

September 10, 2019

North Slope Borough
CIPM Department
P.O. Box 1050
Barrow, Alaska 99723

Attn: Ms. Melissa Bynum

**RE: ADDITIONAL SITE CHARACTERIZATION, SOUTH PAD, BARROW,
ALASKA; ADEC FILE NO. 310.38.028**

This letter report presents the results of Shannon & Wilson's additional site characterization activities conducted at South Pad in Barrow, Alaska. South Pad is a constructed gravel pad located on Nunavaaq Street and is located about 0.8 mile south-southwest of the Wiley Post-Will Rogers Memorial Airport. A vicinity map is included as Figure 1 and general site features are shown on Figure 2.

BACKGROUND

In 2001, Shannon & Wilson conducted a Phase II Environmental Site Assessment (ESA) at South Pad. The project was conducted to support future cleanup activities. During the Phase II ESA, approximately 10,000 cubic feet of creosote-treated poles were documented on the central portion of the southern property boundary, adjacent to construction materials and lumber. The approximate locations of the creosote-treated poles, construction materials, and lumber are shown on Figure 2.

On July 31, 2001, one surface soil sample (SS86) was collected from stained soil located beneath the western end of the creosote-treated poles. The soil sample was analyzed for gasoline range organics (GRO); diesel range organics (DRO); residual range organics (RRO); benzene, toluene, ethylbenzene, and xylenes (BTEX); semi-volatile organic compounds (SVOCs); and Resource Conservation and Recovery Act (RCRA) metals. Sample SS86 contained concentrations of benzo(a)anthracene (37.5 milligrams per kilogram [mg/kg]) and benzo(a)pyrene (13.7 mg/kg), which exceed the current Alaska Department of Environmental Conservation (ADEC) Method Two Human Health cleanup levels for the Arctic Zone of 20 mg/kg and 2.0 mg/kg, respectively. Sample SS86 also contained 12.7 mg/kg arsenic which exceeds the current ADEC Method Two Human Health cleanup level of 8.8 mg/kg. It was our opinion that the reported arsenic

concentration is consistent with background levels present within the Barrow area and is not considered a contaminant of concern. The remaining tested analytes were either not detected or were detected at concentrations less than the applicable cleanup levels.

On September 9, 2001, to evaluate the extent of contamination identified in Sample SS86, three soil samples (duplicate sample set SS88/SS188 and Samples SS89 and SS90) were collected in the vicinity of Sample SS86 and downslope of the creosote-treated poles. In addition, one surface water sample (Sample SW5) was collected off-pad, south of Sample SS86. The soil samples did not contain contaminant concentrations exceeding the ADEC Method Two Human Health cleanup levels. In addition, the surface water sample did not contain target analytes exceeding the ADEC water quality standards. The locations of the surface soil and water samples are shown on Figure 3.

In a letter dated September 18, 2018, Mr. Joshua Barsis of the ADEC provided a closure evaluation of South Pad. Mr. Barsis stated that the contamination previously identified in the vicinity of the Creosote Pole Storage Area had not been addressed. The ADEC requested further characterization of the former Crate and Creosote Pole Storage Area.

The purpose of this project is to obtain the information necessary to receive site closure and the objective is to address the ADEC's request. The project was performed in material accordance with our March 26, 2019 revised site characterization work plan, which was approved by Mr. Joshua Barsis of the ADEC in an April 4, 2019 letter.

FIELD ACTIVITIES

The project consisted of collecting soil samples in the vicinity of Sample SS86, collected in 2001, and the former creosote pole storage area. Field work was conducted by an ADEC-Qualified Environmental Professional, as defined by 18 Alaska Administrative Code (AAC) 75.333. SGS North America Inc. (SGS) of Anchorage, Alaska provided the analysis of the soil samples. Field notes documenting the sampling activities are included in Attachment 1. Site photographs are included in Attachment 2.

Soil Sampling

Twelve soil samples, including one duplicate, were collected from the vicinity of former Sample SS86 and the creosote pole storage area. As stated in our work plan, we intended to locate former Sample SS86, using measurements from Well B27MW, which was installed in 2001.

Well B27MW could not be located and is assumed destroyed. In addition, the creosote-treated poles and construction materials present during our 2001 Phase II ESA had been relocated prior to our 2019 sampling efforts. Therefore, we estimated the location of former Sample SS86 and the creosote-pole storage area based on measurements from a fence, which was also present during our 2001 Phase II ESA. Surface staining, previously observed during the Phase II ESA, was not observed during our 2019 sampling efforts.

The soil samples were collected from hand borings advanced to about 2.0 to 5.5 foot below ground surface (bgs) using a hand auger and stainless-steel sampling spoons. Various sample depths were selected to evaluate potential contaminate concentration in multiple depths of the constructed gravel pad. Pad pore water or frozen was not observed in the hand borings. Sample SS1 and duplicate sample set SS2/SS12 were collected from the location of former Sample SS86. Samples SS3 through SS6 represented step-out samples from former Sample SS86. Samples SS7 through SS11 were advanced in the location of the former creosote pole storage area. The approximate sample locations are shown on Figure 3.

Prior to collection of each sample, the hand auger was decontaminated using a soft bristle brush and an alconox (detergent)/water solution followed by a distilled water rinse. Field screening samples were obtained at each analytical soil sample location. Each sample was "screened" for organic vapors using a photoionization detector (PID) calibrated with 100 parts per million (ppm) isobutylene standard gas. The PID was used to sample the volatile vapors released from the soil using an ADEC-approved headspace sampling method. Headspace samples were collected in re-sealable plastic bags by filling them with freshly exposed soil to between one-third to one-half of capacity and then sealing the top. Headspace samples were warmed to at least 40° F and allowed to develop for at least 10 minutes prior to field headspace screening. Screening was accomplished by inserting the PID sampling probe into the air space above the soil in the bag. Field PID readings were obtained within 60 minutes of the sample collection. The maximum PID reading was recorded for each sample.

The analytical samples were transferred to the appropriate laboratory supplied jars using decontaminated stainless-steel spoons and transferred to the laboratory in coolers with ice packs using chain-of-custody procedures. Sample collection and soil classification details are included in Table 1.

Following sampling, the soil sample locations were backfilled with the excavated material. Water used to decontaminate the hand auger was spilled to the ground surface in the vicinity of the hand borings.

LABORATORY ANALYSES

A total of 12 soil samples, including one duplicate sample, were submitted for analysis. The soil samples were analyzed for polynuclear aromatic hydrocarbons (PAHs) by Environmental Protection Agency (EPA) Method 8270D. The analytical samples were submitted to SGS North America Inc. of Anchorage, Alaska, using chain-of-custody procedures.

DISCUSSION OF ANALYTICAL RESULTS

The analytical soil results were compared to ADEC cleanup levels contained in the November 2018, 18 AAC 75 regulations. The cleanup levels are based on the ADEC Method Two levels listed in Tables B1 and B2 for the “Arctic Zone”. The applicable cleanup levels for soil are listed in Table 2. The laboratory report and completed ADEC Laboratory Data Review Checklist (LDRC) are provided in Attachment 3.

