B2
 DRILL RIG EQUIPMENT: Geoprobe 3010 BT JOB NAME: 1316 S. Burmanys street
 DRILLING METHOD: Auger to 5' DP to LOGGED BY: ADV
 HAMMER TYPE: _____ ROD TYPE/DIA.: _____ LOCATION: 1316 S. Burmanys st ELEV.: _____
 HAMMER WEIGHT: 340lb HAMMER DROP: _____ START DATE: 6/7/19 END DATE: _____
 CASING SIZE/TYPE: _____ HOLE SIZE: _____ WEATHER DURING DRILLING: 71° Sunny

SAMPLE DATA

TIME	SAMP. NO.	DEPTH		DRIVING RESISTANCE BLOWS / 6 INCH	L. REC. Env. Sample (Y/N)	DRILL ACTION	CONTACTS / GROUNDWATER	PID	CONST. %	FIELD IDENTIFICATION [Density/consistency, color, Group Name (USCS); moisture; constituent properties (particle size, plasticity, etc.); organics; structure; other; unit name]
		FROM	TO							
1430	-	0		-	-					Visual soil classification from 0-5
6/7	-	5			-					Brown Gravel w/ sand (Fill) Trace cobbles
1450	S1	5			1.5			0.5		Brown Silt matrix
6/7		7.5			4					
1455	S2	7.5			1.5			0.5		Brown Gravel w/ sand; moist chips
6/7		10			4					
1503	S3	10			1			0.5		gray sand w/ gravel; chips from cobbles; moist
6/7		12.5			4					
1506	S4	12.5			1			0.5		Same as above
6/7		15			4					
1510	S5	17.5			2.2			0.8		Gray gravel w/ sand; chips from cobbles layers; moist
6/7		15			4					
1514	S6	17.5			2.2			0.5		Same as above
6/7		20			4					

SUMMARY FIELD LOG OF BORING

DEPTH		USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG
FROM	TO		

COMMENTS (i.e. materials used, visitors, problems, etc.):
DP B1S1B time 1700
No GW encountered during drilling

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: 30 SAMPLES: _____ Attempted
 _____ Recovered

DRILL/SAMPLE _____ hrs. STANDBY: _____ hrs.
 SETUP/CLEANUP: _____ hrs. WELL INSTALL: _____ hrs.

OTHER: _____

BORING: B2 SHEET 1 OF 2

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Geotech Logan & Patrick JOB NO: 102919-001 BORING NO: B2
 DRILL RIG EQUIPMENT: Geohobc 3040 DT JOB NAME: 1316 S. Bunzanga Street
 DRILLING METHOD: _____ LOGGED BY: ADV
 HAMMER TYPE: 3401b ROD TYPE/DIA.: _____ LOCATION: _____ ELEV.: _____
 HAMMER WEIGHT: _____ HAMMER DROP: _____ START DATE: 6/7/19 END DATE: _____
 CASING SIZE/TYPE: _____ HOLE SIZE: _____ WEATHER DURING DRILLING: 71° Sunny

SAMPLE DATA

TIME	SAMP. NO.	DEPTH	FROM	DRIVING RESISTANCE	L. REC.	DRILL	CONTACTS /	PID	CONST.	FIELD IDENTIFICATION
DATE	TYPE	DEPTH	TO	BLOWS / 6 INCH	Env. Sample (Y/N)	ACTION	GROUNDWATER		%	(Density/consistency, color, Group Name (USCS); moisture; constituent properties (particle size, plasticity, etc.); organics; structure; other; unit name)
1535	57	20						0.2	G	liner melted + stuck - trying to get out → drilling next ✓
6/7		22.5							S	Brown Gravel w/ sand; chips; moist
									F	
* 1605	58	22.5						0.9	G	Brown Gravel w/ sand; chips; moist
6/7		25							S	
									F	Dup B1518 time 1100
1536	59	25						0	G	Same as above
6/7		27.5							S	
									F	
1540	310	27.5						0	G	same as above
6/7		30							S	End of boring
									F	
									G	
									S	
									F	
									G	
									S	
									F	
									G	
									S	
									F	

SUMMARY FIELD LOG OF BORING

DEPTH		USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG
FROM	TO		

COMMENTS (i.e. materials used, visitors, problems, etc.):

NO GW encountered during drilling

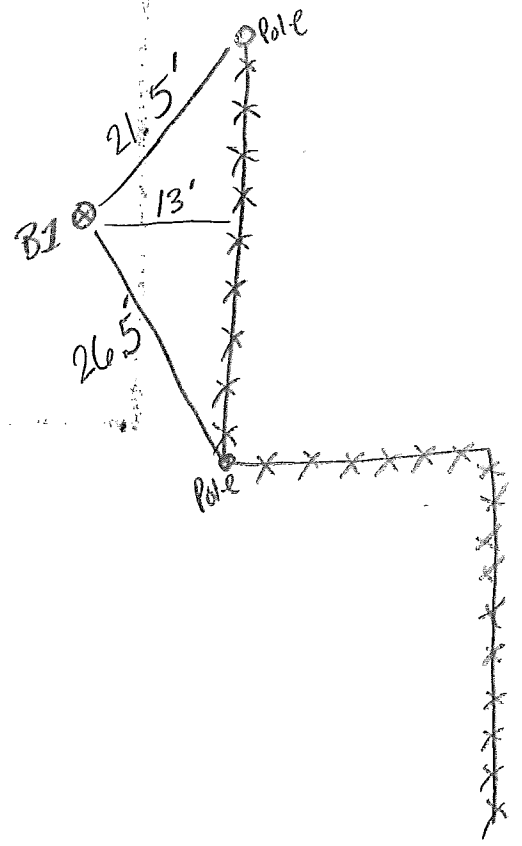
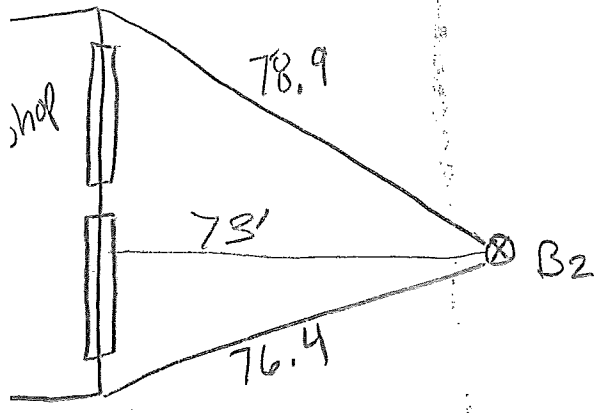
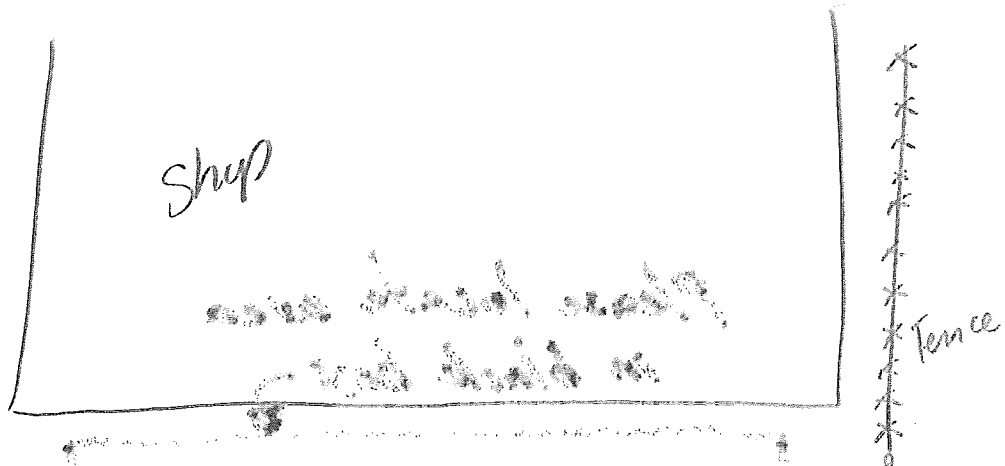
GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE _____ SAMPLES: _____ Attempted
 DRILLED: _____ Recovered
 DRILL/SAMPLE _____ hrs. STANDBY: _____ hrs.
 SETUP/CLEANUP: _____ hrs. WELL INSTALL: _____ hrs.
 OTHER: _____

BORING: B2 SHEET 2 OF 2



N ↑
Not to scale

ATTACHMENT 4
RESULTS OF ANALYTICAL TESTING BY SGS NORTH AMERICA INC.
AND
ADEC LABORATORY DATA REVIEW CHECKLIST



Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks St. Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1192946**

Client Project: **102919-001 1316 S Bonanza**

Dear Jacob Tracy,

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

If there are any questions about the report or services performed during this project, please call Jillian 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.

