SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON

November 20, 2012

Ms. Melinda Brunner
Reuse & Redevelopment Program
Alaska Department of Environmental Conservation
Contaminated Sites Program
610 University Ave.
Fairbanks, Alaska 99709

RE: STOCKPILE SAMPLING AND MANAGEMENT, KOBUK ABANDONED TANK FARM, KOBUK, ALASKA; ADEC HAZARD ID 4615

This letter report presents the results of our stockpile sampling and management activities for the Kobuk Abandoned Tank Farm in Kobuk, Alaska. The project objective was to document current conditions at the abandoned tank farm site and determine whether target analyte concentrations in the soil stockpile allow its use as daily cover at the local landfill. A vicinity map is provided as Figure 1, and a site plan showing the stockpile site is provided as Figure 2.

The project was performed under Shannon & Wilson, Inc's (Shannon & Wilson) Alaska Department of Environmental Conservation (ADEC) Hazardous Substance Spill Prevention and Cleanup Term Contract 18-4002-12. ADEC authorization to proceed was received on July 25, 2012 with Notice to Proceed No. 18-4002-12-050.

BACKGROUND

The abandoned tank farm, known as the Old Fuel Distribution Site or Backup Generator Site, is owned by the City of Kobuk and is located on Lot 26, U.S. Survey #37-88. The site is situated east of the Kobuk River in Kobuk Alaska, as shown in the vicinity map (Figure 1). The site was once a fueling station and tank farm and is now the Backup Generator Site.

The abandoned tank farm was the site of a 2007 ADEC Brownfield Assessment. Approximately 260 to 270 cubic yards of diesel range organics (DRO)-impacted soil was excavated from the abandoned tank farm site and transported to the stockpile location near the Kobuk Landfill.

Of the nine soil samples collected from the excavation limits in 2007, one sample contained DRO concentrations greater than the most stringent ADEC Method 2 cleanup level for the under 40 inches precipitation zone (18 AAC 75.341, October 2011). That sample, collected from

5430 FAIRBANKS STREET•SUITE 3
ANCHORAGE, ALASKA 99518
907-561-2120 • FAX 907-561-4483

beneath the tank fill port of an existing above ground storage tank (AST), contained 2,660 milligrams per kilogram (mg/kg) DRO. Another sample, collected outside the secondary containment berm in an area that was unable to be completely excavated due to equipment limitation and nearby utilities, contained 0.0485 mg/kg benzene, which is greater than the ADEC cleanup level of 0.025 mg/kg.

DRO concentrations in eight samples collected from the stockpile were greater than the ADEC cleanup level of 250 mg/kg, with concentrations ranging from 693 mg/kg to 2,710 mg/kg. Benzene concentrations in the stockpile samples ranged from non-detect to 0.103 mg/kg, which is greater than the ADEC cleanup level.

FIELD ACTIVITIES

The field effort consisted of collecting soil samples from the stockpile and photo documentation of the current conditions at the Backup Generator Site. The field work was performed by Andrew Lee, a Shannon & Wilson environmental scientist who is a "qualified person" as defined by 18 AAC 75.990(100). He was on site to collect the soil samples, take photographs, and document the field activities. The work was implemented in accordance with Shannon & Wilson's Corporate Health and Safety Plan. Field work was conducted in material accordance with our March 26, 2012 work plan which was approved by the ADEC on March 29, 2012. Selected photographs taken during the field activities are provided in Attachment 1. Field notes are provided in Attachment 2.

Stockpile Sampling

A Shannon & Wilson field representative traveled to Kobuk on August 15, 2012 to conduct stockpile sampling and visual site assessment of the Backup Generator Site. A site plan showing the stockpile and global positioning system (GPS) waypoint locations of site photographs and analytical sample locations is provided as Figure 2.

At the time of the site visit, the stockpile had vegetation growing on it (Photo 1) and the top liner of the stockpile was weathered and deteriorating (Photo 2). The stockpile was approximately 6 feet high above ground surface at the northwest end, and sloped to approximately 2 feet high above ground surface at the southeast end. Our field representative estimated the volume of the stockpile as 200 cubic yards (cy). The field representative collected soil samples using a shovel.

The shovel was decontaminated between samples to avoid cross-contamination. Decontamination water was poured onto the stockpile after sampling. Based on a screening frequency of at least one screening sample per 10 cy of soil, 28 test pits were advanced across the approximately 200 cy stockpile. The soil screening samples were collected at least 18 inches beneath the stockpile surface and at various depths to adequately represent soil contaminant distribution within the stockpile. One screening sample was collected from each test pit. Screening sample locations are shown in Figure 3.

The soil samples were screened for organic vapors with a photoionization detector (PID) using a headspace screening method. The PID was calibrated before screening activities with 100 parts per million (ppm) isobutylene standard gas. Headspace samples were collected in re-sealable plastic bags by filling them with freshly exposed soil to about one-third to one-half of their volumes and then sealing the top. Headspace samples were warmed to at least 40 degrees Fahrenheit prior to field headspace screening. Measurement was accomplished by inserting the PID sampling probe into the air space above the soil in the bag. The field PID readings were measured between 10 minutes and one hour of the time of sample collection.

Four analytical soil samples and one field duplicate were collected from the stockpile. The analytical soil samples were selected based on headspace results, spatial representation, and depth representation. Sample locations, descriptions, headspace screening results and GPS waypoints of analytical samples are provided in Table 1. GPS waypoint coordinates, which were recorded for analytical samples and photo locations, are provided in Attachment 3 and displayed visually in Figure 2. Approximate sample locations are shown in Figure 3.

Soil samples were placed in laboratory-supplied jars and stored in a chilled cooler after collection. Soil samples were transported to Anchorage and submitted to SGS North America, Inc. (SGS) in Anchorage using chain-of-custody (COC) procedures.

Backup Generator Site Visual Assessment

Shannon & Wilson's field representative visited the Backup Generator Site on August 15, 2012 to observe and document the current site conditions. Photographs of the site observations are included in Attachment 1. A site plan showing the backup generator building and GPS waypoint locations of the site photographs is provided as Figure 4. The backup generator building is located on a hill (Photo 3) and several other utilities are present in the surrounding area,

including a sewer line (Photo 4) and transformer marked as less than 50 ppm polychlorinated biphenyls (Photo 5). Caution tape labeled with "Danger Asbestos" was observed around the generator building (Photo 6). Access roads are present to the south and west of the generator building (Photo 7). Miscellaneous debris was observed to the south and north of the generator building (Photos 8 and 9). The largest pile of debris was located to the north and appeared to contain sections of sewer line, metal pipes, plastic liner, tubing, cables, and wire (Photo 10).

The ground surface around the Backup Generator Site was also observed. Gravelly fill material appeared to have been placed around the site to facilitate roads. Black liner material was observed in several places in the fill material (Photos 11 and 12). In addition, piles of granular soil were observed along the access roads (Photo 13).

The areas surrounding the Backup Generator Site were also observed. An apparently abandoned tank measuring approximately 6 feet long and 3.5 feet in diameter was observed to the northwest of the site (Photo 14). Beyond the tank, an abandoned truck was observed (Photo 15). A second tank marked as a 500-gallon tank was observed in the woods to the north of the site (Photo 16).

LABORATORY ANALYSES

The soil stockpile samples were tested for DRO by Alaska Method (AK) 102 and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B. Under the sample numbering scheme used for this project, a typical analytical sample identification number is 17480-SP-5 for the soil samples. The '17480-' portion of the ID indicates the Shannon & Wilson job number, the 'SP' is for stockpile, and the '5' is the sample identification number. For brevity in the text of this report, the '17480-' prefix is omitted.

DISCUSSION OF ANALYTICAL RESULTS

The soil sample results are compared to the most stringent ADEC Method Two cleanup levels listed in 18 AAC 75.341 (April 2012) Tables B1 and B2 for the "under 40 inch (precipitation) zone". The applicable cleanup levels are provided in Table 2 with the tabled sample results.

Four of the five stockpile samples (including one field duplicate) contained DRO concentrations greater than the 250 mg/kg cleanup level. DRO concentrations ranged from 186 mg/kg (Sample SP-25) to 3,640 mg/kg (Sample SP-29). The laboratory noted for each stockpile sample that the

AK102 (DRO) chromatograph pattern was "consistent with a weathered middle distillate." Concentrations of BTEX constituents were detected in each soil sample, but at concentrations less than cleanup levels.

QUALITY ASSURANCE SUMMARY

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 included surrogate spikes, method blanks, laboratory control samples/laboratory control sample duplicates (LCS/LCSD), and matrix spike/matrix spike duplicates (MS/MSD) to assess recovery rates, precision, and accuracy. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the Case Narrative of their Laboratory Analysis Report (see Attachment 4).

Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist, which is included in Attachment 4. No non-conformances that would adversely affect data usability were noted in the laboratory report, except for the following:

- Toulene was detected in a method blank at an estimated (J-flagged) concentration of 0.00850 mg/kg. Due to reported toluene concentrations within five times the method blank concentration, toluene is considered not detected in Samples SP-10 and SP-25. The sample results are flagged with a "B" in Table 2.

One soil field duplicate set (Samples SP-2/SP-29) was compared to assess precision of the sampling and analysis processes using the calculated relative percent difference (RPD). The RPDs are within the ADEC recommended DQO of 50 percent for soil.