Soil Samples

The soil samples did not contain detectable concentrations of benzo(a)anthracene or benzo(a)pyrene. Benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and/or pyrene were detected in Samples SS6, SS7, and SS10 at concentrations several orders of magnitude less than applicable ADEC cleanup levels. The remaining samples did not contain detectable concentrations of PAHs.

Quality Control

The project laboratory implements on-going quality assurance/quality control procedures to evaluate conformance to ADEC data quality objectives (DQOs). Internal laboratory controls for this project include surrogates, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control samples (LCS) to assess precision, accuracy, and matrix bias. If a DQO is not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory reports (See Attachment 3).

Shannon & Wilson reviewed the SGS data deliverables and completed an ADEC Laboratory Data Review Checklist for the project work order. The laboratory report and data review

checklist are included in Attachment 3. In our opinion, no non-conformances that would adversely impact data usability for the objectives of this project were noted.

One duplicate set, Samples SS2/SS12, were collected to assess precision of the sampling and analysis processes. Concentration of target analytes were not detected in either sample; therefore the relative percent differences (RPDs) could not be calculated.

CONCLUSIONS

Based on the results of our July 2019 site characterization activities, concentrations of PAHs exceeding the ADEC cleanup levels were not documented in the location of former Sample SS86 and the creosote pole storage area. Therefore, we recommend that the ADEC approve conditional closure for the site.

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives. The findings we have presented within this report are based on the limited research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the project site's soil quality. It is possible that our tests missed higher levels of contaminants, although our intention was to sample areas likely to be impacted and in accordance with our ADEC-approved work plans. As a result, the sampling and analyses performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised. Shannon & Wilson has prepared the document in Attachment 4, Important Information About Your Geotechnical/Environmental Report, to assist you and others in understanding the use and limitations of our reports.

You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study unless authorized by you or required by law.

North Slope Borough
Attn: Ms. Melissa Bynum
September 10, 2019
Page 6

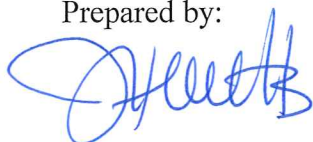
SHANNON & WILSON, INC.

We appreciate the opportunity to be of service. If you have questions or comments concerning this report, please call the undersigned at (907) 561-2120.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:



Jessa Tibbetts
Environmental Scientist

Reviewed by:



Dan P. McMahon
Senior Associate

Enc: Tables 1 and 2, Figures 1 through 3, and Attachments 1 through 4

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location (See Figure 3)	Depth** (feet)	Headspace (ppm) ^	Sample Description
SOIL SAMPLES					
* SS1	7/24/2019	Location of former Sample SS86	3.0-3.2	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS2	7/24/2019	Location of former Sample SS86	3.5-3.7	0.5	Brown, <i>Sand with Silt</i> ; moist
* SS12	7/24/2019	Duplicate of SS2	3.5-3.7	0.5	Brown, <i>Sand with Silt</i> ; moist
* SS3	7/24/2019	Approximately 10 feet south of former Sample SS86	2.0-2.2	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS4	7/24/2019	Approximately 20 feet northwest of former Sample SS86	3.2-3.4	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS5	7/24/2019	Approximately 15 feet northeast of former Sample SS86	3.0-3.2	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS6	7/24/2019	Approximately 20 northwest of former Sample SS86	5.2-5.4	0.5	Brown, <i>Sand with Silt</i> ; moist
* SS7	7/24/2019	Northwest portion of former Creosote Pole Storage Area	5.2-5.4	0.5	Brown, <i>Sand with Silt</i> ; moist
* SS8	7/24/2019	South portion of former Creosote Pole Storage Area	4.0-4.2	0.7	Brown, <i>Sand with Silt</i> ; moist
* SS9	7/24/2019	North portion of former Creosote Pole Storage Area	5.3-5.5	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS10	7/24/2019	South portion of former Creosote Pole Storage Area	4.0-4.2	0.2	Brown, <i>Sand with Silt</i> ; moist
* SS11	7/24/2019	North portion of former Creosote Pole Storage Area	5.3-5.5	0.5	Brown, <i>Sand with Silt</i> ; moist

Notes:

* = Sample analyzed by the project laboratory (See Table 2)

** = Soil sample depth below ground surface

^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID).