Jillian Janssen
Project Manager
Jillian.Janssen@sgs.com

Date

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1192946**
Project Name/Site: **102919-001 1316 S Bonanza**
Project Contact: **Jacob Tracy**

Refer to sample receipt form for information on sample condition.

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

Print Date: 06/18/2019 4:52:06PM

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
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>
102919-B1S4	1192946001	06/07/2019	06/10/2019	Soil/Solid (dry weight)
102919-B1S40	1192946002	06/07/2019	06/10/2019	Soil/Solid (dry weight)
102919-B1S12	1192946003	06/07/2019	06/10/2019	Soil/Solid (dry weight)
102919-B2S8	1192946004	06/07/2019	06/10/2019	Soil/Solid (dry weight)
102919-STB	1192946005	06/07/2019	06/10/2019	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW8260C	VOC 8260 (S) Field Extracted

Print Date: 06/18/2019 4:52:11PM

Detectable Results Summary

Client Sample ID: **102919-B1S4**

Lab Sample ID: 1192946001

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzene	4.67J	ug/Kg
Ethylbenzene	9.97J	ug/Kg
Gasoline Range Organics	0.636J	mg/Kg
o-Xylene	27.8	ug/Kg
P & M -Xylene	70.9	ug/Kg
Toluene	31.4	ug/Kg
Xylenes (total)	98.7	ug/Kg

Client Sample ID: **102919-B1S40**

Lab Sample ID: 1192946002

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzene	4.71J	ug/Kg
Ethylbenzene	8.39J	ug/Kg
Gasoline Range Organics	0.819J	mg/Kg
o-Xylene	21.7	ug/Kg
P & M -Xylene	64.0	ug/Kg
Toluene	28.4	ug/Kg
Xylenes (total)	85.7	ug/Kg

Client Sample ID: **102919-B1S12**

Lab Sample ID: 1192946003

Volatile Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	0.700J	mg/Kg
1,2,4-Trimethylbenzene	37.2J	ug/Kg
1,3,5-Trimethylbenzene	10.6J	ug/Kg
Benzene	4.45J	ug/Kg
Ethylbenzene	18.9J	ug/Kg
n-Propylbenzene	6.79J	ug/Kg
o-Xylene	26.6	ug/Kg
P & M -Xylene	74.6	ug/Kg
Toluene	42.3	ug/Kg
Xylenes (total)	101	ug/Kg



Results of 102919-B1S4

Client Sample ID: 102919-B1S4
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946001
Lab Project ID: 1192946

Collection Date: 06/07/19 11:52
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):92.2
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 0.636 J, 2.12, 0.637, mg/Kg, 1, 06/12/19 14:32

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 111, 50-150, %, 1, 06/12/19 14:32

Batch Information

Analytical Batch: VFC14773
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/12/19 14:32
Container ID: 1192946001-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 11:52
Prep Initial Wt./Vol.: 79.805 g
Prep Extract Vol: 31.2286 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 92.1, 72-119, %, 1, 06/12/19 14:32

Batch Information

Analytical Batch: VFC14773
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 06/12/19 14:32
Container ID: 1192946001-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 11:52
Prep Initial Wt./Vol.: 79.805 g
Prep Extract Vol: 31.2286 mL



Results of 102919-B1S40

Client Sample ID: 102919-B1S40
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946002
Lab Project ID: 1192946

Collection Date: 06/07/19 14:00
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):92.6
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 0.819 J, 2.05, 0.614, mg/Kg, 1, 06/12/19 14:50

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 100, 50-150, %, 1, 06/12/19 14:50

Batch Information

Analytical Batch: VFC14773
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/12/19 14:50
Container ID: 1192946002-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 14:00
Prep Initial Wt./Vol.: 82.013 g
Prep Extract Vol: 31.0753 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 92.2, 72-119, %, 1, 06/12/19 14:50

Batch Information

Analytical Batch: VFC14773
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 06/12/19 14:50
Container ID: 1192946002-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 14:00
Prep Initial Wt./Vol.: 82.013 g
Prep Extract Vol: 31.0753 mL



Results of 102919-B1S12

Client Sample ID: 102919-B1S12
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946003
Lab Project ID: 1192946

Collection Date: 06/07/19 14:06
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):96.7
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated values.

Batch Information

Analytical Batch: XMS11451
Analytical Method: 8270D SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 06/14/19 06:49
Container ID: 1192946003-A

Prep Batch: XXX41577
Prep Method: SW3550C
Prep Date/Time: 06/13/19 16:20
Prep Initial Wt./Vol.: 22.778 g
Prep Extract Vol: 5 mL

Results of 102919-B1S12

Client Sample ID: **102919-B1S12**
 Client Project ID: **102919-001 1316 S Bonanza**
 Lab Sample ID: 1192946003
 Lab Project ID: 1192946

Collection Date: 06/07/19 14:06
 Received Date: 06/10/19 13:31
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.7
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.700 J	2.16	0.648	mg/Kg	1		06/12/19 15:08
Surrogates							
4-Bromofluorobenzene (surr)	96.2	50-150		%	1		06/12/19 15:08

Batch Information

Analytical Batch: VFC14773
 Analytical Method: AK101
 Analyst: ST
 Analytical Date/Time: 06/12/19 15:08
 Container ID: 1192946003-B

Prep Batch: VXX34238
 Prep Method: SW5035A
 Prep Date/Time: 06/07/19 14:06
 Prep Initial Wt./Vol.: 65.015 g
 Prep Extract Vol: 27.1612 mL



Results of 102919-B1S12

Client Sample ID: 102919-B1S12
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946003
Lab Project ID: 1192946

Collection Date: 06/07/19 14:06
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):96.7
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 06/18/2019 4:52:13PM

J flagging is activated

Results of 102919-B1S12

Client Sample ID: **102919-B1S12**
 Client Project ID: **102919-001 1316 S Bonanza**
 Lab Sample ID: 1192946003
 Lab Project ID: 1192946

Collection Date: 06/07/19 14:06
 Received Date: 06/10/19 13:31
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.7
 Location:

Results by Volatile GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	86.5 U	173	53.6	ug/Kg	1		06/17/19 15:31
Chloroform	0.865 U	1.73	0.536	ug/Kg	1		06/17/19 15:31
Chloromethane	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
cis-1,2-Dichloroethene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
cis-1,3-Dichloropropene	5.40 U	10.8	3.37	ug/Kg	1		06/17/19 15:31
Dibromochloromethane	0.865 U	1.73	0.536	ug/Kg	1		06/17/19 15:31
Dibromomethane	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
Dichlorodifluoromethane	21.6 U	43.2	13.0	ug/Kg	1		06/17/19 15:31
Ethylbenzene	18.9 J	21.6	6.74	ug/Kg	1		06/17/19 15:31
Freon-113	43.2 U	86.4	26.8	ug/Kg	1		06/17/19 15:31
Hexachlorobutadiene	8.65 U	17.3	5.36	ug/Kg	1		06/17/19 15:31
Isopropylbenzene (Cumene)	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
Methylene chloride	43.2 U	86.4	26.8	ug/Kg	1		06/17/19 15:31
Methyl-t-butyl ether	43.2 U	86.4	26.8	ug/Kg	1		06/17/19 15:31
Naphthalene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
n-Butylbenzene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
n-Propylbenzene	6.79 J	21.6	6.74	ug/Kg	1		06/17/19 15:31
o-Xylene	26.6	21.6	6.74	ug/Kg	1		06/17/19 15:31
P & M -Xylene	74.6	43.2	13.0	ug/Kg	1		06/17/19 15:31
sec-Butylbenzene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
Styrene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
tert-Butylbenzene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
Tetrachloroethene	5.40 U	10.8	3.37	ug/Kg	1		06/17/19 15:31
Toluene	42.3	21.6	6.74	ug/Kg	1		06/17/19 15:31
trans-1,2-Dichloroethene	10.8 U	21.6	6.74	ug/Kg	1		06/17/19 15:31
trans-1,3-Dichloropropene	5.40 U	10.8	3.37	ug/Kg	1		06/17/19 15:31
Trichloroethene	2.16 U	4.32	1.30	ug/Kg	1		06/17/19 15:31
Trichlorofluoromethane	21.6 U	43.2	13.0	ug/Kg	1		06/17/19 15:31
Vinyl acetate	43.2 U	86.4	26.8	ug/Kg	1		06/17/19 15:31
Vinyl chloride	0.345 U	0.691	0.216	ug/Kg	1		06/17/19 15:31
Xylenes (total)	101	64.8	19.7	ug/Kg	1		06/17/19 15:31
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/17/19 15:31
4-Bromofluorobenzene (surr)	102	55-151		%	1		06/17/19 15:31
Toluene-d8 (surr)	99.1	85-116		%	1		06/17/19 15:31



Results of 102919-B1S12

Client Sample ID: **102919-B1S12**
Client Project ID: **102919-001 1316 S Bonanza**
Lab Sample ID: 1192946003
Lab Project ID: 1192946

Collection Date: 06/07/19 14:06
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):96.7
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19060
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/17/19 15:31
Container ID: 1192946003-B

Prep Batch: VXX34280
Prep Method: SW5035A
Prep Date/Time: 06/07/19 14:06
Prep Initial Wt./Vol.: 65.015 g
Prep Extract Vol: 27.1612 mL



Results of 102919-B2S8

Client Sample ID: 102919-B2S8
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946004
Lab Project ID: 1192946

Collection Date: 06/07/19 16:05
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):97.2
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 1.05 U, 2.11, 0.634, mg/Kg, 1, 06/12/19 15:25

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 90.5, 50-150, %, 1, 06/12/19 15:25

Batch Information

Analytical Batch: VFC14773
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/12/19 15:25
Container ID: 1192946004-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 16:05
Prep Initial Wt./Vol.: 65.303 g
Prep Extract Vol: 26.8197 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 90.7, 72-119, %, 1, 06/12/19 15:25

Batch Information

Analytical Batch: VFC14773
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 06/12/19 15:25
Container ID: 1192946004-B

Prep Batch: VXX34238
Prep Method: SW5035A
Prep Date/Time: 06/07/19 16:05
Prep Initial Wt./Vol.: 65.303 g
Prep Extract Vol: 26.8197 mL

Results of 102919-STB

Client Sample ID: **102919-STB**
 Client Project ID: **102919-001 1316 S Bonanza**
 Lab Sample ID: 1192946005
 Lab Project ID: 1192946

Collection Date: 06/07/19 11:52
 Received Date: 06/10/19 13:31
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.25 U	2.50	0.751	mg/Kg	1		06/12/19 13:57
Surrogates							
4-Bromofluorobenzene (surr)	91.9	50-150		%	1		06/12/19 13:57

Batch Information

Analytical Batch: VFC14773
 Analytical Method: AK101
 Analyst: ST
 Analytical Date/Time: 06/12/19 13:57
 Container ID: 1192946005-A

Prep Batch: VXX34238
 Prep Method: SW5035A
 Prep Date/Time: 06/07/19 11:52
 Prep Initial Wt./Vol.: 49.934 g
 Prep Extract Vol: 25 mL



Results of 102919-STB

Client Sample ID: 102919-STB
Client Project ID: 102919-001 1316 S Bonanza
Lab Sample ID: 1192946005
Lab Project ID: 1192946

Collection Date: 06/07/19 11:52
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 06/18/2019 4:52:13PM

J flagging is activated

Results of 102919-STB

Client Sample ID: **102919-STB**
 Client Project ID: **102919-001 1316 S Bonanza**
 Lab Sample ID: 1192946005
 Lab Project ID: 1192946

Collection Date: 06/07/19 11:52
 Received Date: 06/10/19 13:31
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	100 U	200	62.1	ug/Kg	1		06/17/19 13:54
Chloroform	1.00 U	2.00	0.621	ug/Kg	1		06/17/19 13:54
Chloromethane	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
cis-1,2-Dichloroethene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
cis-1,3-Dichloropropene	6.25 U	12.5	3.91	ug/Kg	1		06/17/19 13:54
Dibromochloromethane	1.00 U	2.00	0.621	ug/Kg	1		06/17/19 13:54
Dibromomethane	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
Dichlorodifluoromethane	25.1 U	50.1	15.0	ug/Kg	1		06/17/19 13:54
Ethylbenzene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
Freon-113	50.0 U	100	31.0	ug/Kg	1		06/17/19 13:54
Hexachlorobutadiene	10.0 U	20.0	6.21	ug/Kg	1		06/17/19 13:54
Isopropylbenzene (Cumene)	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
Methylene chloride	50.0 U	100	31.0	ug/Kg	1		06/17/19 13:54
Methyl-t-butyl ether	50.0 U	100	31.0	ug/Kg	1		06/17/19 13:54
Naphthalene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
n-Butylbenzene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
n-Propylbenzene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
o-Xylene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
P & M -Xylene	25.1 U	50.1	15.0	ug/Kg	1		06/17/19 13:54
sec-Butylbenzene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
Styrene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
tert-Butylbenzene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
Tetrachloroethene	6.25 U	12.5	3.91	ug/Kg	1		06/17/19 13:54
Toluene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
trans-1,2-Dichloroethene	12.5 U	25.0	7.81	ug/Kg	1		06/17/19 13:54
trans-1,3-Dichloropropene	6.25 U	12.5	3.91	ug/Kg	1		06/17/19 13:54
Trichloroethene	2.50 U	5.01	1.50	ug/Kg	1		06/17/19 13:54
Trichlorofluoromethane	25.1 U	50.1	15.0	ug/Kg	1		06/17/19 13:54
Vinyl acetate	50.0 U	100	31.0	ug/Kg	1		06/17/19 13:54
Vinyl chloride	0.401 U	0.801	0.250	ug/Kg	1		06/17/19 13:54
Xylenes (total)	37.5 U	75.1	22.8	ug/Kg	1		06/17/19 13:54
Surrogates							
1,2-Dichloroethane-D4 (surr)	107	71-136		%	1		06/17/19 13:54
4-Bromofluorobenzene (surr)	99.5	55-151		%	1		06/17/19 13:54
Toluene-d8 (surr)	99.9	85-116		%	1		06/17/19 13:54

Results of 102919-STB

Client Sample ID: **102919-STB**
Client Project ID: **102919-001 1316 S Bonanza**
Lab Sample ID: 1192946005
Lab Project ID: 1192946

Collection Date: 06/07/19 11:52
Received Date: 06/10/19 13:31
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19060
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/17/19 13:54
Container ID: 1192946005-A

Prep Batch: VXX34280
Prep Method: SW5035A
Prep Date/Time: 06/07/19 11:52
Prep Initial Wt./Vol.: 49.934 g
Prep Extract Vol: 25 mL



Method Blank

Blank ID: MB for HBN 1794980 [SPT/10793]
Blank Lab ID: 1512837

Matrix: Soil/Solid (dry weight)

QC for Samples:
1192946001, 1192946002, 1192946003, 1192946004

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

Batch Information

Analytical Batch: SPT10793
Analytical Method: SM21 2540G
Instrument:
Analyst: KAJ
Analytical Date/Time: 6/13/2019 4:17:00PM