BTEX constituents were not detected in the soil trip blank, suggesting that the samples were not cross-contaminated with BTEX during sample transport or handling.

CONCLUSIONS

DRO concentrations in the stockpile at the community landfill remain greater than the ADEC cleanup levels for migration to groundwater. However, these concentrations are less than the ADEC cleanup levels for direct contact and inhalation. It is possible that the ADEC may allow

the soil to be used as landfill cover material in a lined landfill, which presumably prevents potential impact from soil to groundwater. If this material is determined to not be suitable for reuse in the landfill, we recommend applying soil amendments (fertilizers) and/or tilling the soil to reduce the DRO concentrations.

CLOSURE/LIMITATIONS

This letter report was prepared for the exclusive use of our clients and their representatives in the study of this site. The findings we have presented within this report are based on the limited research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the site's soil. It is possible that our tests missed higher levels of petroleum hydrocarbon constituents, although our intention was to sample areas in accordance with the work plan. As a result, the sampling and analysis 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. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur with 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 attachments in Attachment 5, "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 specifically authorized by you or required by law.

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

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

Sincerely,

SHANNON & WILSON, INC.

Haydar Turker
Principal Environmental Professional

Matthew S. Hemry, P.E.

JEB:HT/msh

Encl: Table 1 – Sample Locations and Descriptions
Table 2 – Summary of Soil Analytical Results
Figure 1 – Vicinity Map
Figure 2 – Site Plan – Stockpile Site
Figure 3 – Stockpile Sampling Plan
Figure 4 – Site Plan – Backup Generator Site
Attachment 1 – Site Photographs
Attachment 2 – Field Notes
Attachment 3 – Global Positioning System Waypoint Coordinates
Attachment 4 – Results of Analytical Testing by SGS North America Inc. of Anchorage, Alaska and ADEC Laboratory Data Review Checklist
Attachment 5 – Important Information about your Geotechnical/Environmental Report

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample ID Number	Date	Sample Location (See Figures 2 and 3)	GPS Waypoint+	Depth (feet)	Headspace (ppm) ^	Sample Classification (See Attachment 2)
Stockpile Samples						
SP-1	8/15/2012	Southern corner of stockpile	-	1.5-1.7	620	Brown, silty, sandy GRAVEL; moist; hydrocarbon odor
* SP-2	8/15/2012	Southern portion of stockpile	94	1.5-1.7	820	Brown, silty, sandy GRAVEL; moist; hydrocarbon odor
SP-3	8/15/2012	Eastern portion of stockpile	-	1.5-1.7	120	Brown, silty, sandy GRAVEL; moist; hydrocarbon odor
SP-4	8/15/2012	Eastern corner of stockpile	-	1.7-2	34	Gray, silty, sandy GRAVEL; moist; hydrocarbon odor
* SP-5	8/15/2012	Southern portion of stockpile	93	1.5-1.8	470	Gray, silty, sandy GRAVEL; moist; hydrocarbon odor
SP-6	8/15/2012	Southern portion of stockpile	-	1.5-1.8	200	Brown, silty, sandy GRAVEL; moist; hydrocarbon odor
SP-7	8/15/2012	Southern portion of stockpile	-	1.5-1.8	10	Brown, silty, sandy GRAVEL; moist
SP-8	8/15/2012	Southern portion of stockpile	-	2-2.3	1.8	Brown, silty, sandy GRAVEL; moist
SP-9	8/15/2012	Center portion of southern side of stockpile	-	2-2.3	2.5	Brown, silty, sandy GRAVEL; moist
* SP-10	8/15/2012	Central portion of stockpile	91	1.5-1.8	34	Brown, silty, sandy GRAVEL; moist
SP-11	8/15/2012	Central portion of stockpile	-	1.5-1.8	1.8	Brown, silty, gravelly SAND; moist
SP-12	8/15/2012	Center portion of northern side of stockpile	-	2.2-2.5	1.8	Brown, silty, gravelly SAND; moist
SP-13	8/15/2012	Center portion of southern side of stockpile	-	1.5-1.8	1.8	Brown, silty, gravelly SAND; moist
SP-14	8/15/2012	Central portion of stockpile	-	1.5-1.8	1.8	Brown, silty, gravelly SAND; moist
SP-15	8/15/2012	Central portion of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
SP-16	8/15/2012	Center portion of northern side of stockpile	-	2.2-2.5	1.2	Brown, silty, gravelly SAND; moist
SP-17	8/15/2012	Center portion of southern side of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
SP-18	8/15/2012	Central portion of stockpile	-	1.5-1.8	1.8	Brown, silty, gravelly SAND; moist
SP-19	8/15/2012	Central portion of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
SP-20	8/15/2012	Center portion of northern side of stockpile	-	1.7-2	2.5	Brown, silty, gravelly SAND; moist
SP-21	8/15/2012	Western portion of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
SP-22	8/15/2012	Western portion of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
SP-23	8/15/2012	Northern portion of stockpile	-	1.5-1.8	1.3	Brown, silty, gravelly SAND; moist
SP-24	8/15/2012	Northern portion of stockpile	-	1.5-1.8	1.2	Brown, silty, gravelly SAND; moist
* SP-25	8/15/2012	West corner of stockpile	92	3-3.3	1.2	Brown, silty, gravelly SAND; moist

Notes:

* = Sample analyzed by the project laboratory (See Table 2 and Attachment 4)

\+ = See Attachment 3 for coordinates

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

\- = Measurement not recorded or not applicable

ppm = Parts per million

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample ID Number	Date	Sample Location (See Figures 2 and 3)	GPS Waypoint+	Depth (feet)	Headspace (ppm) ^	Sample Classification (See Attachment 2)
Stockpile Samples (continued)						
SP-26	8/15/2012	Western portion of stockpile	-	3-3.3	1.2	Brown, silty, gravelly SAND; moist
SP-27	8/15/2012	Northern portion of stockpile	-	2.2-2.5	1.2	Brown, silty, gravelly SAND; moist
SP-28	8/15/2012	Northern corner of stockpile	-	1.7-2	1.2	Brown, silty, gravelly SAND; moist
* SP-29	8/15/2012	Duplicate of Sample SP-2	94	1.5-1.7	820	Brown, silty, sandy GRAVEL; moist; hydrocarbon odor
Quality Control Samples						
* TB	8/15/2012	Soil Trip Blank	-	-	-	Ottawa sand with methanol added in the laboratory

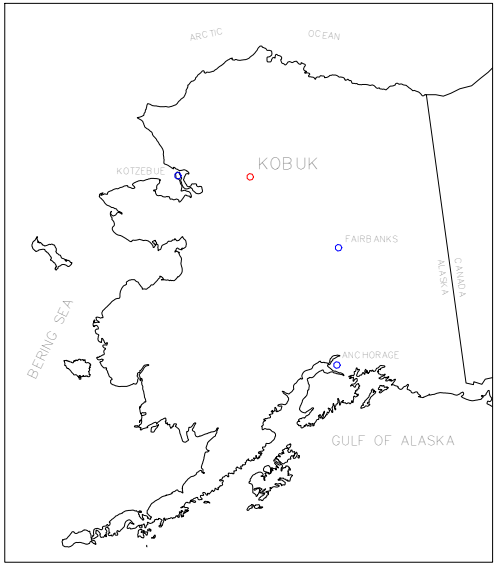
Notes:
* = Sample analyzed by the project laboratory (See Table 2)
\+ = See Attachment 3 for coordinates
^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID)
\- = Measurement not recorded or not applicable
ppm = Parts per million

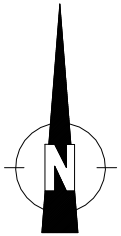
TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS

			Sample ID Number^, and Collection Depth in Feet (See Table 1, Figures 2 and 3, and Attachment 4)					
			Soil Stockpile					Quality Control
Parameter Tested	**Method**	**Cleanup Level****	SP-2 1.5-1.7	SP-29~ 1.5-1.7	SP-5 1.5-1.8	SP-10 1.5-1.8	SP-25 3-3.3	TB
Headspace Reading - ppm	OVM 580B	-	820	820	470	34	1.2	-
Total Solids - percent	SM21 2540G	-	84.1	85.0	85.8	86.7	84.7	-
Diesel Range Organics (DRO) - mg/kg	AK 101	250	**3,420**	**3,640**	**2,870**	**946**	186	-
Aromatic Volatile Organics (BTEX)								
Benzene - mg/kg	EPA 8021B	0.025	0.00607 J	0.00892 J	<0.0104	<0.00924	<0.0119	<0.00806
Toluene - mg/kg	EPA 8021B	6.5	0.964	0.995	0.0593	<0.0375 B	<0.0261 B	<0.0157
Ethylbenzene - mg/kg	EPA 8021B	6.9	3.71	4.09	0.327	0.240	0.0220 J	<0.0157
Xylenes - mg/kg	EPA 8021B	63	30.0	32.9	7.60	0.810	0.0231 J	<0.0459

Notes:
** Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75.341 (April 2012).