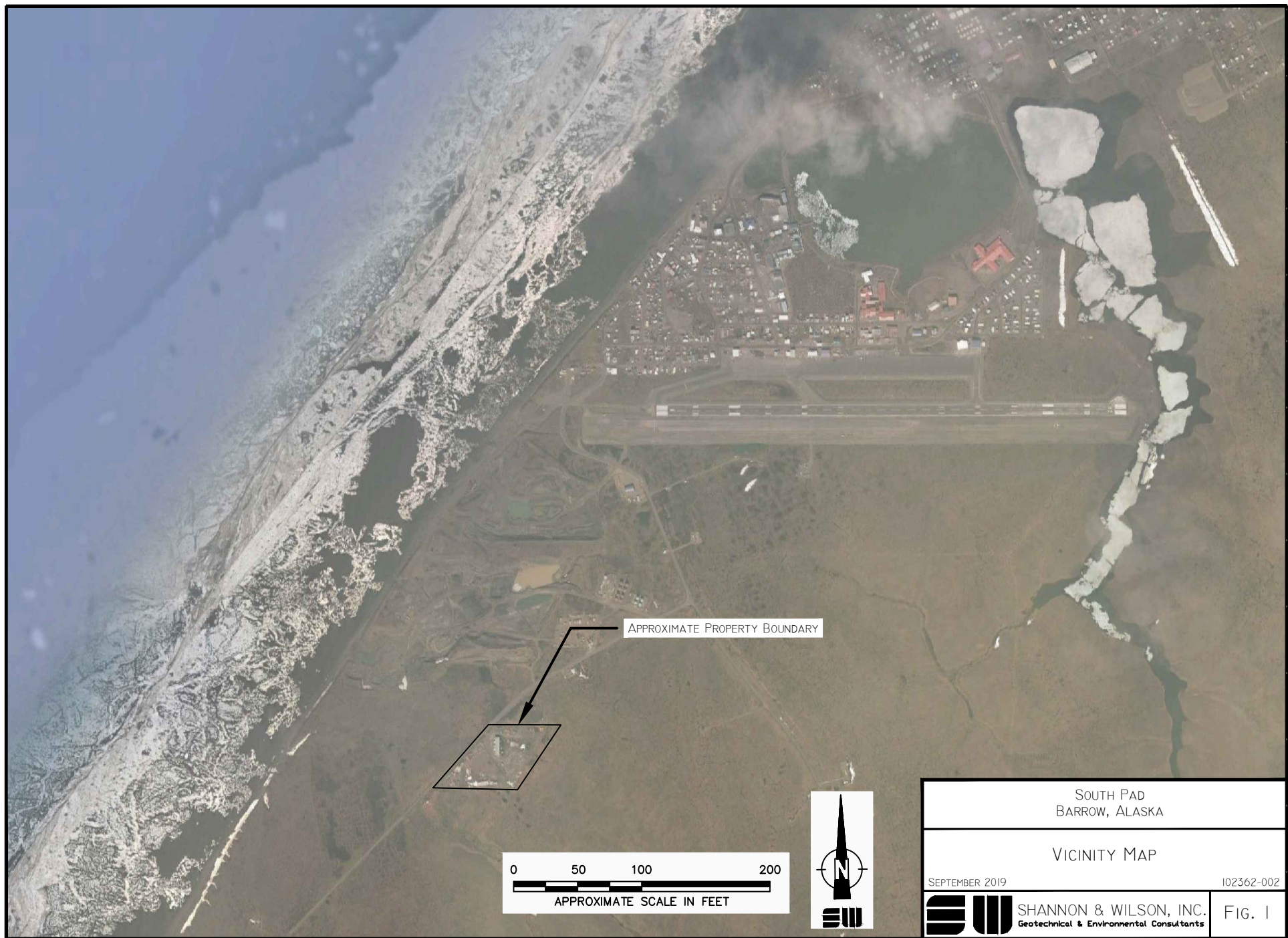
ppm = parts per million

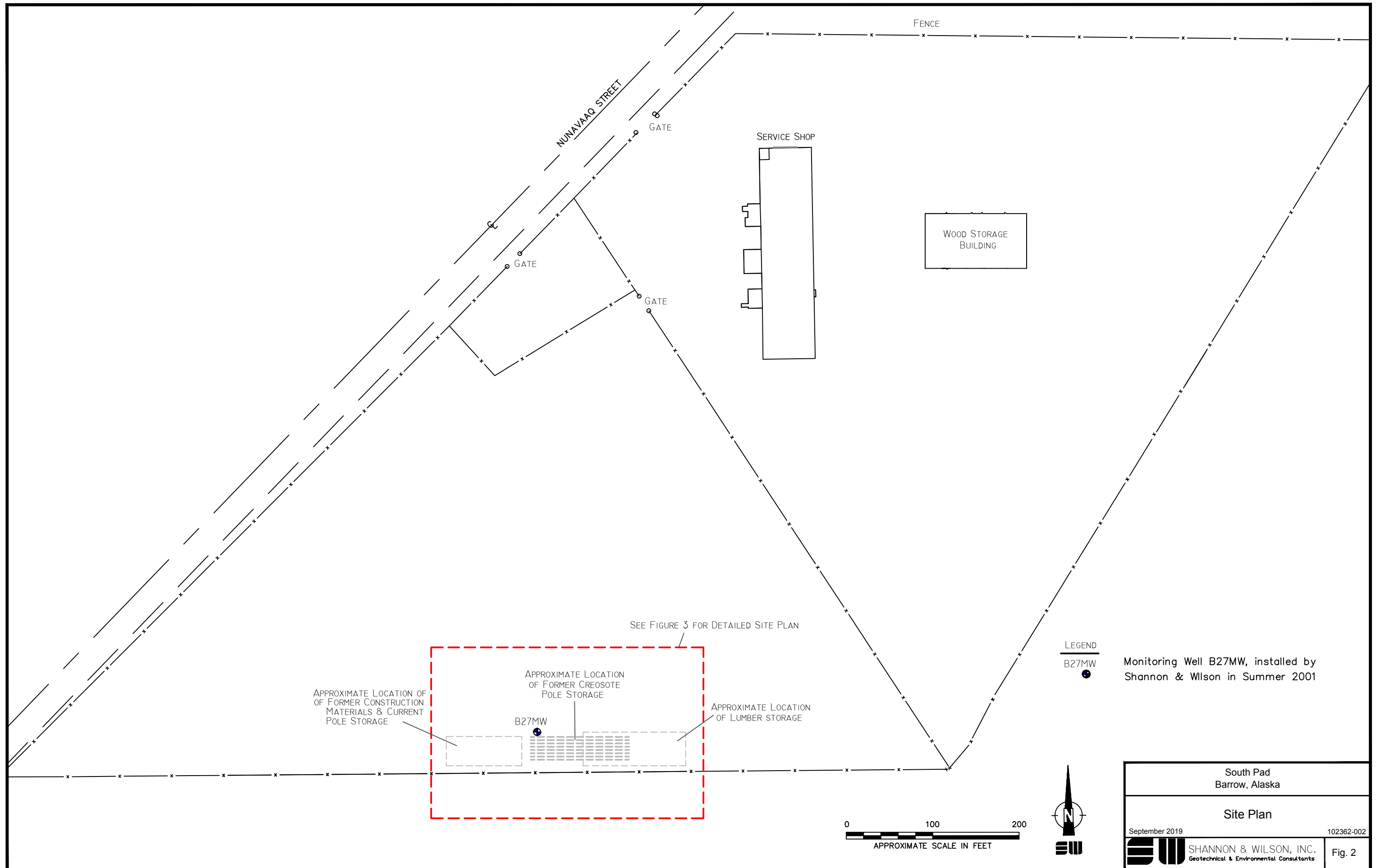
TABLE 2 - SUMMARY OF SOIL ANALYTICAL RESULTS