Print Date: 06/18/2019 4:52:15PM

Duplicate Sample Summary

Original Sample ID: 1192797049

Duplicate Sample ID: 1512838

QC for Samples:

Analysis Date: 06/13/2019 16:17

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	97.5	97.3	%	0.18	(< 15)

Batch Information

Analytical Batch: SPT10793

Analytical Method: SM21 2540G

Instrument:

Analyst: KAJ

Print Date: 06/18/2019 4:52:16PM

Duplicate Sample Summary

Original Sample ID: 1192886019

Duplicate Sample ID: 1512839

QC for Samples:

1192946001, 1192946002, 1192946003, 1192946004

Analysis Date: 06/13/2019 16:17

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	86.9	87.5	%	0.64	(< 15)

Batch Information

Analytical Batch: SPT10793

Analytical Method: SM21 2540G

Instrument:

Analyst: KAJ

Print Date: 06/18/2019 4:52:16PM

Duplicate Sample Summary

Original Sample ID: 1192946004

Duplicate Sample ID: 1512840

QC for Samples:

1192946001, 1192946002, 1192946003, 1192946004

Analysis Date: 06/13/2019 16:17

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	97.2	97.2	%	0.04	(< 15)

Batch Information

Analytical Batch: SPT10793

Analytical Method: SM21 2540G

Instrument:

Analyst: KAJ

Print Date: 06/18/2019 4:52:16PM

Method Blank

Blank ID: MB for HBN 1794918 [VXX/34238]
 Blank Lab ID: 1512538

Matrix: Soil/Solid (dry weight)

QC for Samples:
 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.00625U	0.0125	0.00400	mg/Kg
Ethylbenzene	0.0125U	0.0250	0.00780	mg/Kg
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
o-Xylene	0.0125U	0.0250	0.00780	mg/Kg
P & M -Xylene	0.0250U	0.0500	0.0150	mg/Kg
Toluene	0.0125U	0.0250	0.00780	mg/Kg
Xylenes (total)	0.0375U	0.0750	0.0228	mg/Kg
Surrogates				
1,4-Difluorobenzene (surr)	91.9	72-119		%
4-Bromofluorobenzene (surr)	85	50-150		%

Batch Information

Analytical Batch: VFC14773
 Analytical Method: AK101
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 6/12/2019 1:40:00PM

Prep Batch: VXX34238
 Prep Method: SW5035A
 Prep Date/Time: 6/12/2019 8:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34238]
 Blank Spike Lab ID: 1512539
 Date Analyzed: 06/12/2019 12:29

Spike Duplicate ID: LCSD for HBN 1192946 [VXX34238]
 Spike Duplicate Lab ID: 1512540
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	1.25	1.19	95	1.25	1.28	102	(75-125)	7.30	(< 20)
Ethylbenzene	1.25	1.20	96	1.25	1.29	103	(75-125)	6.90	(< 20)
o-Xylene	1.25	1.18	94	1.25	1.25	100	(75-125)	5.70	(< 20)
P & M -Xylene	2.50	2.43	97	2.50	2.59	103	(80-125)	6.20	(< 20)
Toluene	1.25	1.32	106	1.25	1.41	113	(70-125)	6.40	(< 20)
Xylenes (total)	3.75	3.61	96	3.75	3.84	102	(78-124)	6.10	(< 20)

Surrogates

1,4-Difluorobenzene (surr)	1.25	93.6	94	1.25	93.1	93	(72-119)	0.51	
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Batch Information

Analytical Batch: **VFC14773**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **ST**

Prep Batch: **VXX34238**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/12/2019 08:00**
 Spike Init Wt./Vol.: 1.25 mg/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 1.25 mg/Kg Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34238]
 Blank Spike Lab ID: 1512541
 Date Analyzed: 06/12/2019 13:05

Spike Duplicate ID: LCSD for HBN 1192946 [VXX34238]
 Spike Duplicate Lab ID: 1512542
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	11.8	94	12.5	12.0	96	(60-120)	1.60	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	86.7	87	1.25	88.8	89	(50-150)	2.50	

Batch Information

Analytical Batch: **VFC14773**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **ST**

Prep Batch: **VXX34238**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/12/2019 08:00**
 Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Print Date: 06/18/2019 4:52:21PM

Matrix Spike Summary

Original Sample ID: 1512543
 MS Sample ID: 1512544 MS
 MSD Sample ID: 1512545 MSD

Analysis Date: 06/12/2019 16:18
 Analysis Date: 06/12/2019 16:35
 Analysis Date: 06/12/2019 16:53
 Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by AK101

Parameter	Sample	Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	0.105	3.21	3.32	100	3.21	3.31	100	75-125	0.21	(< 20)
Ethylbenzene	0.214	3.21	3.56	104	3.21	3.59	105	75-125	0.70	(< 20)
o-Xylene	0.140	3.21	3.35	100	3.21	3.42	102	75-125	1.80	(< 20)
P & M -Xylene	0.526	6.41	7.33	106	6.41	7.38	107	80-125	0.76	(< 20)
Toluene	0.153	3.21	3.39	101	3.21	3.39	101	70-125	0.25	(< 20)
Xylenes (total)	0.666	9.62	10.7	104	9.62	10.8	105	78-124	1.10	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		3.21	3.02	94	3.21	3.05	95	72-119	1.10	

Batch Information

Analytical Batch: VFC14773
 Analytical Method: AK101
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 6/12/2019 4:35:00PM

Prep Batch: VXX34238
 Prep Method: AK101 Extraction (S)
 Prep Date/Time: 6/12/2019 8:00:00AM
 Prep Initial Wt./Vol.: 19.49g
 Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1794918 [VXX/34238]
 Blank Lab ID: 1512538

Matrix: Soil/Solid (dry weight)

QC for Samples:
 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	91.9	72-119		%

Batch Information

Analytical Batch: VFC14773
 Analytical Method: SW8021B
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 6/12/2019 1:40:00PM

Prep Batch: VXX34238
 Prep Method: SW5035A
 Prep Date/Time: 6/12/2019 8:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Print Date: 06/18/2019 4:52:24PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34238]
 Blank Spike Lab ID: 1512539
 Date Analyzed: 06/12/2019 12:29

Spike Duplicate ID: LCSD for HBN 1192946 [VXX34238]
 Spike Duplicate Lab ID: 1512540
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by SW8021B

Parameter	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1190	95	1250	1280	102	(75-125)	7.30	(< 20)
Ethylbenzene	1250	1200	96	1250	1290	103	(75-125)	6.90	(< 20)
o-Xylene	1250	1180	94	1250	1250	100	(75-125)	5.70	(< 20)
P & M -Xylene	2500	2430	97	2500	2590	103	(80-125)	6.20	(< 20)
Toluene	1250	1320	106	1250	1410	113	(70-125)	6.40	(< 20)
Xylenes (total)	3750	3610	96	3750	3840	102	(78-124)	6.10	(< 20)

Surrogates

1,4-Difluorobenzene (surr)	1250	93.6	94	1250	93.1	93	(72-119)	0.51	
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Batch Information

Analytical Batch: **VFC14773**
 Analytical Method: **SW8021B**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **ST**

Prep Batch: **VXX34238**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/12/2019 08:00**
 Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1512543
 MS Sample ID: 1512544 MS
 MSD Sample ID: 1512545 MSD

Analysis Date: 06/12/2019 16:18
 Analysis Date: 06/12/2019 16:35
 Analysis Date: 06/12/2019 16:53
 Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1192946001, 1192946002, 1192946003, 1192946004, 1192946005

Results by SW8021B

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	105	3210	3320	100	3210	3310	100	75-125	0.21	(< 20)
Ethylbenzene	214	3210	3560	104	3210	3590	105	75-125	0.70	(< 20)
o-Xylene	140	3210	3350	100	3210	3420	102	75-125	1.80	(< 20)
P & M -Xylene	526	6410	7330	106	6410	7380	107	80-125	0.76	(< 20)
Toluene	153	3210	3390	101	3210	3390	101	70-125	0.25	(< 20)
Xylenes (total)	666	9620	10700	104	9620	10800	105	78-124	1.10	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		3210	3020	94	3210	3050	95	72-119	1.10	