^	= Sample ID No. preceded by "32-1-17480-" on the chain of custody form
ppm	= parts per million
mg/kg	= milligrams per kilogram
~	= duplicate of Sample SP2
J	= estimated concentration; detected at a concentration less than the limit of quantitation
-	= not applicable or sample not tested for this analyte
<0.0375 B	= result of 0.0375 mg/kg was within five times the concentration reported in the associated method blank
<0.0104	= analyte not detected; laboratory reporting limit of 0.0104 mg/kg
3,420	= bolded and highlighted results are greater than ADEC cleanup levels





0 2000 4000

APPROXIMATE SCALE IN FEET

Map adapted from aerial imagery provided by Google Earth Pro,
reproduced by permission granted by Google Earth Mapping Service.

Kobuk Abandoned Tank Farm
Kobuk, Alaska

VICINITY MAP

November 2012 32-1-17480-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 1

LEGEND

63 Global Positioning System (GPS) waypoint number
See Attachment 3 for coordinates

Waypoints were plotted on this figure using GPS coordinates and Google Earth Pro. Locations may appear to differ from those shown on report photographs or Figure 3 due to accuracy limitations of GPS and Google Earth Pro aerial photographs.

Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth Mapping Service.

0 40 80
APPROXIMATE SCALE IN FEET

N

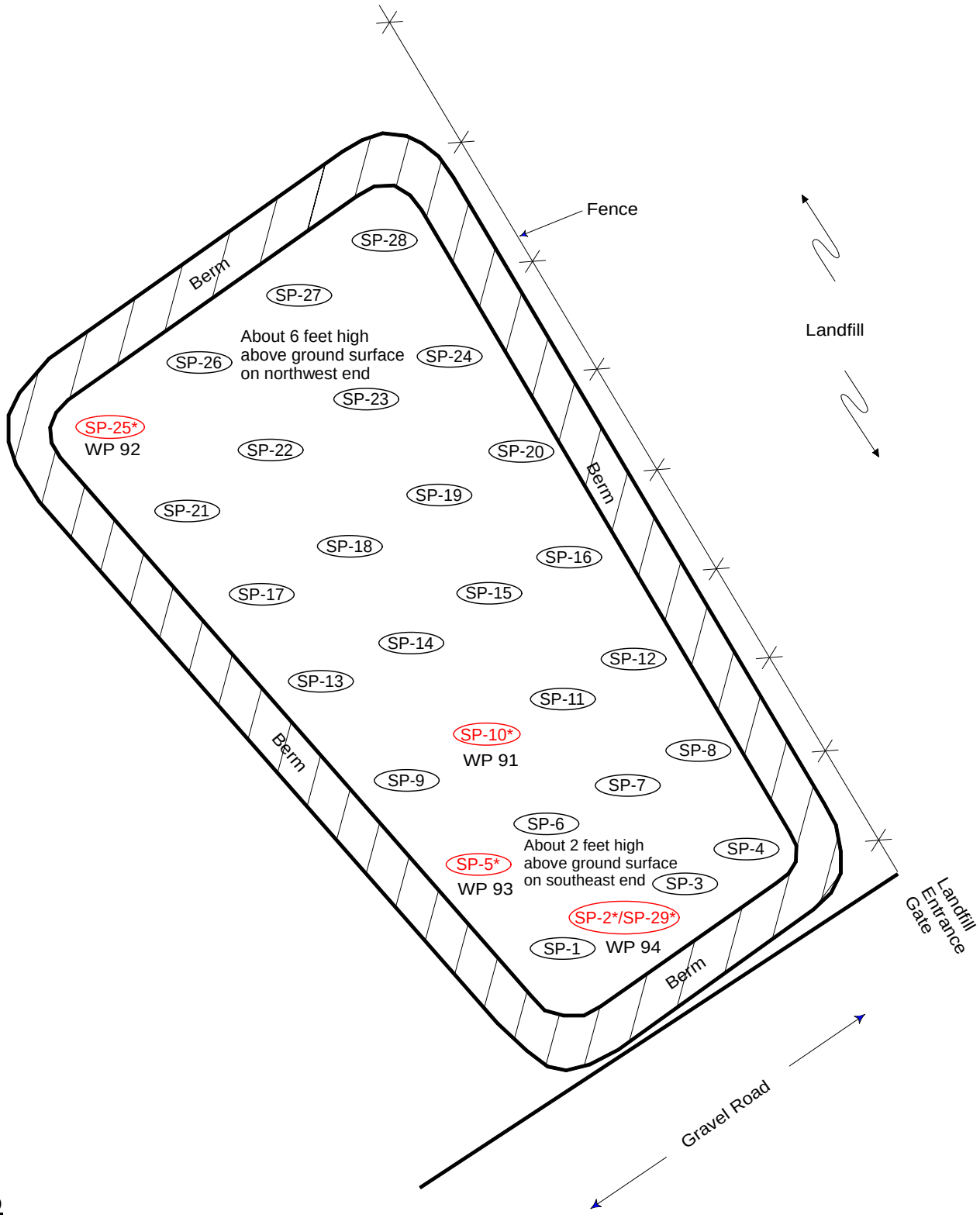
Kobuk Abandoned Tank Farm
Kobuk, Alaska

SITE PLAN
STOCKPILE SITE

November 2012 32-1-17480-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 2



LEGEND

SP-26	Approximate location of field screening Sample SP26, collected by Shannon & Wilson, Inc. on August 15, 2012
SP-5*	Approximate location of analytical Sample SP5, collected by Shannon & Wilson, Inc. on August 15, 2012
WP 92	GPS Waypoint Number 92 (See Attachment 3 for coordinates)

0 10 20

APPROXIMATE SCALE IN FEET

Kobuk Abandoned Tank Farm
Kobuk, Alaska

STOCKPILE SAMPLING PLAN

November 2012

32-1-17480-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3

LEGEND

65 Global positioning system waypoint number
See Attachment 3 for coordinates

Waypoints were plotted on this figure using GPS coordinates and Google Earth Pro. Locations may appear to differ from those shown on report photographs due to accuracy limitations of GPS and Google Earth Pro aerial photographs.

Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth Mapping Service.

0 30 60
APPROXIMATE SCALE IN FEET

N

Kobuk Abandoned Tank Farm
November 2012 Kobuk, Alaska

SITE PLAN
BACKUP GENERATOR SITE

November 2012 32-1-17480-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 4

ATTACHMENT 1

SITE PHOTOGRAPHS

Photo 1: Looking northeast, vegetation was growing out of the stockpiled soil. (Waypoint 57, 8/15/2012)

Photo 2: The top cover of the stockpile appeared weathered and was deteriorating. (Waypoint 59, 8/15/2012)

Photo 3: Looking east across the access road at the Backup Generator Building. (Waypoint 65, 8/15/2012)

Photo 4: Looking east, the sewer line was observed to the west of the Backup Generator Building. (Waypoint 67, 8/15/2012)

Kobuk Abandoned Tank Farm
Kobuk, Alaska

PHOTOGRAPHS 1 THROUGH 4

November 2012 32-1-17480-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Photo 5: Looking north, a transformer was observed adjacent to the Backup Generator Building. (Waypoint 68, 8/15/2012)

Photo 6: Looking north, caution tape indicating asbestos dangers was observed on the ground adjacent to the Backup Generator Building. (Waypoint 75, 8/15/2012)

Photo 7: Looking west at the access roads in the vicinity of the Backup Generator Building. (Waypoint 69, 8/15/2012)

Photo 8: Looking south, debris was observed to the south of the Backup Generator Building. (Waypoint 69, 8/15/2012)

Photo 9: Looking north, debris was observed to the north of the Backup Generator Site. (Waypoint 70, 8/15/2012)

Photo 10: Looking east, the largest pile of debris contained sewer line, piping, cables, wire, and plastic liner. (Waypoint 76, 8/15/2012)

Photo 11: Looking south, liner material was observed in road areas around the Backup Generator Site. (Waypoint 72, 8/15/2012)

Photo 12: Looking southeast, liner was observed along the edge of the gravel fill material. (Waypoint 82, 8/15/2012)

Photo 13: Looking west, berms of fill material were observed along the access road. (Waypoint 73, 8/15/2012)

Photo 14: Looking east, a tank measuring 6 feet long and approximately 3.5 feet in diameter was observed in the woods adjacent to the Backup Generator Site. (Waypoint 79, 8/15/2012)

Photo 15: Looking northeast, an abandoned truck was observed in the woods to the northeast of the Backup Generator Site. (Waypoint 80, 8/15/2012)

Photo 16: Looking south, a tank marked as 500-gallon was observed in the woods to the north of the Backup Generator Site. (Waypoint 90, 8/15/2012)

ATTACHMENT 2

FIELD NOTES

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kobuk JOB NO. 17480-2
SUBJECT Field Notes DATE Aug 2012
BY Anderlee CHK'D SHEET 1 of

Wed Aug 15, 2012

4:30 Meet gear together - travel to Airport for Alaska Air flight to Kotzebue

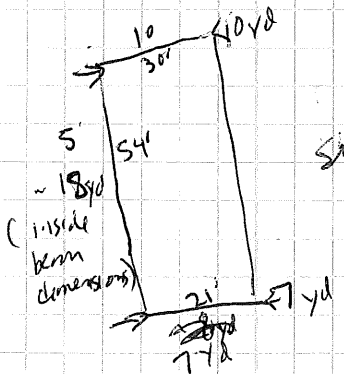
Take Bering Air to Kobuk. Gear will go on afternoon flight due to space limitations and Not being able to get gear from Alaska Air Cargo to Bering in time.