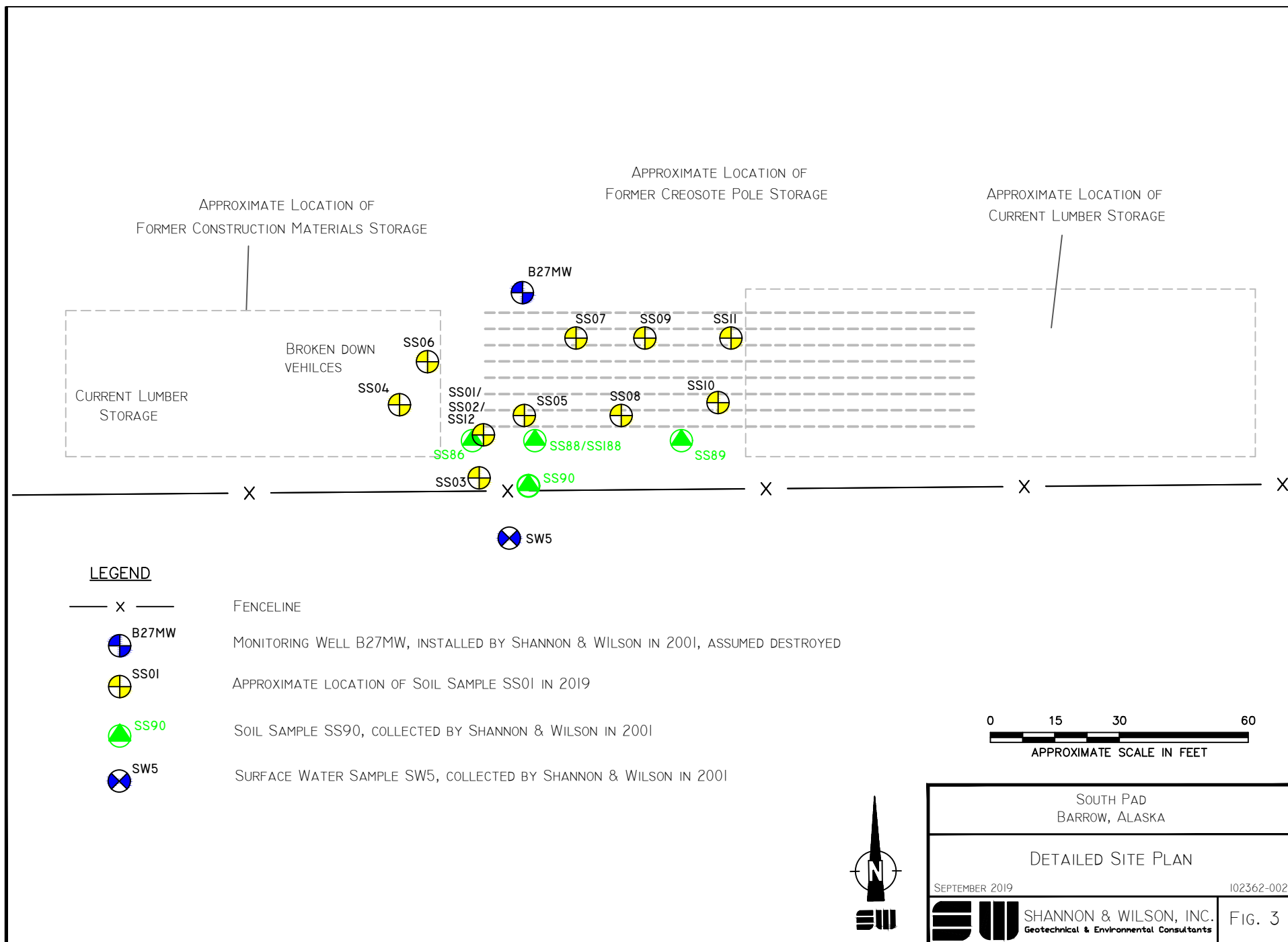
Parameter Tested	Method*	Cleanup Level** (mg/kg)	Sample ID Number^ and Soil Sample Depth in Feet Below Surface of Pad (See Table 1 and Figure 3)											
			SS1 3.0-3.2	SS2 3.5-3.7	SS12~ 3.5-3.7	SS3 2.0-2.2	SS4 3.2-3.4	SS5 3.0-3.2	SS6 5.2-5.4	SS7 5.2-5.4	SS8 4.0-4.2	SS9 5.3-5.5	SS10 4.0-4.2	SS11 5.3-5.5
PID Headspace Reading - ppm	580B PID	-	0.2	0.5	0.5	0.2	0.2	0.2	0.5	0.5	0.7	0.2	0.2	0.5
Polynuclear Aromatic Hydrocarbons (PAHs)														
Benzo[a]Anthracene - mg/kg	EPA 8270D SIM	20	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	<0.0139	<0.0141	<0.0143	<0.0130	<0.0133
Benzo[a]pyrene - mg/kg	EPA 8270D SIM	2.0	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	<0.0139	<0.0141	<0.0143	<0.0130	<0.0133
Benzo[b]Fluoranthene - mg/kg	EPA 8270D SIM	20	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	0.00726 J	<0.0141	<0.0143	0.0106 J	<0.0133
Chrysene - mg/kg	EPA 8270D SIM	2,000	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	0.00803 J	<0.0141	<0.0143	0.0144 J	<0.0133
Fluoranthene - mg/kg	EPA 8270D SIM	4,200	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	0.00829 J	<0.0141	<0.0143	0.0291	<0.0133
Phenanthrene - mg/kg	EPA 8270D SIM	3,100	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	<0.0134	<0.0139	<0.0141	<0.0143	0.0185 J	<0.0133
Pyrene - mg/kg	EPA 8270D SIM	3,100	<0.0129	<0.0131	<0.0133	<0.0129	<0.0129	<0.0131	0.0127 J	0.00739 J	<0.0141	<0.0143	0.0206 J	<0.0133
Other PAHs - mg/kg	EPA 8270D SIM	Various	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Key:

- * = See Attachment e for compounds tested, methods, and laboratory reporting limits
- ** = Cleanup levels are the applicable ADEC Method Two standards listed in Table B1, 18 AAC 75, for the "Arctic Zone" (October 2018)
- ^ = Sample ID number preceded by "102362-" on the chain-of-custody form
- PID = photoionization detector
- mg/kg = Milligram per kilogram
- ~ = Sample is a duplicate of Sample SS2
- ND = Individual analytes not detected
- J = Concentration is reported at estimated value less than the limit of quantitation (LOQ)
- = Not applicable or sample not tested for this analyte
- 0.0127** = Detected concentration
- <0.0129 = Analyte not detected; laboratory limit of detection of 0.0129







ATTACHMENT 1

FIELD NOTES

830 Pick up equipment from NAC
Mobilize to site. Open access

1000 Walk around site. Doesn't appear anything has been moved.
Measure distance to proposed sampling area.
Several broken down trucks in proposed sampling area.
Try to find well B27MW. Could not locate
Measured from approx. location of B27MW and from
fence to sample locations

Begin to dig holes for sampling. See sample log.

102362-001

NORTH SLOPE BOROUGH SOUTH PAD

JULY 24, 2019

Overcast 50°F

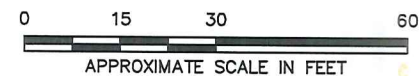
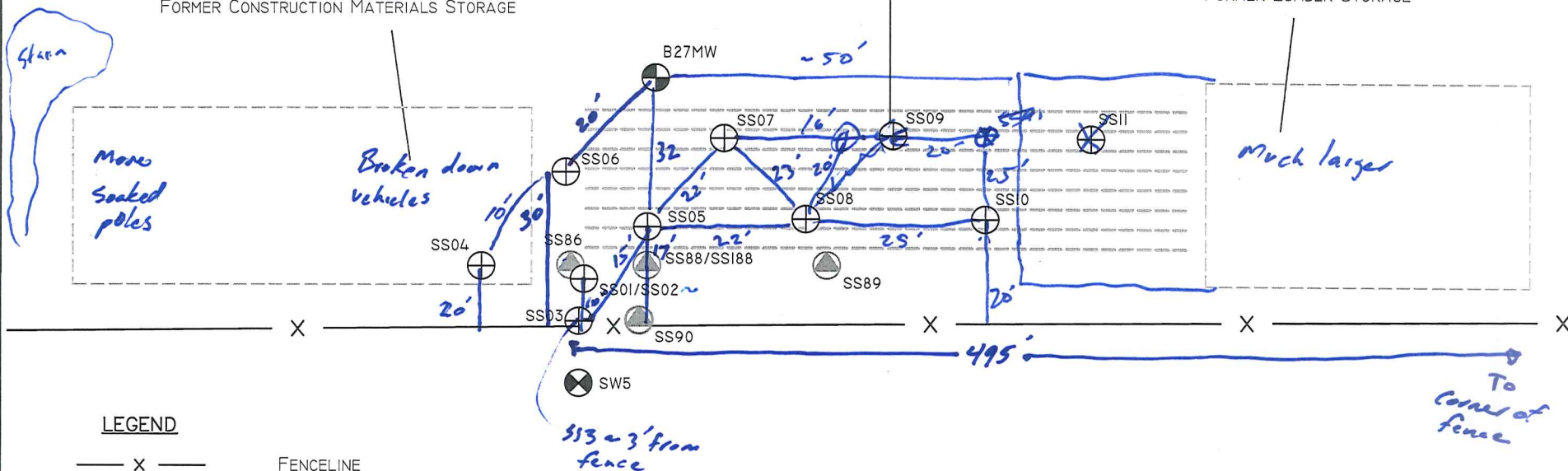
JLT