Batch Information

Analytical Batch: VFC14773
 Analytical Method: SW8021B
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 6/12/2019 4:35:00PM

Prep Batch: VXX34238
 Prep Method: AK101 Extraction (S)
 Prep Date/Time: 6/12/2019 8:00:00AM
 Prep Initial Wt./Vol.: 19.49g
 Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1795160 [VXX/34280]

Blank Lab ID: 1513580

QC for Samples:

1192946003, 1192946005

Matrix: Soil/Solid (dry weight)

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	10.0U	20.0	6.20	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	1.00U	2.00	0.620	ug/Kg
1,1,2-Trichloroethane	0.400U	0.800	0.250	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	0.500U	1.00	0.310	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	1.00U	2.00	0.620	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	50.0U	100	31.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	50.0U	100	25.0	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Acetone	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	1.00U	2.00	0.620	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	10.0U	20.0	6.20	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg

Print Date: 06/18/2019 4:52:29PM

Method Blank

Blank ID: MB for HBN 1795160 [VXX/34280]

Blank Lab ID: 1513580

QC for Samples:

1192946003, 1192946005

Matrix: Soil/Solid (dry weight)

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloroform	1.00U	2.00	0.620	ug/Kg
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Dibromochloromethane	1.00U	2.00	0.620	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	10.0U	20.0	6.20	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	12.5U	25.0	7.80	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Trichloroethene	2.50U	5.00	1.50	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	0.400U	0.800	0.250	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	96.9	71-136		%
4-Bromofluorobenzene (surr)	90.9	55-151		%
Toluene-d8 (surr)	99.1	85-116		%

Print Date: 06/18/2019 4:52:29PM

Method Blank

Blank ID: MB for HBN 1795160 [VXX/34280]

Blank Lab ID: 1513580

QC for Samples:

1192946003, 1192946005

Matrix: Soil/Solid (dry weight)

Results by SW8260C

Parameter

Results

LOQ/CL

DL

Units

Batch Information

Analytical Batch: VMS19060

Analytical Method: SW8260C

Instrument: VQA 7890/5975 GC/MS

Analyst: NRO

Analytical Date/Time: 6/17/2019 11:26:00AM

Prep Batch: VXX34280

Prep Method: SW5035A

Prep Date/Time: 6/17/2019 6:00:00AM

Prep Initial Wt./Vol.: 50 g

Prep Extract Vol: 25 mL

Print Date: 06/18/2019 4:52:29PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34280]

Blank Spike Lab ID: 1513581

Date Analyzed: 06/17/2019 11:42

Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
1,1,1,2-Tetrachloroethane	750	801	107	(78-125)
1,1,1-Trichloroethane	750	885	118	(73-130)
1,1,2,2-Tetrachloroethane	750	832	111	(70-124)
1,1,2-Trichloroethane	750	781	104	(78-121)
1,1-Dichloroethane	750	745	99	(76-125)
1,1-Dichloroethene	750	776	103	(70-131)
1,1-Dichloropropene	750	763	102	(76-125)
1,2,3-Trichlorobenzene	750	769	103	(66-130)
1,2,3-Trichloropropane	750	792	106	(73-125)
1,2,4-Trichlorobenzene	750	767	102	(67-129)
1,2,4-Trimethylbenzene	750	729	97	(75-123)
1,2-Dibromo-3-chloropropane	750	805	107	(61-132)
1,2-Dibromoethane	750	789	105	(78-122)
1,2-Dichlorobenzene	750	792	106	(78-121)
1,2-Dichloroethane	750	801	107	(73-128)
1,2-Dichloropropane	750	879	117	(76-123)
1,3,5-Trimethylbenzene	750	783	104	(73-124)
1,3-Dichlorobenzene	750	800	107	(77-121)
1,3-Dichloropropane	750	781	104	(77-121)
1,4-Dichlorobenzene	750	779	104	(75-120)
2,2-Dichloropropane	750	809	108	(67-133)
2-Butanone (MEK)	2250	2620	116	(51-148)
2-Chlorotoluene	750	788	105	(75-122)
2-Hexanone	2250	2400	107	(53-145)
4-Chlorotoluene	750	786	105	(72-124)
4-Isopropyltoluene	750	760	101	(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2150	96	(65-135)
Acetone	2250	2510	112	(36-164)
Benzene	750	821	109	(77-121)
Bromobenzene	750	800	107	(78-121)
Bromochloromethane	750	815	109	(78-125)
Bromodichloromethane	750	813	108	(75-127)
Bromoform	750	797	106	(67-132)
Bromomethane	750	809	108	(53-143)

Print Date: 06/18/2019 4:52:31PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34280]

Blank Spike Lab ID: 1513581

Date Analyzed: 06/17/2019 11:42

Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
Carbon disulfide	1130	1150	102	(63-132)
Carbon tetrachloride	750	789	105	(70-135)
Chlorobenzene	750	822	110	(79-120)
Chloroethane	750	980	131	(59-139)
Chloroform	750	795	106	(78-123)
Chloromethane	750	679	91	(50-136)
cis-1,2-Dichloroethene	750	756	101	(77-123)
cis-1,3-Dichloropropene	750	782	104	(74-126)
Dibromochloromethane	750	795	106	(74-126)
Dibromomethane	750	783	104	(78-125)
Dichlorodifluoromethane	750	759	101	(29-149)
Ethylbenzene	750	782	104	(76-122)
Freon-113	1130	1220	109	(66-136)
Hexachlorobutadiene	750	752	100	(61-135)
Isopropylbenzene (Cumene)	750	812	108	(68-134)
Methylene chloride	750	784	104	(70-128)
Methyl-t-butyl ether	1130	1310	116	(73-125)
Naphthalene	750	766	102	(62-129)
n-Butylbenzene	750	730	97	(70-128)
n-Propylbenzene	750	777	104	(73-125)
o-Xylene	750	770	103	(77-123)
P & M -Xylene	1500	1480	99	(77-124)
sec-Butylbenzene	750	756	101	(73-126)
Styrene	750	825	110	(76-124)
tert-Butylbenzene	750	779	104	(73-125)
Tetrachloroethene	750	810	108	(73-128)
Toluene	750	735	98	(77-121)
trans-1,2-Dichloroethene	750	754	100	(74-125)
trans-1,3-Dichloropropene	750	778	104	(71-130)
Trichloroethene	750	780	104	(77-123)
Trichlorofluoromethane	750	837	112	(62-140)
Vinyl acetate	750	724	97	(50-151)
Vinyl chloride	750	803	107	(56-135)
Xylenes (total)	2250	2250	100	(78-124)

Print Date: 06/18/2019 4:52:31PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [VXX34280]
 Blank Spike Lab ID: 1513581
 Date Analyzed: 06/17/2019 11:42

Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	97.4	97	(71-136)
4-Bromofluorobenzene (surr)	750	91.3	91	(55-151)
Toluene-d8 (surr)	750	101	101	(85-116)

Batch Information

Analytical Batch: **VMS19060**
 Analytical Method: **SW8260C**
 Instrument: **VQA 7890/5975 GC/MS**
 Analyst: **NRO**

Prep Batch: **VXX34280**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/17/2019 06:00**
 Spike Init Wt./Vol.: 750 ug/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1199396008
 MS Sample ID: 1513582 MS
 MSD Sample ID: 1513583 MSD