10:30 at Kobuk city office - to talk to Billy Joe about 4-wheeler and room.

walk to Stockpile for photos

#	time	WP	looking	what
1615	12:02	57	NE	stockpile
1616	12:03	57	NE	stockpile
1617	12:09	58	NW	stockpile
1618	12:14	59	NW	topliner deteriorated - holes
1619	12:15	60	NW	"
1620	12:16	61	S	N corner of SP looking S
1621	12:20	62	SW	height of SP about 5' at highest from fence
1622	12:22	63	S	looking at SP from N - height about 6' above tundra ↳ berm of SP
1623	12:27	64	NE	NW berm of SP on left, SP on right

- high end of Stockpile is to the NW, low end is to the SE
- low end ends at gate of landfill



see next page

- weather: about 55°F, cloudy, light wind

rain starting at 4pm

3:00 pm Lunch

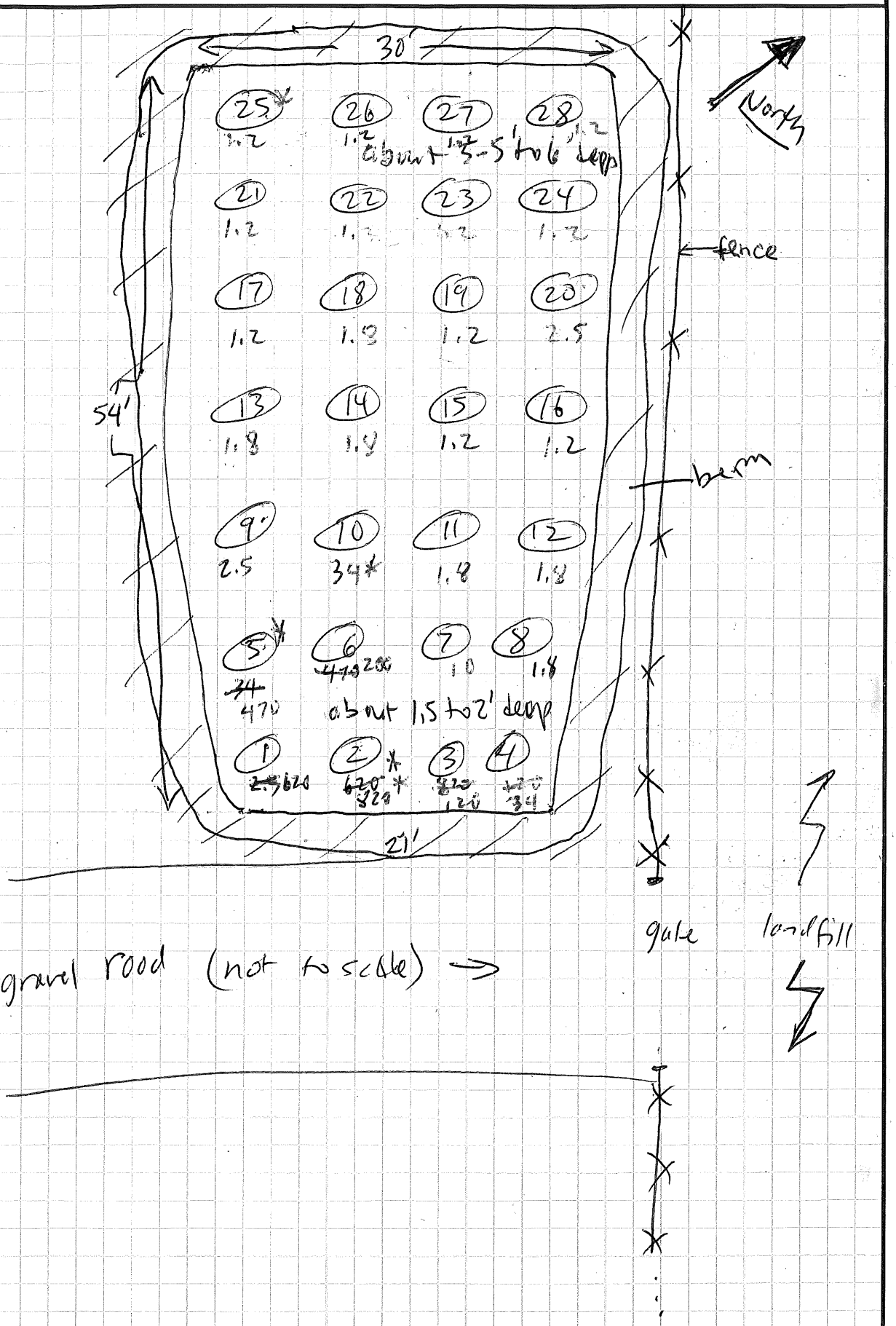
3:45 pm rent 4-wheeler from Billy @ clinic + trailer

wait for Bering to bring my gear @ 4:10pm → cancel taxi

17:00 on site At Stockpile - Calibrate PID #4 to 100 ppm isobutylene (check)

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kobuk JOB NO. 17480-2
SUBJECT Frill Holes DATE 8-15-12
BY Andrew Lee CHK'D SHEET 2 of



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kobuk JOB NO. 17480-2
SUBJECT Field Notes DATE 8-15-12
BY Andrew Lee CHK'D SHEET 3 of

Wed 8/15/12
13:23 at Backup Generator Site

photos:

#	time	WP	direction	what
1626	1330	65	~~NE~~ E	Backup Generator building. From W, across road
1627	1330	66	E	" from NW corner of site/road
1628	13:37	66	SE	" " "
1629	13:39	67	E	sewer line from road
1630	13:41	68	N	transformer - (<50 ppm PCB)
1631	13:42	69	W	from B.G. building towards road (SE corner of B.G. building)
1632	13:44	69	S	from B.G. building at debris
1633	13:45	69	SE	" towards SE corner
1634	13:45	69	E	" towards E side
1635	13:46	69	NE	" towards NE
1636	13:49	70	N	from NE corner B.G. building - debris
1637	13:49	70	NW	"
1638	13:50	71	W	site from east side
1639	13:52	72	S	ground surface, remnant line - material from NE corner of site
1640	13:53	72	SW	site from NE corner
1641	13:55	73	W	from SE corner
1642	13:55	73	NW	"
1643	13:55	73	N	"
1644	13:57	74	S	from ~~south~~ side of site - debris
1645	13:58	75	N	Asbestos caution tape at SE corner of B.G. building
1646	14:00	76	E	debris on S side of site - sewer line, pipes liner, cable, tubing
1647	14:04	77	E	from NW of site - debris - cables, tires, tank
1648	14:05	78	SE	tank ~~in~~ NW corner of property (off site)
1649	14:07	79	E	" about 6' long x 3.5' dia. (off site)
1650	14:11	80	NE	debris to NW (off site)
1651	14:11	80	NE	" zoom in to old truck (off site)
1652	14:16	81	NW	" old sewer line 2 trucks on other side of property line.
~~1653~~	~~14:17~~			
1653	14:17	82	SE	ground surface - Sandy gravel on surface, old line -
1654	14:19	83	NE	ground surface - vegetation in shallow ditch
1655	14:21	84	SE	vegetation on higher ground on SE corner of site
1656	14:22	85	NE	" mushrooms
1657	14:24	86	W	from behind B.G. look out at exit route
1658	14:25	87	W	" wet silty spot on ground
1659	14:27	88	SE	berm on SE corner of property
1660	14:28	89	NE	clearing behind B.G. building - some berms visible.
1661	14:35	90	S	old 500-gallon tank in woods north of site

Sample/screen soil - back after midnight 12:15 AM 8-16-12.
after clean up.
- everything wet.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kobuk JOB NO. 17480-2
SUBJECT Field Notes DATE 8
BY Andrea CHK'D SHEET 4 of

8-16-12 Thurs

8AM - re-label material/pack, return ATV, pay for it ($100)
Travel back to Anchorage (Kotzebue A.P.) - Bering Air to Kotzebue

1hr lunch 1pm-2pm

- Travel Kotzebue to Anch.
Flight delayed 45 min.

In Anchorage 5pm - wait for baggage until 5:30 - don't arrive.