<u>Sample ID</u>	<u>Time</u>	<u>Location</u>	<u>Depth</u>	<u>DID</u>	<u>Description</u>
102362-SS1	1245	See Figure	3.0-3.2	0.2	Brown, Sand w/ Silt; moist
SS2	1255	↓	3.5-3.7	0.5	↓
SS3	1310		2.0-2.2	0.2	
SS4	1320		3.2-3.4	0.2	
SS5	1340		3.0-3.2	0.2	
SS6	1200		5.2-5.4	0.5	
SS7	1350		5.2-5.4	0.5	
SS8	1400		4.0-4.2	0.7	
SS9	1410		5.3-5.5	0.2	
SS10	1420		4.0-4.2	0.2	
SS11	1430		5.3-5.5	0.5	
SS12	1455	Dup of SS2	3.5-3.7	0.5	↓

APPROXIMATE LOCATION OF
FORMER CONSTRUCTION MATERIALS STORAGE

APPROXIMATE LOCATION OF
FORMER CREOSOTE POLE STORAGE

APPROXIMATE LOCATION OF
FORMER LUMBER STORAGE



SOUTH PAD
BARROW, ALASKA

DETAILED SITE PLAN

MARCH 2019

102362-001



SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. 3

ATTACHMENT 2
SITE PHOTOGRAPHS



Photo 1: Looking southwest in the vicinity of former Well B27MW. (July 25, 2019)



Photo 2: Looking east at the wood storage area. (July 25, 2019)

South Pad
Barrow, Alaska

PHOTOS 1 AND 2

September 2019

102978-001



SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants



Photo 3: Looking east at the subject area. (July 25, 2019)



Photo 4: Looking south at the sampling area. (July 24, 2019)

South Pad
Barrow, Alaska

PHOTOS 3 AND 4

September 2019

102978-001



SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

ATTACHMENT 3

RESULTS OF ANALYTICAL TESTING BY

SGS NORTH AMERICA INC. OF ANCHORAGE, ALASKA

AND

ADEC LABORATORY DATA REVIEW CHECKLIST

Laboratory Report of Analysis

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

Report Number: **1194163**

Client Project: **102362-002 Barrow South Pad**

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: **1194163**
Project Name/Site: **102362-002 Barrow South Pad**
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: 08/07/2019 12:23:25PM

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). SGS is only certified for the analytes listed on our Drinking Water Certification, and only those analytes will be reported to the State of Alaska for compliance. 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>
102362-SS1	1194163001	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS2	1194163002	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS3	1194163003	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS4	1194163004	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS5	1194163005	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS6	1194163006	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS7	1194163007	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS8	1194163008	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS9	1194163009	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS10	1194163010	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS11	1194163011	07/24/2019	07/26/2019	Soil/Solid (dry weight)
102362-SS12	1194163012	07/24/2019	07/26/2019	Soil/Solid (dry weight)

Method

8270D SIM (PAH)
SM21 2540G

Method Description

8270 PAH SIM Semi-Volatiles GC/MS
Percent Solids SM2540G

Detectable Results Summary

Client Sample ID: **102362-SS6**

Lab Sample ID: 1194163006

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Pyrene	12.7J	ug/Kg

Client Sample ID: **102362-SS7**

Lab Sample ID: 1194163007

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzo[b]Fluoranthene	7.26J	ug/Kg
Chrysene	8.03J	ug/Kg
Fluoranthene	8.29J	ug/Kg
Pyrene	7.39J	ug/Kg

Client Sample ID: **102362-SS10**

Lab Sample ID: 1194163010

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Benzo[b]Fluoranthene	10.6J	ug/Kg
Chrysene	14.4J	ug/Kg
Fluoranthene	29.1	ug/Kg
Phenanthrene	18.5J	ug/Kg
Pyrene	20.6J	ug/Kg

Results of 102362-SS1

Client Sample ID: **102362-SS1**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163001
 Lab Project ID: 1194163

Collection Date: 07/24/19 12:45
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
2-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Acenaphthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Acenaphthylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Benzo(a)Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Benzo[a]pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Benzo[b]Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Benzo[g,h,i]perylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Benzo[k]fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Chrysene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Dibenzo[a,h]anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Fluorene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Indeno[1,2,3-c,d] pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Naphthalene	10.4 U	20.7	5.17	ug/Kg	1		08/06/19 14:48
Phenanthrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 14:48
Surrogates							
2-Methylnaphthalene-d10 (surr)	82.2	58-103		%	1		08/06/19 14:48
Fluoranthene-d10 (surr)	81.3	54-113		%	1		08/06/19 14:48

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 14:48
 Container ID: 1194163001-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.596 g
 Prep Extract Vol: 5 mL

Results of 102362-SS2

Client Sample ID: **102362-SS2**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163002
 Lab Project ID: 1194163

Collection Date: 07/24/19 12:55
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.1
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
2-Methylnaphthalene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Acenaphthene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Acenaphthylene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Anthracene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Benzo(a)Anthracene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Benzo[a]pyrene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Benzo[b]Fluoranthene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Benzo[g,h,i]perylene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Benzo[k]fluoranthene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Chrysene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Dibenzo[a,h]anthracene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Fluoranthene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Fluorene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Indeno[1,2,3-c,d] pyrene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Naphthalene	10.5 U	21.0	5.25	ug/Kg	1		08/06/19 15:09
Phenanthrene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Pyrene	13.1 U	26.2	6.56	ug/Kg	1		08/06/19 15:09
Surrogates							
2-Methylnaphthalene-d10 (surr)	82.2	58-103		%	1		08/06/19 15:09
Fluoranthene-d10 (surr)	80.3	54-113		%	1		08/06/19 15:09

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 15:09
 Container ID: 1194163002-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.537 g
 Prep Extract Vol: 5 mL

Results of 102362-SS3

Client Sample ID: **102362-SS3**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163003
 Lab Project ID: 1194163

Collection Date: 07/24/19 13:10
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.8
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
2-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Acenaphthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Acenaphthylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Benzo(a)Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Benzo[a]pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Benzo[b]Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Benzo[g,h,i]perylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Benzo[k]fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Chrysene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Dibenzo[a,h]anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Fluorene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Indeno[1,2,3-c,d] pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Naphthalene	10.4 U	20.7	5.18	ug/Kg	1		08/06/19 15:29
Phenanthrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:29
Surrogates							
2-Methylnaphthalene-d10 (surr)	80.1	58-103		%	1		08/06/19 15:29
Fluoranthene-d10 (surr)	78.6	54-113		%	1		08/06/19 15:29

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 15:29
 Container ID: 1194163003-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.687 g
 Prep Extract Vol: 5 mL

Results of 102362-SS4

Client Sample ID: **102362-SS4**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163004
 Lab Project ID: 1194163

Collection Date: 07/24/19 13:20
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.1
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
2-Methylnaphthalene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Acenaphthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Acenaphthylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Benzo(a)Anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Benzo[a]pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Benzo[b]Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Benzo[g,h,i]perylene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Benzo[k]fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Chrysene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Dibenzo[a,h]anthracene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Fluoranthene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Fluorene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Indeno[1,2,3-c,d] pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Naphthalene	10.4 U	20.7	5.18	ug/Kg	1		08/06/19 15:50
Phenanthrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Pyrene	12.9 U	25.9	6.47	ug/Kg	1		08/06/19 15:50
Surrogates							
2-Methylnaphthalene-d10 (surr)	81.6	58-103		%	1		08/06/19 15:50
Fluoranthene-d10 (surr)	79.9	54-113		%	1		08/06/19 15:50