Analysis Date: 06/17/2019 14:10
 Analysis Date: 06/17/2019 12:50
 Analysis Date: 06/17/2019 13:06
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	18.1U	283	265	94	283	287	101	78-125	7.60	(< 20)
1,1,1-Trichloroethane	22.7U	283	305	108	283	327	115	73-130	6.70	(< 20)
1,1,2,2-Tetrachloroethane	1.81U	283	289	102	283	311	110	70-124	7.30	(< 20)
1,1,2-Trichloroethane	0.725U	283	261	92	283	282	100	78-121	7.80	(< 20)
1,1-Dichloroethane	22.7U	283	269	95	283	277	98	76-125	2.90	(< 20)
1,1-Dichloroethene	22.7U	283	278	98	283	294	104	70-131	5.50	(< 20)
1,1-Dichloropropene	22.7U	283	256	91	283	279	99	76-125	8.70	(< 20)
1,2,3-Trichlorobenzene	45.5U	283	263	93	283	294	104	66-130	11.40	(< 20)
1,2,3-Trichloropropane	0.910U	283	274	97	283	294	104	73-125	6.90	(< 20)
1,2,4-Trichlorobenzene	22.7U	283	266	94	283	290	103	67-129	8.70	(< 20)
1,2,4-Trimethylbenzene	34.5J	283	249	76	283	269	83	75-123	7.60	(< 20)
1,2-Dibromo-3-chloropropane	91.0U	283	291	103	283	312	110	61-132	6.90	(< 20)
1,2-Dibromoethane	0.910U	283	267	95	283	288	102	78-122	7.30	(< 20)
1,2-Dichlorobenzene	22.7U	283	266	94	283	290	103	78-121	8.90	(< 20)
1,2-Dichloroethane	1.81U	283	286	101	283	294	104	73-128	2.50	(< 20)
1,2-Dichloropropane	9.10U	283	305	108	283	320	113	76-123	4.60	(< 20)
1,3,5-Trimethylbenzene	33.6J	283	265	82	283	282	88	73-124	6.50	(< 20)
1,3-Dichlorobenzene	22.7U	283	272	96	283	288	102	77-121	5.80	(< 20)
1,3-Dichloropropane	9.10U	283	262	93	283	283	100	77-121	7.90	(< 20)
1,4-Dichlorobenzene	22.7U	283	271	96	283	286	101	75-120	5.50	(< 20)
2,2-Dichloropropane	22.7U	283	287	101	283	306	108	67-133	6.70	(< 20)
2-Butanone (MEK)	227U	849	904	107	849	979	115	51-148	8.00	(< 20)
2-Chlorotoluene	22.7U	283	264	93	283	283	100	75-122	7.20	(< 20)
2-Hexanone	91.0U	849	839	99	849	902	106	53-145	7.20	(< 20)
4-Chlorotoluene	22.7U	283	270	95	283	286	101	72-124	5.60	(< 20)
4-Isopropyltoluene	91.0U	283	262	93	283	280	99	73-127	7.00	(< 20)
4-Methyl-2-pentanone (MIBK)	227U	849	771	91	849	800	94	65-135	3.50	(< 20)
Acetone	227U	849	870	103	849	953	112	36-164	9.10	(< 20)
Benzene	11.4U	283	285	101	283	298	106	77-121	4.70	(< 20)
Bromobenzene	22.7U	283	275	97	283	291	103	78-121	5.60	(< 20)
Bromochloromethane	22.7U	283	299	106	283	304	108	78-125	1.60	(< 20)
Bromodichloromethane	1.81U	283	288	102	283	296	105	75-127	2.80	(< 20)
Bromoform	22.7U	283	280	99	283	294	104	67-132	4.60	(< 20)
Bromomethane	18.1U	283	310	110	283	304	107	53-143	2.10	(< 20)
Carbon disulfide	91.0U	424	430	101	424	433	102	63-132	0.76	(< 20)
Carbon tetrachloride	11.4U	283	267	95	283	293	103	70-135	8.80	(< 20)
Chlorobenzene	22.7U	283	280	99	283	296	105	79-120	5.40	(< 20)

Print Date: 06/18/2019 4:52:33PM

Matrix Spike Summary

Original Sample ID: 1199396008
 MS Sample ID: 1513582 MS
 MSD Sample ID: 1513583 MSD

Analysis Date: 06/17/2019 14:10
 Analysis Date: 06/17/2019 12:50
 Analysis Date: 06/17/2019 13:06
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Chloroethane	182U	283	352J	125	283	318J	112	59-139	10.30	(< 20)
Chloroform	1.81U	283	286	101	283	293	103	78-123	2.40	(< 20)
Chloromethane	22.7U	283	262	93	283	250	89	50-136	4.60	(< 20)
cis-1,2-Dichloroethene	22.7U	283	278	98	283	281	99	77-123	1.30	(< 20)
cis-1,3-Dichloropropene	11.4U	283	277	98	283	287	101	74-126	3.80	(< 20)
Dibromochloromethane	1.81U	283	270	95	283	288	102	74-126	6.80	(< 20)
Dibromomethane	22.7U	283	282	100	283	288	102	78-125	1.90	(< 20)
Dichlorodifluoromethane	45.5U	283	275	97	283	285	101	29-149	3.30	(< 20)
Ethylbenzene	22.7U	283	259	92	283	279	99	76-122	7.30	(< 20)
Freon-113	91.0U	424	401	95	424	471	111	66-136	16.20	(< 20)
Hexachlorobutadiene	18.1U	283	338	120	283	326	115	61-135	3.80	(< 20)
Isopropylbenzene (Cumene)	22.7U	283	265	94	283	288	102	68-134	8.30	(< 20)
Methylene chloride	91.0U	283	287	101	283	291	103	70-128	1.40	(< 20)
Methyl-t-butyl ether	91.0U	424	456	107	424	479	113	73-125	4.90	(< 20)
Naphthalene	22.7U	283	262	93	283	296	105	62-129	12.10	(< 20)
n-Butylbenzene	22.7U	283	264	94	283	279	99	70-128	5.40	(< 20)
n-Propylbenzene	22.7U	283	262	92	283	281	99	73-125	7.10	(< 20)
o-Xylene	17.7J	283	264	87	283	273	90	77-123	3.30	(< 20)
P & M -Xylene	45.5U	566	512	91	566	533	94	77-124	3.80	(< 20)
sec-Butylbenzene	22.7U	283	253	89	283	275	97	73-126	8.40	(< 20)
Styrene	22.7U	283	290	103	283	302	106	76-124	3.50	(< 20)
tert-Butylbenzene	22.7U	283	258	91	283	285	101	73-125	9.70	(< 20)
Tetrachloroethene	11.4U	283	259	92	283	295	104	73-128	12.50	(< 20)
Toluene	22.7U	283	250	89	283	266	94	77-121	6.30	(< 20)
trans-1,2-Dichloroethene	22.7U	283	274	97	283	282	100	74-125	3.00	(< 20)
trans-1,3-Dichloropropene	11.4U	283	265	94	283	282	100	71-130	6.30	(< 20)
Trichloroethene	4.54U	283	266	94	283	282	100	77-123	6.00	(< 20)
Trichlorofluoromethane	45.5U	283	296	105	283	313	111	62-140	5.30	(< 20)
Vinyl acetate	91.0U	283	267	95	283	274	97	50-151	2.30	(< 20)
Vinyl chloride	0.725U	283	297	105	283	297	105	56-135	0.03	(< 20)
Xylenes (total)	68.0U	849	777	92	849	806	95	78-124	3.60	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		283	288	102	283	283	100	71-136	1.60	
4-Bromofluorobenzene (surr)		472	381	81	472	407	86	55-151	6.60	
Toluene-d8 (surr)		283	282	100	283	283	100	85-116	0.14	

Print Date: 06/18/2019 4:52:33PM

Matrix Spike Summary

Original Sample ID: 1199396008
 MS Sample ID: 1513582 MS
 MSD Sample ID: 1513583 MSD

Analysis Date:
 Analysis Date: 06/17/2019 12:50
 Analysis Date: 06/17/2019 13:06
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003, 1192946005

Results by SW8260C

Parameter	Sample	Matrix Spike (%)			Spike Duplicate (%)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			

Batch Information

Analytical Batch: VMS19060
 Analytical Method: SW8260C
 Instrument: VQA 7890/5975 GC/MS
 Analyst: NRO
 Analytical Date/Time: 6/17/2019 12:50:01PM