Back home 5:52pm

SAMPLE COLLECTION LOG

SHANNON & WILSON, INC

Project Number: 32-1-17480-2 17480-2
Date: 8-15-12
Sampler: Andrew Lee

Location: Kobuk
Site: Stockpile by Landfill
Sheet Number: 1

Sample Number	Location	Sample Time	Sample Depth	Sample Type	GPS Reading*	PID Reading	Soil Classification	Analyses
(empty bag)	—		—	bag	—	2.5	— blank bag	—
SP-1	Stockpile	1720	1.5-1.8	Soil		32.0	Brown, silty, sandy, GRAVEL; moist, HC odor	@ 22:55
SP-2	See sketch	1732	1.5-1.8	↓	94	82.0	"	↓
SP-3	p. 3	17:42	"			120		
SP-4	↓	17:51	1.7-2			34	Gray, silty, sandy GRAVEL; moist, HC	
SP-5		18:03	1.5-1.8		93	470	"	23:05
SP-6		18:13	1.5-1.8			200	Brown, "	
SP-7		18:32	1.5-1.8			10	Brown, silty, sandy GRAVEL; moist	
SP-8		18:43	2-2.3			1.8	"	
SP-9		18:50	2-2.2			2.5	"	
SP-10		19:05	1.5-1.8		91	34	"	23:15
SP-11		19:15	"			1.8	Brown, silty, gravelly SAND; moist	
SP-12		19:45	2.2-2.5			1.8	"	
SP-13		19:35	1.5-1.8			1.8	"	
SP-14		19:50	1.5-1.8			1.8	"	
SP-15		20:15	1.5-1.8			1.2	"	
SP-16		20:25	2.2-2.5			1.2	"	
SP-17		20:35	1.5-1.8			1.2	"	
SP-18		20:45	1.5-1.8			1.8	"	
SP-19		20:55	1.5-1.8			1.2	"	
SP-20		21:05	1.7-2			2.5	"	
SP-21		21:13	1.5-1.8			1.2	"	
SP-22		21:21	1.5-1.8			1.2	"	
SP-23		21:30	1.5-1.8			1.3	"	
SP-24		21:40	1.5-1.8			1.2	"	
SP-25		22:00	3-3.3		92	1.2	"	@ 23:10
SP-26		22:17	3-3.3			1.2	"	
SP-27		22:30	2.2-2.5			1.2	"	
SP-28	↓	22:40	1.7-2	↓		1.2	"	
SP-29	duplicate of SP-2							@ 23:00

Sample Type
ES Environmental sample
FD Field duplicate
FM Field Screening
TB Trip blank
* GPS readings only collected from analytical sample locations

- DRO/BTEX
- 4 + (duplicate) [illegible]

on screen 38
horizontal & vertical
spatial representation

ATTACHMENT 3

GLOBAL POSITIONING SYSTEM WAYPOINT COORDINATES

ATTACHMENT 3
GLOBAL POSITIONING SYSTEM WAYPOINT COORDINATES

Waypoint ID	Latitude (degrees)	Longitude (degrees)
57	66.927808 N	156.879549 W
58	66.92798 N	156.878234 W
59	66.928104 N	156.878395 W
60	66.92813 N	156.878503 W
61	66.928226 N	156.878563 W
62	66.928252 N	156.87838 W
63	66.928332 N	156.878504 W
64	66.928184 N	156.878676 W
65	66.906069 N	156.88304 W
66	66.906192 N	156.882756 W
67	66.906151 N	156.88283 W
68	66.906094 N	156.88253 W
69	66.906044 N	156.882321 W
70	66.90611 N	156.882276 W
71	66.906055 N	156.881711 W
72	66.906183 N	156.881681 W
73	66.905958 N	156.881639 W
74	66.906034 N	156.88221 W
75	66.906082 N	156.882318 W
76	66.905955 N	156.882303 W
77	66.906218 N	156.88268 W
78	66.906205 N	156.882629 W
79	66.906205 N	156.882627 W
80	66.906139 N	156.882441 W
81	66.906166 N	156.88225 W
82	66.906138 N	156.882066 W
83	66.9061 N	156.881999 W
84	66.906047 N	156.88202 W
85	66.906017 N	156.882047 W
86	66.906094 N	156.882079 W
87	66.90609 N	156.881903 W
88	66.906023 N	156.882141 W
89	66.906012 N	156.882205 W
90	66.906294 N	156.882019 W
91	66.928165 N	156.878466 W
92	66.928227 N	156.8786 W
93	66.928144 N	156.878415 W
94	66.928151 N	156.878352 W

Notes:
Waypoints are Shannon & Wilson identification numbers that start with Waypoint 57 for this project. Coordinates are recorded in WGS84

ATTACHMENT 4

RESULTS OF ANALYTICAL TESTING BY

SGS NORTH AMERICA INC. OF ANCHORAGE, ALASKA

AND

ADEC LABORATORY DATA REVIEW CHECKLIST

SGS North America Inc.
Alaska Division
Level II Laboratory Data Report

Project:	32-1-17480-2 Kobuk
Client:	Shannon & Wilson, Inc.
SGS Work Order:	1123828

Released by:

Contents:

CASE NARRATIVE

Print Date: 8/28/2012

Client Name: Shannon & Wilson, Inc.
Project Name: 32-1-17480-2 Kobuk
Workorder No.: 1123828

Sample Comments

Refer to the sample receipt form for information on sample condition.

Lab Sample ID	Sample Type	Client Sample ID
1123828001	PS	17480-SP-2
	AK102 - The pattern is consistent with a weathered middle distillate.	
1123828002	PS	17480-SP-5
	AK102 - The pattern is consistent with a weathered middle distillate.	
1123828003	PS	17480-SP-10
	AK102 - The pattern is consistent with a weathered middle distillate.	
1123828004	PS	17480-SP-25
	AK102 - The pattern is consistent with a weathered middle distillate.	
1123828005	PS	17480-SP-29
	AK102 - The pattern is consistent with a weathered middle distillate.	
1109257	* MS	1123828002MS
	8021B - MS recoveries for p&m-xylene and o-xylene do not meet QC criteria due to matrix interference. Refer to LCS/LSCS for accuracy.	
1109258	* MSD	1123828002MSD
	8021B - MSD recoveries for p&m-xylene and o-xylene do not meet QC criteria due to matrix interference. Refer to LCS/LSCS for accuracy.	

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

Report of Manual Integrations

Print Date: 8/28/2012 10:27 am

Laboratory ID	Client Sample ID	Analytical Batch	Method	Analyte	Reason
1123828002	17480-SP-5	VFC11133	SW8021B	o-Xylene	SP
1123828002	17480-SP-5	VFC11133	SW8021B	P & M -Xylene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Laboratory Analytical Report

Client: **Shannon & Wilson, Inc.**
5430 Fairbanks Street
Suite 3
Anchorage, AK 99518

Attn: **Andrew Lee**
T: (907)561-2120 F:
asl@shanwil.com

Project: **32-1-17480-2 Kobuk**

Workorder No.: **1123828**

Certification:

This data package is in compliance with the terms and conditions of the contract, both technically and for completeness, unless otherwise noted on the sample data sheet(s) and/or case narrative. This certification applies only to the tested parameters and the specific sample(s) received at the laboratory. If you have any questions regarding this report, or if we can be of further assistance, please contact your SGS Project Manager.

Steve Crupi

steven.crupi@sgs.com
Project Manager

Contents (Bookmarked in PDF):

Print Date: 8/28/2012

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO 17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

Print Date: 8/28/2012 10:27 am

Client Name: Shannon & Wilson, Inc.
Project Name: 32-1-17480-2 Kobuk
Workorder No.: 1123828

Analytical Methods

Method Description	Analytical Method
BTEX 8021 prepped by AK101 Field Prep	SW8021B
Diesel Range Organics (S)	AK102
Percent Solids SM2540G	SM21 2540G

Sample ID Cross Reference

Lab Sample ID	Client Sample ID
1123828001	17480-SP-2
1123828002	17480-SP-5
1123828003	17480-SP-10
1123828004	17480-SP-25
1123828005	17480-SP-29
1123828006	17480-TB

Detectable Results Summary

Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-2**
SGS Ref. #: 1123828001

Volatile Fuels Department

Parameter	Result	Units
Benzene	6.07J	ug/Kg
Toluene	964	ug/Kg
Ethylbenzene	3710	ug/Kg
o-Xylene	14200	ug/Kg
P & M -Xylene	15800	ug/Kg

Semivolatile Organic Fuels Department

Parameter	Result	Units
Diesel Range Organics	3420	mg/Kg

Client Sample ID: **17480-SP-5**
SGS Ref. #: 1123828002

Volatile Fuels Department

Parameter	Result	Units
Toluene	59.3	ug/Kg
Ethylbenzene	327	ug/Kg
o-Xylene	4320	ug/Kg
P & M -Xylene	3280	ug/Kg

Semivolatile Organic Fuels Department

Parameter	Result	Units
Diesel Range Organics	2870	mg/Kg

Client Sample ID: **17480-SP-10**
SGS Ref. #: 1123828003

Volatile Fuels Department

Parameter	Result	Units
Toluene	37.5	ug/Kg
Ethylbenzene	240	ug/Kg
o-Xylene	277	ug/Kg
P & M -Xylene	533	ug/Kg

Semivolatile Organic Fuels Department

Parameter	Result	Units
Diesel Range Organics	946	mg/Kg

Client Sample ID: **17480-SP-25**
SGS Ref. #: 1123828004

Volatile Fuels Department

Parameter	Result	Units
Toluene	26.1J	ug/Kg
Ethylbenzene	22.0J	ug/Kg
o-Xylene	23.1J	ug/Kg

Semivolatile Organic Fuels Department

Parameter	Result	Units
Diesel Range Organics	186	mg/Kg

Detectable Results Summary

Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-29**

SGS Ref. #: 1123828005

Parameter	Result	Units
Volatile Fuels Department		
Benzene	8.92J	ug/Kg
Toluene	995	ug/Kg
Ethylbenzene	4090	ug/Kg
o-Xylene	15400	ug/Kg
P & M -Xylene	17500	ug/Kg
Semivolatile Organic Fuels Department		
Diesel Range Organics	3640	mg/Kg