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 15:50
 Container ID: 1194163004-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.851 g
 Prep Extract Vol: 5 mL

Results of 102362-SS5

Client Sample ID: **102362-SS5**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163005
 Lab Project ID: 1194163

Collection Date: 07/24/19 13:40
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.8
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
2-Methylnaphthalene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Acenaphthene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Acenaphthylene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Anthracene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Benzo(a)Anthracene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Benzo[a]pyrene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Benzo[b]Fluoranthene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Benzo[g,h,i]perylene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Benzo[k]fluoranthene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Chrysene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Dibenzo[a,h]anthracene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Fluoranthene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Fluorene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Indeno[1,2,3-c,d] pyrene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Naphthalene	10.4 U	20.9	5.22	ug/Kg	1		08/06/19 16:10
Phenanthrene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Pyrene	13.1 U	26.1	6.52	ug/Kg	1		08/06/19 16:10
Surrogates							
2-Methylnaphthalene-d10 (surr)	81	58-103		%	1		08/06/19 16:10
Fluoranthene-d10 (surr)	80.6	54-113		%	1		08/06/19 16:10

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 16:10
 Container ID: 1194163005-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.514 g
 Prep Extract Vol: 5 mL

Results of 102362-SS6

Client Sample ID: **102362-SS6**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163006
 Lab Project ID: 1194163

Collection Date: 07/24/19 12:00
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):92.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
2-Methylnaphthalene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Acenaphthene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Acenaphthylene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Anthracene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Benzo(a)Anthracene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Benzo[a]pyrene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Benzo[b]Fluoranthene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Benzo[g,h,i]perylene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Benzo[k]fluoranthene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Chrysene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Dibenzo[a,h]anthracene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Fluoranthene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Fluorene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Indeno[1,2,3-c,d] pyrene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Naphthalene	10.7 U	21.4	5.35	ug/Kg	1		08/06/19 16:31
Phenanthrene	13.4 U	26.7	6.68	ug/Kg	1		08/06/19 16:31
Pyrene	12.7 J	26.7	6.68	ug/Kg	1		08/06/19 16:31
Surrogates							
2-Methylnaphthalene-d10 (surr)	82.4	58-103		%	1		08/06/19 16:31
Fluoranthene-d10 (surr)	78.1	54-113		%	1		08/06/19 16:31

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 16:31
 Container ID: 1194163006-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.824 g
 Prep Extract Vol: 5 mL

Results of 102362-SS7

Client Sample ID: **102362-SS7**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163007
 Lab Project ID: 1194163

Collection Date: 07/24/19 13:50
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
2-Methylnaphthalene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Acenaphthene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Acenaphthylene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Anthracene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Benzo(a)Anthracene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Benzo[a]pyrene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Benzo[b]Fluoranthene	7.26 J	27.7	6.92	ug/Kg	1		08/06/19 16:51
Benzo[g,h,i]perylene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Benzo[k]fluoranthene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Chrysene	8.03 J	27.7	6.92	ug/Kg	1		08/06/19 16:51
Dibenzo[a,h]anthracene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Fluoranthene	8.29 J	27.7	6.92	ug/Kg	1		08/06/19 16:51
Fluorene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Indeno[1,2,3-c,d] pyrene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Naphthalene	11.1 U	22.1	5.54	ug/Kg	1		08/06/19 16:51
Phenanthrene	13.9 U	27.7	6.92	ug/Kg	1		08/06/19 16:51
Pyrene	7.39 J	27.7	6.92	ug/Kg	1		08/06/19 16:51
Surrogates							
2-Methylnaphthalene-d10 (surr)	81.7	58-103		%	1		08/06/19 16:51
Fluoranthene-d10 (surr)	80.2	54-113		%	1		08/06/19 16:51

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 16:51
 Container ID: 1194163007-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.792 g
 Prep Extract Vol: 5 mL

Results of 102362-SS8

Client Sample ID: **102362-SS8**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163008
 Lab Project ID: 1194163

Collection Date: 07/24/19 14:00
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.0
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
2-Methylnaphthalene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Acenaphthene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Acenaphthylene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Anthracene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Benzo(a)Anthracene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Benzo[a]pyrene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Benzo[b]Fluoranthene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Benzo[g,h,i]perylene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Benzo[k]fluoranthene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Chrysene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Dibenzo[a,h]anthracene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Fluoranthene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Fluorene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Indeno[1,2,3-c,d] pyrene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Naphthalene	11.3 U	22.6	5.65	ug/Kg	1		08/06/19 17:12
Phenanthrene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Pyrene	14.1 U	28.2	7.06	ug/Kg	1		08/06/19 17:12
Surrogates							
2-Methylnaphthalene-d10 (surr)	79.6	58-103		%	1		08/06/19 17:12
Fluoranthene-d10 (surr)	77.3	54-113		%	1		08/06/19 17:12

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 17:12
 Container ID: 1194163008-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.909 g
 Prep Extract Vol: 5 mL

Results of 102362-SS9

Client Sample ID: **102362-SS9**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163009
 Lab Project ID: 1194163

Collection Date: 07/24/19 14:10
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
2-Methylnaphthalene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Acenaphthene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Acenaphthylene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Anthracene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Benzo(a)Anthracene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Benzo[a]pyrene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Benzo[b]Fluoranthene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Benzo[g,h,i]perylene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Benzo[k]fluoranthene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Chrysene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Dibenzo[a,h]anthracene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Fluoranthene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Fluorene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Indeno[1,2,3-c,d] pyrene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Naphthalene	11.4 U	22.9	5.72	ug/Kg	1		08/06/19 17:32
Phenanthrene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Pyrene	14.3 U	28.6	7.15	ug/Kg	1		08/06/19 17:32
Surrogates							
2-Methylnaphthalene-d10 (surr)	79.4	58-103		%	1		08/06/19 17:32
Fluoranthene-d10 (surr)	77.9	54-113		%	1		08/06/19 17:32

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 17:32
 Container ID: 1194163009-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.573 g
 Prep Extract Vol: 5 mL

Results of 102362-SS10

Client Sample ID: **102362-SS10**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163010
 Lab Project ID: 1194163

Collection Date: 07/24/19 14:20
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.0
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
2-Methylnaphthalene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Acenaphthene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Acenaphthylene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Anthracene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Benzo(a)Anthracene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Benzo[a]pyrene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Benzo[b]Fluoranthene	10.6 J	26.0	6.49	ug/Kg	1		08/06/19 17:53
Benzo[g,h,i]perylene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Benzo[k]fluoranthene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Chrysene	14.4 J	26.0	6.49	ug/Kg	1		08/06/19 17:53
Dibenzo[a,h]anthracene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Fluoranthene	29.1	26.0	6.49	ug/Kg	1		08/06/19 17:53
Fluorene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Indeno[1,2,3-c,d] pyrene	13.0 U	26.0	6.49	ug/Kg	1		08/06/19 17:53
Naphthalene	10.4 U	20.8	5.19	ug/Kg	1		08/06/19 17:53
Phenanthrene	18.5 J	26.0	6.49	ug/Kg	1		08/06/19 17:53
Pyrene	20.6 J	26.0	6.49	ug/Kg	1		08/06/19 17:53
Surrogates							
2-Methylnaphthalene-d10 (surr)	80.1	58-103		%	1		08/06/19 17:53
Fluoranthene-d10 (surr)	78.8	54-113		%	1		08/06/19 17:53