Prep Batch: VXX34280
 Prep Method: Vol. Extraction SW8260 Field Extracted L
 Prep Date/Time: 6/17/2019 6:00:00AM
 Prep Initial Wt./Vol.: 151.50g
 Prep Extract Vol: 25.00mL

Print Date: 06/18/2019 4:52:33PM



Method Blank

Blank ID: MB for HBN 1794969 [XXX/41577]
Blank Lab ID: 1512779

Matrix: Soil/Solid (dry weight)

QC for Samples:
1192946003

Results by 8270D SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	12.5U	25.0	6.25	ug/Kg
2-Methylnaphthalene	12.5U	25.0	6.25	ug/Kg
Acenaphthene	12.5U	25.0	6.25	ug/Kg
Acenaphthylene	12.5U	25.0	6.25	ug/Kg
Anthracene	12.5U	25.0	6.25	ug/Kg
Benzo(a)Anthracene	12.5U	25.0	6.25	ug/Kg
Benzo[a]pyrene	12.5U	25.0	6.25	ug/Kg
Benzo[b]Fluoranthene	12.5U	25.0	6.25	ug/Kg
Benzo[g,h,i]perylene	12.5U	25.0	6.25	ug/Kg
Benzo[k]fluoranthene	12.5U	25.0	6.25	ug/Kg
Chrysene	12.5U	25.0	6.25	ug/Kg
Dibenzo[a,h]anthracene	12.5U	25.0	6.25	ug/Kg
Fluoranthene	12.5U	25.0	6.25	ug/Kg
Fluorene	12.5U	25.0	6.25	ug/Kg
Indeno[1,2,3-c,d] pyrene	12.5U	25.0	6.25	ug/Kg
Naphthalene	10.0U	20.0	5.00	ug/Kg
Phenanthrene	12.5U	25.0	6.25	ug/Kg
Pyrene	12.5U	25.0	6.25	ug/Kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	82.2	58-103		%
Fluoranthene-d10 (surr)	82.7	54-113		%

Batch Information

Analytical Batch: XMS11451
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 6/13/2019 11:38:00PM

Prep Batch: XXX41577
Prep Method: SW3550C
Prep Date/Time: 6/13/2019 4:20:15PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Print Date: 06/18/2019 4:52:34PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1192946 [XXX41577]

Blank Spike Lab ID: 1512780

Date Analyzed: 06/13/2019 23:59

Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003

Results by 8270D SIM (PAH)

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
1-Methylnaphthalene	111	92.3	83	(43-111)
2-Methylnaphthalene	111	98.2	88	(39-114)
Acenaphthene	111	94.0	85	(44-111)
Acenaphthylene	111	97.9	88	(39-116)
Anthracene	111	99.3	89	(50-114)
Benzo(a)Anthracene	111	97.1	87	(54-122)
Benzo[a]pyrene	111	99.9	90	(50-125)
Benzo[b]Fluoranthene	111	101	91	(53-128)
Benzo[g,h,i]perylene	111	103	92	(49-127)
Benzo[k]fluoranthene	111	101	91	(56-123)
Chrysene	111	101	91	(57-118)
Dibenzo[a,h]anthracene	111	104	94	(50-129)
Fluoranthene	111	101	91	(55-119)
Fluorene	111	98.8	89	(47-114)
Indeno[1,2,3-c,d] pyrene	111	108	97	(49-130)
Naphthalene	111	92.8	84	(38-111)
Phenanthrene	111	96.5	87	(49-113)
Pyrene	111	107	96	(55-117)
Surrogates				
2-Methylnaphthalene-d10 (surr)	111	81.9	82	(58-103)
Fluoranthene-d10 (surr)	111	83.2	83	(54-113)

Batch Information

Analytical Batch: XMS11451

Analytical Method: 8270D SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: BMZ

Prep Batch: XXX41577

Prep Method: SW3550C

Prep Date/Time: 06/13/2019 16:20

Spike Init Wt./Vol.: 111 ug/Kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:



Matrix Spike Summary

Original Sample ID: 1193000004
 MS Sample ID: 1512781 MS
 MSD Sample ID: 1512782 MSD

Analysis Date: 06/14/2019 5:06
 Analysis Date: 06/14/2019 5:27
 Analysis Date: 06/14/2019 5:47
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1192946003

Results by 8270D SIM (PAH)

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1-Methylnaphthalene	13.4U	120	100	84	121	104	87	43-111	4.40	(< 20)
2-Methylnaphthalene	13.4U	120	107	89	121	110	91	39-114	3.00	(< 20)
Acenaphthene	13.4U	120	103	86	121	107	89	44-111	3.10	(< 20)
Acenaphthylene	13.4U	120	108	90	121	111	92	39-116	3.20	(< 20)
Anthracene	13.4U	120	108	90	121	113	94	50-114	4.30	(< 20)
Benzo(a)Anthracene	13.4U	120	105	88	121	106	88	54-122	1.00	(< 20)
Benzo(a)pyrene	13.4U	120	101	85	121	103	85	50-125	1.00	(< 20)
Benzo(b)Fluoranthene	13.4U	120	106	89	121	107	89	53-128	0.61	(< 20)
Benzo(g,h,i)perylene	13.4U	120	86.4	72	121	87.6	73	49-127	1.40	(< 20)
Benzo(k)fluoranthene	13.4U	120	102	85	121	104	87	56-123	2.20	(< 20)
Chrysene	13.4U	120	105	88	121	108	90	57-118	2.60	(< 20)
Dibenzo(a,h)anthracene	13.4U	120	96.0	80	121	97.6	81	50-129	1.70	(< 20)
Fluoranthene	13.4U	120	112	94	121	112	94	55-119	0.40	(< 20)
Fluorene	13.4U	120	110	92	121	112	94	47-114	2.40	(< 20)
Indeno[1,2,3-c,d] pyrene	13.4U	120	95.9	80	121	97.7	81	49-130	1.90	(< 20)
Naphthalene	10.7U	120	97.4	81	121	100	83	38-111	2.60	(< 20)
Phenanthrene	13.4U	120	106	88	121	107	89	49-113	1.40	(< 20)
Pyrene	13.4U	120	116	97	121	119	98	55-117	1.30	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		120	97.5	81	121	101	84	58-103	3.50	
Fluoranthene-d10 (surr)		120	103	86	121	103	86	54-113	0.02	

Batch Information

Analytical Batch: XMS11451
 Analytical Method: 8270D SIM (PAH)
 Instrument: SVA Agilent 780/5975 GC/MS
 Analyst: BMZ
 Analytical Date/Time: 6/14/2019 5:27:00AM

Prep Batch: XXX41577
 Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
 Prep Date/Time: 6/13/2019 4:20:15PM
 Prep Initial Wt./Vol.: 22.71g
 Prep Extract Vol: 5.00mL

Print Date: 06/18/2019 4:52:38PM

1192946



SHANNON & WILSON, INC.
 Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020
 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600
 3990 Collins Way, Suite 100 Lake Oswego, OR 97035 (503) 223-6147
 2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 690-0000
 5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120
 1321 Barnock Street, Suite 200 Denver, CO 80204 (303) 825-3800

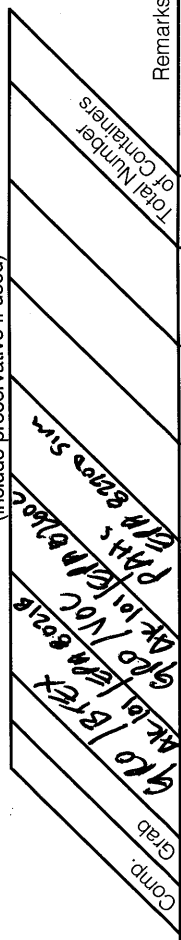
CHAIN-OF-CUSTODY RECORD

2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309

Laboratory SGS Page 1 of 1
 Attn: JILLIAN

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

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab			Remarks/Matrix
				g/g	g/g	Total Number of Containers	
102919-8154		1152	6/7/19	X		2	Soil
2110 B1540		1400		X		2	
300 B1512		1406		X	X	2	
400 B2S8		1605		X		2	
500 5TB					X	1	Trip Blank



Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Project Number: <u>102917-001</u>	Total Number of Containers	Signature: <u>Jake Traylor</u>	Signature: _____	Signature: _____
Project Name: <u>1316 S Donnan</u>	COC Seals/Intact? Y/N/NA	Printed Name: _____	Printed Name: _____	Printed Name: _____
Contact: <u>JCT</u>	Received Good Cond./Cold	Date: _____	Date: _____	Date: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method:	Company: _____	Company: _____	Company: _____
Sampler: <u>ADV</u>	(attach shipping bill, if any)	Time: _____	Time: _____	Time: _____
Instructions	Requested Turnaround Time: <u>STANDARD</u>			
Special Instructions: <u>Profile: 33486A JKJ6/10</u>	Received By: <u>2.</u> Signature: <u>[Signature]</u> Time: <u>11:31</u>			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File		Printed Name: <u>NOAFNO</u> Date: <u>6/10/19</u>		
		Company: <u>SGS</u>		

T3.0€ No. 35320
 DTF



e-Sample Receipt Form

SGS Workorder #:

1192946



1 1 9 2 9 4 6

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below				
Chain of Custody / Temperature Requirements		<input checked="" type="checkbox"/> Yes	Exemption permitted if sampler hand carries/delivers.			
Were Custody Seals intact? Note # & location	<input type="checkbox"/> No		HD			
COC accompanied samples?	<input checked="" type="checkbox"/> Yes					
DOD: Were samples received in COC corresponding coolers?	<input type="checkbox"/> N/A					
<input checked="" type="checkbox"/> N/A	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required					
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input checked="" type="checkbox"/> Yes	Cooler ID:	1	@	3.0	°C Therm. ID: D55
	<input type="checkbox"/> N/A	Cooler ID:		@		°C Therm. ID:
	<input type="checkbox"/> N/A	Cooler ID:		@		°C Therm. ID:
	<input type="checkbox"/> N/A	Cooler ID:		@		°C Therm. ID:
	<input type="checkbox"/> N/A					
	<input type="checkbox"/> N/A					
*If >6°C, were samples collected <8 hours ago?	<input type="checkbox"/> N/A					
If <0°C, were sample containers ice free?	<input type="checkbox"/> N/A					
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.						
Holding Time / Documentation / Sample Condition Requirements	Note: Refer to form F-083 "Sample Guide" for specific holding times.					
Were samples received within holding time?	<input checked="" type="checkbox"/> Yes					
Do samples match COC** (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> Yes					
**Note: If times differ <1hr, record details & login per COC.						
***Note: If sample information on containers differs from COC, SGS will default to COC information						
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals))	<input checked="" type="checkbox"/> Yes					
Were proper containers (type/mass/volume/preservative***) used?	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A	***Exemption permitted for metals (e.g. 200.8/6020A).			
Volatile / LL-Hg Requirements						
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="checkbox"/> Yes					
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> N/A					
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> N/A					
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.						
Additional notes (if applicable):						



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1192946001-A	No Preservative Required	OK			
1192946001-B	Methanol field pres. 4 C	OK			
1192946002-A	No Preservative Required	OK			
1192946002-B	Methanol field pres. 4 C	OK			
1192946003-A	No Preservative Required	OK			
1192946003-B	Methanol field pres. 4 C	OK			
1192946004-A	No Preservative Required	OK			
1192946004-B	Methanol field pres. 4 C	OK			
1192946005-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

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

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

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

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

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

LABORATORY DATA REVIEW CHECKLIST

CS Report Name: Release Investigation, 1316 S. Bonanza Street, Palmer, Alaska

Date: July 2019

Laboratory Report Date: June 6, 2019

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Alena Voigt

Title: Environmental Scientist

Laboratory Name: SGS North America Inc.

Work Order Number: 1192946

ADEC File Number: 2245.26.009

(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**

Comments: *The samples were not transferred to another "network" laboratory or sub-contracted to an alternate laboratory.*

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?

Yes / No / NA (Please explain.)

Comments:

- b. Correct analyses requested? **Yes** / No / NA (Please explain.)

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($6^{\circ} \pm 0^{\circ}$ C)?

Yes / No / NA (Please explain.)

Comments: *The temperature blank was documented as 3.0° C.*

- b. Sample preservation acceptable - acidified waters, Methanol-preserved VOC soil (GRO, BTEX, VOCs, etc.)? **Yes** / No / NA (Please explain.)

Comments:

- c. Sample condition documented - broken, leaking (soil MeOH), zero headspace (VOC vials)? **Yes** / No / NA (Please explain.)

Comments: *Discrepancies were not noted by the laboratory.*

- d. If there were any discrepancies, were they documented (e.g., incorrect sample containers/preservation, sample temperatures outside range, insufficient sample size, missing samples)? Yes / No / **NA** (Please explain.)

Comments:

- e. Data quality or usability affected? Yes / **No** (Please Explain.)

Comments: *Data quality/usability is unaffected.*

4. Case Narrative

- a. Present and understandable? **Yes** / No / NA (Please explain.)

Comments:

- b. Discrepancies, errors or QC failures noted by the lab? **Yes** / No / NA (Please explain.)

Comments: *The case narrative noted to refer to sample receipt form for information on sample condition.*

- 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: *The case narrative does not discuss the effect on the data quality/usability.*

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: *The LOQ for several VOCs are greater than the ADEC cleanup level.*

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

Comments: *There is a potential that these VOCs are present at concentrations greater than the ADEC cleanup levels but less than the LOQs.*

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:

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

Comments:

- iv. Do the affected sample(s) have data flags? Yes / No / **NA**

Comments: *See above.*

- If so, are the data flags clearly defined? Yes / No / **NA**

Comments: *See above.*

- v. Data quality or usability affected? **(Please explain.)** Yes / No / **NA**

Comments: *See above.*

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: *Metals/inorganics were not analyzed.*

- iii. Accuracy – All percent recoveries (%R) reported *and* within method or laboratory limits? And project specified DQOs, if applicable. (AK petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes** / No / NA **(Please explain.)**

Comments:

- iv. Precision – All relative percent differences (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:

- vi. Do the affected samples(s) have data flags? **Yes** / No / **NA**

Comments:

If so, are the data flags clearly defined? **Yes** / No / **NA**

Comments:

- vii. Data quality or usability affected? Explain. **Yes** / No / **NA**

Comments:

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? **Yes** / No / **NA** (Please explain.)

Comments:

- iv. If so, are the data flags clearly defined? **Yes** / No / **NA**

Comments: *See above.*

- v. Data quality or usability affected? Please explain. **Yes** / No / **NA**

Comments:

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

- i. One trip blank reported per matrix, analysis and cooler? **Yes** / No / NA (Please

explain.)

Comments:

- ii. Is the cooler used to transport the trip blank and volatile samples clearly indicated on the COC? **Yes** / No / NA (Please explain if NA or no.)

Comments: *One soil trip blank (STB) was submitted to the laboratory with the project sample.*

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

Comments:

- iv. If above LOQ, what samples are affected?

Comments:

- v. Data quality or usability affected? Explain.

Comments:

e. Field Duplicate

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

Yes / No / NA (Please explain.)

Comments: *The field duplicate set is B1S4/B1S40.*

- ii. Were the field duplicates 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? Explain. **NA**

Comments:

- f. Decontamination or Equipment Blank** (if not applicable, a comment stating why must be entered below)

Yes / **No** / NA (Please explain.)

Comments: *An equipment blank was not included in our ADEC-approved work plan.*

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

Comments:

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

Comments:

- iii. Data quality or usability affected? Explain. **NA**

Comments:

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

- a. Are they defined and appropriate? **Yes** / No / NA

Comments: *Laboratory-specific flags are defined on page 3 of the SGS report.*

ATTACHMENT 5
IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT



Date: July 2019
To: City of Palmer

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