Client Sample ID: **17480-SP-2**
SGS Ref. #: 1123828001
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.1

Collection Date/Time: 08/15/12 22:55
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	6.07J	17.9	5.72	ug/Kg	1	VFC11129	VXX23916	
Ethylbenzene	3710	35.7	11.1	ug/Kg	1	VFC11129	VXX23916	
o-Xylene	14200	357	111	ug/Kg	10	VFC11133	VXX23925	
P & M -Xylene	15800	71.5	21.4	ug/Kg	1	VFC11129	VXX23916	
Toluene	964	35.7	11.1	ug/Kg	1	VFC11129	VXX23916	
1,4-Difluorobenzene <surr>	97.5	72-119		%	1	VFC11129	VXX23916	

Batch Information

Analytical Batch: VFC11129
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 04:41
Dilution Factor: 1
Prep Batch: VXX23916
Prep Method: SW5035A
Prep Date/Time: 08/15/12 22:55
Initial Prep Wt./Vol.: 56.587 g
Prep Extract Vol.: 34.001 mL
Container ID:1123828001-B
Analyst: HM

Analytical Batch: VFC11133
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 16:26
Dilution Factor: 10
Prep Batch: VXX23925
Prep Method: SW5035A
Prep Date/Time: 08/15/12 22:55
Initial Prep Wt./Vol.: 56.587 g
Prep Extract Vol.: 34.001 mL
Container ID:1123828001-B
Analyst: HM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-2**
SGS Ref. #: 1123828001
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.1

Collection Date/Time: 08/15/12 22:55
Receipt Date/Time: 08/20/12 13:39

Semivolatile Organic Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Diesel Range Organics	3420	235	72.8	mg/Kg	10	XFC10547	XXX27769	
5a Androstane <surr>	89	50-150		%	10	XFC10547	XXX27769	

Batch Information

Analytical Batch: XFC10547
Analytical Method: AK102
Analysis Date/Time: 08/23/12 13:53
Dilution Factor: 10

Prep Batch: XXX27769
Prep Method: SW3550C
Prep Date/Time: 08/22/12 10:40

Initial Prep Wt./Vol.: 30.365 g
Prep Extract Vol.: 1 mL
Container ID:1123828001-A
Analyst: MEM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-2**
SGS Ref. #: 1123828001
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.1

Collection Date/Time: 08/15/12 22:55
Receipt Date/Time: 08/20/12 13:39

Solids

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Total Solids	84.1			%	1	SPT8762		

Batch Information

Analytical Batch: SPT8762
Analytical Method: SM21 2540G
Analysis Date/Time: 08/21/12 16:31
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL
Container ID:1123828001-A
Analyst: CNP

Client Sample ID: **17480-SP-5**
SGS Ref. #: 1123828002
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.8

Collection Date/Time: 08/15/12 23:05
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	10.4 U	16.2	5.18	ug/Kg	1	VFC11133	VXX23925	
Ethylbenzene	327	32.4	10.1	ug/Kg	1	VFC11133	VXX23925	
o-Xylene	4320	32.4	10.1	ug/Kg	1	VFC11133	VXX23925	
P & M -Xylene	3280	64.8	19.4	ug/Kg	1	VFC11133	VXX23925	
Toluene	59.3	32.4	10.1	ug/Kg	1	VFC11133	VXX23925	
1,4-Difluorobenzene <surr>	99.1	72-119		%	1	VFC11133	VXX23925	

Batch Information

Analytical Batch: VFC11133
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 16:07
Dilution Factor: 1

Prep Batch: VXX23925
Prep Method: SW5035A
Prep Date/Time: 08/15/12 23:05

Initial Prep Wt./Vol.: 60.481 g
Prep Extract Vol.: 33.6072 mL
Container ID:1123828002-B
Analyst: HM

Client Sample ID: **17480-SP-5**
SGS Ref. #: 1123828002
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.8

Collection Date/Time: 08/15/12 23:05
Receipt Date/Time: 08/20/12 13:39

Semivolatile Organic Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Diesel Range Organics	2870	116	36.0	mg/Kg	5	XFC10547	XXX27769	
5a Androstane <surr>	101	50-150		%	5	XFC10547	XXX27769	

Batch Information

Analytical Batch: XFC10547
Analytical Method: AK102
Analysis Date/Time: 08/23/12 14:03
Dilution Factor: 5

Prep Batch: XXX27769
Prep Method: SW3550C
Prep Date/Time: 08/22/12 10:40

Initial Prep Wt./Vol.: 30.099 g
Prep Extract Vol.: 1 mL
Container ID:1123828002-A
Analyst: MEM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-5**
SGS Ref. #: 1123828002
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.8

Collection Date/Time: 08/15/12 23:05
Receipt Date/Time: 08/20/12 13:39

Solids

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Total Solids	85.8			%	1	SPT8762		

Batch Information

Analytical Batch: SPT8762
Analytical Method: SM21 2540G
Analysis Date/Time: 08/21/12 16:31
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL
Container ID:1123828002-A
Analyst: CNP

Client Sample ID: **17480-SP-10**
SGS Ref. #: 1123828003
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 86.7

Collection Date/Time: 08/15/12 23:15
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	9.24 U	14.4	4.62	ug/Kg	1	VFC11133	VXX23925	
Ethylbenzene	240	28.8	9.00	ug/Kg	1	VFC11133	VXX23925	
o-Xylene	277	28.8	9.00	ug/Kg	1	VFC11133	VXX23925	
P & M -Xylene	533	57.7	17.3	ug/Kg	1	VFC11133	VXX23925	
Toluene	37.5	28.8	9.00	ug/Kg	1	VFC11133	VXX23925	
1,4-Difluorobenzene <surr>	100	72-119		%	1	VFC11133	VXX23925	

Batch Information

Analytical Batch: VFC11133
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 15:30
Dilution Factor: 1

Prep Batch: VXX23925
Prep Method: SW5035A
Prep Date/Time: 08/15/12 23:15

Initial Prep Wt./Vol.: 67.952 g
Prep Extract Vol.: 34.0089 mL
Container ID:1123828003-B
Analyst: HM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-10**
SGS Ref. #: 1123828003
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 86.7

Collection Date/Time: 08/15/12 23:15
Receipt Date/Time: 08/20/12 13:39

Semivolatile Organic Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Diesel Range Organics	946	91.5	28.4	mg/Kg	4	XFC10547	XXX27769	
5a Androstane <surr>	87.3	50-150		%	4	XFC10547	XXX27769	

Batch Information

Analytical Batch: XFC10547
Analytical Method: AK102
Analysis Date/Time: 08/23/12 14:13
Dilution Factor: 4

Prep Batch: XXX27769
Prep Method: SW3550C
Prep Date/Time: 08/22/12 10:40

Initial Prep Wt./Vol.: 30.236 g
Prep Extract Vol.: 1 mL
Container ID:1123828003-A
Analyst: MEM

Client Sample ID: **17480-SP-10**
SGS Ref. #: 1123828003
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 86.7

Collection Date/Time: 08/15/12 23:15
Receipt Date/Time: 08/20/12 13:39

Solids

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Total Solids	86.7			%	1	SPT8762		

Batch Information

Analytical Batch: SPT8762
Analytical Method: SM21 2540G
Analysis Date/Time: 08/21/12 16:31
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL
Container ID:1123828003-A
Analyst: CNP

Client Sample ID: **17480-SP-25**
SGS Ref. #: 1123828004
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.7

Collection Date/Time: 08/15/12 23:10
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	11.9 U	18.6	5.96	ug/Kg	1	VFC11133	VXX23925	
Ethylbenzene	22.0J	37.3	11.6	ug/Kg	1	VFC11133	VXX23925	
o-Xylene	23.1J	37.3	11.6	ug/Kg	1	VFC11133	VXX23925	
P & M -Xylene	44.8 U	74.6	22.4	ug/Kg	1	VFC11133	VXX23925	
Toluene	26.1J	37.3	11.6	ug/Kg	1	VFC11133	VXX23925	
1,4-Difluorobenzene <surr>	93.2	72-119		%	1	VFC11133	VXX23925	

Batch Information

Analytical Batch: VFC11133
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 15:49
Dilution Factor: 1

Prep Batch: VXX23925
Prep Method: SW5035A
Prep Date/Time: 08/15/12 23:10

Initial Prep Wt./Vol.: 52.308 g
Prep Extract Vol.: 33.0211 mL
Container ID:1123828004-B
Analyst: HM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-25**
SGS Ref. #: 1123828004
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.7

Collection Date/Time: 08/15/12 23:10
Receipt Date/Time: 08/20/12 13:39

Semivolatile Organic Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Diesel Range Organics	186	23.4	7.25	mg/Kg	1	XFC10547	XXX27769	
5a Androstane <surr>	103	50-150		%	1	XFC10547	XXX27769	

Batch Information

Analytical Batch: XFC10547
Analytical Method: AK102
Analysis Date/Time: 08/23/12 08:06
Dilution Factor: 1

Prep Batch: XXX27769
Prep Method: SW3550C
Prep Date/Time: 08/22/12 10:40

Initial Prep Wt./Vol.: 30.316 g
Prep Extract Vol.: 1 mL
Container ID:1123828004-A
Analyst: MEM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-25**
SGS Ref. #: 1123828004
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 84.7