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 17:53
 Container ID: 1194163010-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.564 g
 Prep Extract Vol: 5 mL

Results of 102362-SS11

Client Sample ID: **102362-SS11**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163011
 Lab Project ID: 1194163

Collection Date: 07/24/19 14:30
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):92.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
2-Methylnaphthalene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Acenaphthene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Acenaphthylene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Anthracene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Benzo(a)Anthracene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Benzo[a]pyrene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Benzo[b]Fluoranthene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Benzo[g,h,i]perylene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Benzo[k]fluoranthene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Chrysene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Dibenzo[a,h]anthracene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Fluoranthene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Fluorene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Indeno[1,2,3-c,d] pyrene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Naphthalene	10.7 U	21.3	5.32	ug/Kg	1		08/06/19 18:14
Phenanthrene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Pyrene	13.3 U	26.6	6.65	ug/Kg	1		08/06/19 18:14
Surrogates							
2-Methylnaphthalene-d10 (surr)	81.6	58-103		%	1		08/06/19 18:14
Fluoranthene-d10 (surr)	78.6	54-113		%	1		08/06/19 18:14

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 18:14
 Container ID: 1194163011-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.936 g
 Prep Extract Vol: 5 mL

Results of 102362-SS12

Client Sample ID: **102362-SS12**
 Client Project ID: **102362-002 Barrow South Pad**
 Lab Sample ID: 1194163012
 Lab Project ID: 1194163

Collection Date: 07/24/19 14:55
 Received Date: 07/26/19 14:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.8
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
2-Methylnaphthalene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Acenaphthene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Acenaphthylene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Anthracene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Benzo(a)Anthracene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Benzo[a]pyrene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Benzo[b]Fluoranthene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Benzo[g,h,i]perylene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Benzo[k]fluoranthene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Chrysene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Dibenzo[a,h]anthracene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Fluoranthene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Fluorene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Indeno[1,2,3-c,d] pyrene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Naphthalene	10.6 U	21.2	5.31	ug/Kg	1		08/06/19 18:34
Phenanthrene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Pyrene	13.3 U	26.5	6.64	ug/Kg	1		08/06/19 18:34
Surrogates							
2-Methylnaphthalene-d10 (surr)	81.5	58-103		%	1		08/06/19 18:34
Fluoranthene-d10 (surr)	78.4	54-113		%	1		08/06/19 18:34

Batch Information

Analytical Batch: XMS11606
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 08/06/19 18:34
 Container ID: 1194163012-A

Prep Batch: XXX41916
 Prep Method: SW3550C
 Prep Date/Time: 08/02/19 15:51
 Prep Initial Wt./Vol.: 22.579 g
 Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1797359 [SPT/10844]
Blank Lab ID: 1523086

Matrix: Soil/Solid (dry weight)

QC for Samples:

1194163001, 1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009,
1194163010, 1194163011, 1194163012

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: SPT10844
Analytical Method: SM21 2540G
Instrument:
Analyst: MER
Analytical Date/Time: 8/2/2019 11:38:00PM

Print Date: 08/07/2019 12:23:31PM

Duplicate Sample Summary

Original Sample ID: 1194163001

Duplicate Sample ID: 1523087

QC for Samples:

1194163001, 1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009, 1194163010, 1194163011, 1194163012

Analysis Date: 08/02/2019 23:38

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	96.2	95.7	%	0.59	(< 15)

Batch Information

Analytical Batch: SPT10844

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Print Date: 08/07/2019 12:23:32PM

Duplicate Sample Summary

Original Sample ID: 1194216016

Duplicate Sample ID: 1523088

QC for Samples:

1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009, 1194163010, 1194163011, 1194163012

Analysis Date: 08/02/2019 23:38

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	83.7	83.4	%	0.37	(< 15)

Batch Information

Analytical Batch: SPT10844

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Print Date: 08/07/2019 12:23:32PM

Method Blank

Blank ID: MB for HBN 1797342 [XXX/41916]
Blank Lab ID: 1523023

Matrix: Soil/Solid (dry weight)

QC for Samples:

1194163001, 1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009, 1194163010, 1194163011, 1194163012

Results by 8270D SIM (PAH)

Parameter	Results	LOQ/CL	DL	Units
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)	84.9	58-103	%
Fluoranthene-d10 (surr)	82.8	54-113	%

Batch Information

Analytical Batch: XMS11606
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: DSD
Analytical Date/Time: 8/6/2019 12:04:00PM

Prep Batch: XXX41916
Prep Method: SW3550C
Prep Date/Time: 8/2/2019 3:51:29PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1194163 [XXX41916]

Blank Spike Lab ID: 1523024

Date Analyzed: 08/06/2019 12:24

Matrix: Soil/Solid (dry weight)

QC for Samples: 1194163001, 1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009, 1194163010, 1194163011, 1194163012

Results by 8270D SIM (PAH)

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	111	98.5	89	(43-111)
2-Methylnaphthalene	111	95.9	86	(39-114)
Acenaphthene	111	97.5	88	(44-111)
Acenaphthylene	111	101	91	(39-116)
Anthracene	111	102	92	(50-114)
Benzo(a)Anthracene	111	98.9	89	(54-122)
Benzo[a]pyrene	111	97.7	88	(50-125)
Benzo[b]Fluoranthene	111	103	92	(53-128)
Benzo[g,h,i]perylene	111	98.4	89	(49-127)
Benzo[k]fluoranthene	111	98.3	89	(56-123)
Chrysene	111	100	90	(57-118)
Dibenzo[a,h]anthracene	111	101	91	(50-129)
Fluoranthene	111	97.9	88	(55-119)
Fluorene	111	100	90	(47-114)
Indeno[1,2,3-c,d] pyrene	111	106	95	(49-130)
Naphthalene	111	97.6	88	(38-111)
Phenanthrene	111	98.7	89	(49-113)
Pyrene	111	102	92	(55-117)

Surrogates

2-Methylnaphthalene-d10 (surr)	111	79.9	80	(58-103)
Fluoranthene-d10 (surr)	111	77.5	78	(54-113)

Batch Information

Analytical Batch: XMS11606

Analytical Method: 8270D SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: DSD

Prep Batch: XXX41916

Prep Method: SW3550C

Prep Date/Time: 08/02/2019 15:51

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

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 08/07/2019 12:23:34PM

Matrix Spike Summary

Original Sample ID: 1199584005
MS Sample ID: 1523025 MS
MSD Sample ID: 1523026 MSD

Analysis Date: 08/06/2019 13:26
Analysis Date: 08/06/2019 13:46
Analysis Date: 08/06/2019 14:07
Matrix: Soil/Solid (dry weight)

QC for Samples: 1194163001, 1194163002, 1194163003, 1194163004, 1194163005, 1194163006, 1194163007, 1194163008, 1194163009, 1194163010, 1194163011, 1194163012

Results by 8270D SIM (PAH)