Collection Date/Time: 08/15/12 23:10
Receipt Date/Time: 08/20/12 13:39

Solids

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Total Solids	84.7			%	1	SPT8762		

Batch Information

Analytical Batch: SPT8762
Analytical Method: SM21 2540G
Analysis Date/Time: 08/21/12 16:31
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL
Container ID:1123828004-A
Analyst: CNP

Client Sample ID: **17480-SP-29**
SGS Ref. #: 1123828005
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.0

Collection Date/Time: 08/15/12 23:00
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	8.92J	18.6	5.94	ug/Kg	1	VFC11129	VXX23916	
Ethylbenzene	4090	37.1	11.6	ug/Kg	1	VFC11129	VXX23916	
o-Xylene	15400	371	116	ug/Kg	10	VFC11133	VXX23925	
P & M -Xylene	17500	74.3	22.3	ug/Kg	1	VFC11129	VXX23916	
Toluene	995	37.1	11.6	ug/Kg	1	VFC11129	VXX23916	
1,4-Difluorobenzene <surr>	99.2	72-119		%	1	VFC11129	VXX23916	

Batch Information

Analytical Batch: VFC11129
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 05:18
Dilution Factor: 1
Prep Batch: VXX23916
Prep Method: SW5035A
Prep Date/Time: 08/15/12 23:00
Initial Prep Wt./Vol.: 52.007 g
Prep Extract Vol.: 32.8258 mL
Container ID:1123828005-B
Analyst: HM

Analytical Batch: VFC11133
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 16:44
Dilution Factor: 10
Prep Batch: VXX23925
Prep Method: SW5035A
Prep Date/Time: 08/15/12 23:00
Initial Prep Wt./Vol.: 52.007 g
Prep Extract Vol.: 32.8258 mL
Container ID:1123828005-B
Analyst: HM

Client Sample ID: **17480-SP-29**
SGS Ref. #: 1123828005
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.0

Collection Date/Time: 08/15/12 23:00
Receipt Date/Time: 08/20/12 13:39

Semivolatile Organic Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Diesel Range Organics	3640	234	72.5	mg/Kg	10	XFC10547	XXX27769	
5a Androstane <surr>	96.4	50-150		%	10	XFC10547	XXX27769	

Batch Information

Analytical Batch: XFC10547
Analytical Method: AK102
Analysis Date/Time: 08/23/12 14:23
Dilution Factor: 10

Prep Batch: XXX27769
Prep Method: SW3550C
Prep Date/Time: 08/22/12 10:40

Initial Prep Wt./Vol.: 30.186 g
Prep Extract Vol.: 1 mL
Container ID:1123828005-A
Analyst: MEM

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-SP-29**
SGS Ref. #: 1123828005
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)
Percent Solids: 85.0

Collection Date/Time: 08/15/12 23:00
Receipt Date/Time: 08/20/12 13:39

Solids

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Total Solids	85.0			%	1	SPT8762		

Batch Information

Analytical Batch: SPT8762
Analytical Method: SM21 2540G
Analysis Date/Time: 08/21/12 16:31
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL
Container ID:1123828005-A
Analyst: CNP

Shannon & Wilson, Inc. Print Date: 8/28/2012 10:27 am

Client Sample ID: **17480-TB**
SGS Ref. #: 1123828006
Project ID: 32-1-17480-2 Kobuk
Matrix: Soil/Solid (dry weight)

Collection Date/Time: 08/15/12 08:00
Receipt Date/Time: 08/20/12 13:39

Volatile Fuels Department

Parameter	Result	LOQ/CL	DL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	8.06 U	12.6	4.03	ug/Kg	1	VFC11129	VXX23916	
Ethylbenzene	15.7 U	25.2	7.86	ug/Kg	1	VFC11129	VXX23916	
o-Xylene	15.7 U	25.2	7.86	ug/Kg	1	VFC11129	VXX23916	
P & M -Xylene	30.2 U	50.4	15.1	ug/Kg	1	VFC11129	VXX23916	
Toluene	15.7 U	25.2	7.86	ug/Kg	1	VFC11129	VXX23916	
1,4-Difluorobenzene <surr>	93	72-119		%	1	VFC11129	VXX23916	

Batch Information

Analytical Batch: VFC11129
Analytical Method: SW8021B
Analysis Date/Time: 08/23/12 06:13
Dilution Factor: 1

Prep Batch: VXX23916
Prep Method: SW5035A
Prep Date/Time: 08/15/12 08:00

Initial Prep Wt./Vol.: 49.603 g
Prep Extract Vol.: 25 mL
Container ID:1123828006-A
Analyst: HM

SGS Ref.#	1108473	Method Blank	**Printed Date/Time**	08/28/2012 10:27
Client Name	Shannon & Wilson, Inc.		**Prep Batch**	
Project Name/#	32-1-17480-2 Kobuk		**Method**	
Matrix	Soil/Solid (dry weight)		**Date**	

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
Solids					
Total Solids	100			%	08/21/12
Batch SPT8762					
Method SM21 2540G					
Instrument					

SGS Ref.#	1108629	Method Blank	**Printed Date/Time**		08/28/2012 10:27
Client Name	Shannon & Wilson, Inc.		**Prep**	**Batch**	XXX27769
Project Name/#	32-1-17480-2 Kobuk			**Method**	SW3550C
Matrix	Soil/Solid (dry weight)			**Date**	08/22/2012

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
Semivolatile Organic Fuels Department					
Diesel Range Organics	12.4 U	20.0	6.20	mg/Kg	08/23/12
Surrogates					
5a Androstane <surr>	68.9	60-120		%	08/23/12
Batch	XFC10547				
Method	AK102				
Instrument	HP 6890 Series II FID SV D F				

SGS Ref.#	1108838	Method Blank	**Printed Date/Time**		08/28/2012 10:27
Client Name	Shannon & Wilson, Inc.		**Prep**	**Batch**	VXX23916
Project Name/#	32-1-17480-2 Kobuk			**Method**	SW5035A
Matrix	Soil/Solid (dry weight)			**Date**	08/22/2012

QC results affect the following production samples:

1123828001, 1123828005, 1123828006

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
Volatile Fuels Department					
Benzene	8.00 U	12.5	4.00	ug/Kg	08/22/12
Ethylbenzene	15.6 U	25.0	7.80	ug/Kg	08/22/12
o-Xylene	15.6 U	25.0	7.80	ug/Kg	08/22/12
P & M -Xylene	30.0 U	50.0	15.0	ug/Kg	08/22/12
Toluene	15.6 U	25.0	7.80	ug/Kg	08/22/12
Surrogates					
1,4-Difluorobenzene <surr>	90.9	72-119		%	08/22/12
Batch	VFC11129				
Method	SW8021B				
Instrument	Agilent 7890A PID/FID				

SGS Ref.#	1109252	Method Blank	**Printed Date/Time**		08/28/2012 10:27
Client Name	Shannon & Wilson, Inc.		**Prep**	**Batch**	VXX23925
Project Name/#	32-1-17480-2 Kobuk			**Method**	SW5035A
Matrix	Soil/Solid (dry weight)			**Date**	08/23/2012

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
Volatile Fuels Department					
Benzene	8.00 U	12.5	4.00	ug/Kg	08/23/12
Ethylbenzene	15.6 U	25.0	7.80	ug/Kg	08/23/12
o-Xylene	15.6 U	25.0	7.80	ug/Kg	08/23/12
P & M -Xylene	30.0 U	50.0	15.0	ug/Kg	08/23/12
Toluene	8.50J	25.0	7.80	ug/Kg	08/23/12
Surrogates					
1,4-Difluorobenzene <surr>	92.1	72-119		%	08/23/12

Batch	VFC11133
Method	SW8021B
Instrument	Agilent 7890A PID/FID

SGS Ref.#	1108474	Duplicate	**Printed Date/Time**		08/28/2012 10:27
Client Name	Shannon & Wilson, Inc.		**Prep**	**Batch**	
Project Name/#	32-1-17480-2 Kobuk			**Method**	
Original	1123828001			**Date**	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter	Original Result	QC Result	Units	RPD	RPD Limits	Analysis Date
Solids						
Total Solids	84.1	82.4	%	2	(< 15)	08/21/2012
Batch SPT8762						
Method SM21 2540G						
Instrument						

SGS Ref.#	1108630 Lab Control Sample		**Printed Date/Time**	08/28/2012	10:27
	1108631 Lab Control Sample Duplicate		**Prep Batch**	XXX27769	
Client Name	Shannon & Wilson, Inc.		**Method**	SW3550C	
Project Name/#	32-1-17480-2 Kobuk		**Date**	08/22/2012	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS	124	75	(75-125)			167 mg/Kg	08/23/2012
	LCSD	137	82		10	(< 20)	167 mg/Kg	08/23/2012
Surrogates								
5a Androstane <surr>	LCS		87	(60-120)				08/23/2012
	LCSD		91		4			08/23/2012