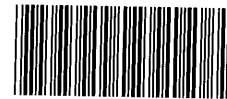
Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Acenaphthene	13.4U	120	103	86	121	106	88	44-111	3.20	(< 20)
Acenaphthylene	13.4U	120	106	89	121	111	92	39-116	3.80	(< 20)
Anthracene	13.4U	120	102	85	121	106	88	50-114	3.90	(< 20)
Benzo(a)Anthracene	13.4U	120	93.4	78	121	94.5	78	54-122	1.20	(< 20)
Benzo[a]pyrene	13.4U	120	87.5	73	121	86.8	72	50-125	0.67	(< 20)
Benzo[b]Fluoranthene	13.4U	120	93.4	78	121	92.5	77	53-128	0.97	(< 20)
Benzo[g,h,i]perylene	13.4U	120	78.2	65	121	75.4	63	49-127	3.50	(< 20)
Benzo[k]fluoranthene	13.4U	120	90.3	76	121	89.9	75	56-123	0.50	(< 20)
Chrysene	13.4U	120	94.0	79	121	95.9	80	57-118	1.90	(< 20)
Dibenzo[a,h]anthracene	13.4U	120	81.3	68	121	79.6	66	50-129	2.10	(< 20)
Fluoranthene	13.4U	120	97.8	82	121	98.6	82	55-119	0.69	(< 20)
Fluorene	13.4U	120	102	86	121	107	89	47-114	4.60	(< 20)
Indeno[1,2,3-c,d] pyrene	13.4U	120	82.8	69	121	81.1	67	49-130	2.10	(< 20)
Naphthalene	10.8U	120	105	88	121	111	92	38-111	5.10	(< 20)
Phenanthrene	13.4U	120	100	84	121	105	87	49-113	4.60	(< 20)
Pyrene	13.4U	120	100	84	121	102	85	55-117	1.80	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		120	90.5	76	121	95.5	79	58-103	5.40	
Fluoranthene-d10 (surr)		120	87.6	73	121	89.7	74	54-113	2.40	

Batch Information

Analytical Batch: XMS11606
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: DSD
Analytical Date/Time: 8/6/2019 1:46:00PM

Prep Batch: XXX41916
Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
Prep Date/Time: 8/2/2019 3:51:29PM
Prep Initial Wt./Vol.: 22.72g
Prep Extract Vol: 5.00mL

Print Date: 08/07/2019 12:23:35PM


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CHAIN-OF-CUSTODY RECORD

 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	PAH	EPA 8210D Sim	Total Number of Containers	Remarks/Matrix
102362-SS1	① A	1245	7/24/19	X	X			1	S-1
SS2	② A	1255		X	X				
SS3	③ A	1310		X	X				
SS4	④ A	1320		X	X				
SS5	⑤ A	1340		X	X				
SS6	⑥ A	1200		X	X				
SS7	⑦ A	1350		X	X				
SS8	⑧ A	1400		X	X				
SS9	⑨ A	1410		X	X				
SS10	⑩ A	1420		X	X				
SS11	⑪ A	1430		X	X				
SS12	⑫ A	1455		X	X				

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>102362-002</u>		Total Number of Containers		Signature: <u>Jake Tracy</u> Time: <u>14:43</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>Bailow South Rd</u>		DOC Seals/Intact? Y/N/NA		Printed Name: <u>Jake Tracy</u> Date: <u>7/26/19</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>JCT</u>		Received Good Cond./Cold		Company: <u>SGS</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method:							
Sampler: <u>JCT</u>		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: <u>Standard</u>				Signature: _____ Time: _____		Signature: _____ Time: _____		Signature: <u>Michelle Albarra</u> Time: <u>14:43</u>	
Special Instructions:				Printed Name: _____ Date: _____		Printed Name: _____ Date: _____		Printed Name: <u>Michelle Albarra</u> Date: <u>7-26-19</u>	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File				Company: _____		Company: _____		Company: <u>SGS</u>	



e-Sample Receipt Form

SGS Workorder #:

1194163



1 1 9 4 1 6 3

Review Criteria		Condition (Yes, No, N/A)	Exceptions Noted below	
Chain of Custody / Temperature Requirements			Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	HD		
COC accompanied samples?	Yes			
DOD: Were samples received in COC corresponding coolers?				
<input type="checkbox"/> **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)?	Yes	Cooler ID: 1	@ 2.1 °C	Therm. ID: D58
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID:	@	°C Therm. ID:
		Cooler ID:	@	°C Therm. ID:
		Cooler ID:	@	°C Therm. ID:
		Cooler ID:	@	°C Therm. ID:
*If >6°C, were samples collected <8 hours ago?		N/A		
If <0°C, were sample containers ice free?		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?	Yes			
Do samples match COC** (i.e., sample IDs, dates/times collected)?	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))	Yes			
Were proper containers (type/mass/volume/preservative***) used?		Yes		***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?	N/A			
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A			
Were all soil VOAs field extracted with MeOH+BFB?	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>
1194163001-A	No Preservative Required	OK			
1194163002-A	No Preservative Required	OK			
1194163003-A	No Preservative Required	OK			
1194163004-A	No Preservative Required	OK			
1194163005-A	No Preservative Required	OK			
1194163006-A	No Preservative Required	OK			
1194163007-A	No Preservative Required	OK			
1194163008-A	No Preservative Required	OK			
1194163009-A	No Preservative Required	OK			
1194163010-A	No Preservative Required	OK			
1194163011-A	No Preservative Required	OK			
1194163012-A	No Preservative Required	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.

NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.

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: Additional Site Characterization, 591 West 67th Avenue, Anchorage, Alaska

Date: August 2019

Laboratory Report Date: August 8, 2019

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Jessa Tibbetts

Title: Environmental Scientist

Laboratory Name: SGS North America Inc.

Work Order Number: 1194163

ADEC File Number: 310.38.028

(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 2.1° 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:

- 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: *Discrepancies were not noted by the laboratory*

- 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: *No discrepancies, errors or QC failures were noted by the lab.*

- 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: *NA.*

5. Sample Results

- a. Correct analyses performed/reported as requested on COC? **Yes** / No / NA (Please explain.)

Comments:

- b. All applicable holding times met? **Yes** / No / NA (Please explain.)

Comments:

- c. All soils reported on a dry-weight basis? **Yes** / No / NA (Please explain.)

Comments:

- d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes** / No / NA (Please explain.)

Comments:

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

Comments:

6. QC Samples

a. Method Blank

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

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

Comments:

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

Comments:

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

Comments: NA.

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

Comments:

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

Comments:

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

Comments:

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: *Only organic analyses were requested with this work order.*

- 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: NA

- 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.

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:

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

Comments:

- iv. Data quality or usability affected? Explain.

Comments:

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

- i. One trip blank reported per matrix, analysis and cooler? **Yes** / **No** / NA (Please explain.) Comments: *Volatile analyses were not requested as part of this project.*

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:

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

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

v. Data quality or usability affected? Explain.
Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (Please explain.)
Comments: *Sample SS12 is a duplicate of Sample SS2.*

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.
Comments:

f. Decontamination or Equipment Blank (if not applicable, a comment stating why must be entered below)
Yes / No / NA (Please explain.) *Decontamination and equipment blanks were 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 4
IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT



Date: September 2019
To: North Slope Borough
CIPM Department

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