Batch XFC10547
Method AK102
Instrument HP 6890 Series II FID SV D F

SGS Ref.#	1108839 Lab Control Sample		**Printed Date/Time**	08/28/2012	10:27
	1108840 Lab Control Sample Duplicate		**Prep Batch**	VXX23916	
Client Name	Shannon & Wilson, Inc.		**Method**	SW5035A	
Project Name/#	32-1-17480-2 Kobuk		**Date**	08/22/2012	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1123828001, 1123828005, 1123828006

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department								
Benzene	LCS	1270	102	(75-125)			1250 ug/Kg	08/22/2012
	LCSD	1330	106		4	(< 20)	1250 ug/Kg	08/22/2012
Ethylbenzene	LCS	1280	102	(75-125)			1250 ug/Kg	08/22/2012
	LCSD	1300	104		2	(< 20)	1250 ug/Kg	08/22/2012
o-Xylene	LCS	1260	101	(75-125)			1250 ug/Kg	08/22/2012
	LCSD	1290	103		2	(< 20)	1250 ug/Kg	08/22/2012
P & M -Xylene	LCS	2590	104	(80-125)			2500 ug/Kg	08/22/2012
	LCSD	2650	106		2	(< 20)	2500 ug/Kg	08/22/2012
Toluene	LCS	1270	101	(70-125)			1250 ug/Kg	08/22/2012
	LCSD	1290	103		1	(< 20)	1250 ug/Kg	08/22/2012
Surrogates								
1,4-Difluorobenzene <surr>	LCS		95	(72-119)				08/22/2012
	LCSD		96		2			08/22/2012

Batch	VFC11129
Method	SW8021B
Instrument	Agilent 7890A PID/FID

SGS Ref.#	1109253 Lab Control Sample		**Printed Date/Time**	08/28/2012	10:27
	1109254 Lab Control Sample Duplicate		**Prep Batch**	VXX23925	
Client Name	Shannon & Wilson, Inc.		**Method**	SW5035A	
Project Name/#	32-1-17480-2 Kobuk		**Date**	08/23/2012	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department								
Benzene	LCS	1250	100	(75-125)			1250 ug/Kg	08/23/2012
	LCSD	1320	106		6	(< 20)	1250 ug/Kg	08/23/2012
Ethylbenzene	LCS	1290	103	(75-125)			1250 ug/Kg	08/23/2012
	LCSD	1280	103		0	(< 20)	1250 ug/Kg	08/23/2012
o-Xylene	LCS	1270	101	(75-125)			1250 ug/Kg	08/23/2012
	LCSD	1280	103		1	(< 20)	1250 ug/Kg	08/23/2012
P & M -Xylene	LCS	2590	104	(80-125)			2500 ug/Kg	08/23/2012
	LCSD	2620	105		1	(< 20)	2500 ug/Kg	08/23/2012
Toluene	LCS	1290	103	(70-125)			1250 ug/Kg	08/23/2012
	LCSD	1270	102		1	(< 20)	1250 ug/Kg	08/23/2012
Surrogates								
1,4-Difluorobenzene <surr>	LCS		93	(72-119)				08/23/2012
	LCSD		97		4			08/23/2012

Batch	VFC11133
Method	SW8021B
Instrument	Agilent 7890A PID/FID

SGS Ref.#	1108843	Matrix Spike	**Printed Date/Time**		08/28/2012 10:27
	1108844	Matrix Spike Duplicate	**Prep**	**Batch**	VXX23916
				Method	AK101 Extraction (S)
				Date	08/22/2012

Original 1123863004
Matrix Soil/Solid (dry weight)

QC results affect the following production samples:
1123828001, 1123828005, 1123828006

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount		Analysis Date
Volatile Fuels Department											
Benzene		MS	4.00J	1151	103	(75-125)			1109	ug/Kg	08/22/2012
		MSD		1130	101		2	(< 20)	1109	ug/Kg	08/22/2012
Ethylbenzene		MS	84.7	1235	104	(75-125)			1109	ug/Kg	08/22/2012
		MSD		1204	101		3	(< 20)	1109	ug/Kg	08/22/2012
o-Xylene		MS	374	1711	120	(75-125)			1109	ug/Kg	08/22/2012
		MSD		1690	118		1	(< 20)	1109	ug/Kg	08/22/2012
P & M -Xylene		MS	454	2587	96	(80-125)			2218	ug/Kg	08/22/2012
		MSD		2524	93		3	(< 20)	2218	ug/Kg	08/22/2012
Toluene		MS	24.5J	1151	102	(70-125)			1109	ug/Kg	08/22/2012
		MSD		1119	98		3	(< 20)	1109	ug/Kg	08/22/2012
Surrogates											
1,4-Difluorobenzene <surr>		MS		1041	94	(72-119)					08/22/2012
		MSD		1050	95		1				08/22/2012

Batch VFC11129
Method SW8021B
Instrument Agilent 7890A PID/FID

SGS Ref.#	1109257	Matrix Spike	**Printed Date/Time**		08/28/2012 10:27
	1109258	Matrix Spike Duplicate	**Prep**	**Batch**	VXX23925
				Method	AK101 Extraction (S)
				Date	08/23/2012

Original 1123828002
Matrix Soil/Solid (dry weight)

QC results affect the following production samples:
1123828001, 1123828002, 1123828003, 1123828004, 1123828005

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount		Analysis Date
Volatile Fuels Department											
Benzene		MS	(10.4) U	1270	106	(75-125)			1200	ug/Kg	08/23/2012
		MSD		1235	103		3	(< 20)	1200	ug/Kg	08/23/2012
Ethylbenzene		MS	327	1329	83	(75-125)			1200	ug/Kg	08/23/2012
		MSD		1329	84		0	(< 20)	1200	ug/Kg	08/23/2012
o-Xylene		MS	4320	4872	46*	(75-125)			1200	ug/Kg	08/23/2012
		MSD		4848	44*		1	(< 20)	1200	ug/Kg	08/23/2012
P & M -Xylene		MS	3280	4767	62*	(80-125)			2413	ug/Kg	08/23/2012
		MSD		4720	60*		1	(< 20)	2413	ug/Kg	08/23/2012
Toluene		MS	59.3	1235	97	(70-125)			1200	ug/Kg	08/23/2012
		MSD		1224	97		0	(< 20)	1200	ug/Kg	08/23/2012
Surrogates											
1,4-Difluorobenzene <surr>		MS		1166	97	(72-119)					08/23/2012
		MSD		1150	96		2				08/23/2012

Batch VFC11133
Method SW8021B
Instrument Agilent 7890A PID/FID

1123828

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

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

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

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

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

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

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

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

Laboratory SGS
Attn: Steve Crapi

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	DRO AK102	BTEX 8021B (meOH)					Total Number of Containers	Remarks/Matrix
17480-SP-2	(1)A-B	22:55	8/15/12		X	X	X					2	Soil
17480-SP-5	(2)A-B	23:05	8/15/12		X	X	X					2	↓
17480-SP-10	(3)A-B	23:15	8/15/12		X	X	X					2	
17480-SP-25	(4)A-B	23:10	8/15/12		X	X	X					2	
17480-SP-29	(5)A-B	23:00	8/15/12		X	X	X					2	
17480-TB	(6)A	8:00	8/15/12				X					1	Soil Trip blank

Project Information		Sample Receipt	
Project Number:	32-1-17480-2	Total Number of Containers	
Project Name:	Kobuk	COC Seals/Intact? Y/N/NA	
Contact:	Andrew Lee/Hayden Tubbs	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 13:35	Signature: Time:	Signature: Time:
Printed Name: Andrew Lee Date: 8-20-12	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 1337
Printed Name: Date:	Printed Name: Date:	Printed Name: Wesley Hendley Date: 08/20/12
Company:	Company:	Company: SGS

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

F-19-91/UR

No. 29834

SGS

1123828

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after correction factor)? * ***Note: Exemption permitted for chilled samples collected less than 8 hours ago.*** Cooler ID: 1 @ 0.2° w/ Therm.ID: 35 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ ***Note: If non-compliant, use form FS-0029 to document affected samples/analyses.*** If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled." **If temperature(s) <0°C, were all sample containers ice free?**	(Yes) No N/A Yes No (N/A)	
Delivery method (specify all that apply): (Client) USPS Alert Courier Road Runner ~~AK Air~~ Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See Attached or (N/A) Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC **(circle one)** or note: (N/A) → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed.	SRF Initiated by: AW (N/A)	
Were samples received within hold time? ***Note: Refer to form F-083 "Sample Guide" for hold time information.*** Do samples **match COC*** (i.e., sample IDs, dates/times collected)? *** Note: Exemption permitted if times differ <1hr; in which case, use times on COC.*** Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	Yes No (N/A) (Yes) No N/A	
Were **proper containers** (type/mass/volume/preservative*) used? *** Note: Exemption permitted for waters to be analyzed for metals.*** Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No N/A	
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No (N/A) Yes No (N/A)	
For **RUSH/SHORT Hold Time** or **site-specific QC** (e.g., BMS/BMSD/BDUP) samples, were the COC & bottles flagged (e.g., stickers) accordingly? For RUSH/SHORT HT, was email sent?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: AW PM = N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: (N/A)
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: October 3, 2012

CS Report Name: Re: Stockpile Sampling and Management, Kobuk Abandoned Tank Farm, Kobuk, Alaska
ADEC Hazard ID 4615

Laboratory Report Date: August 28, 2012

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1123828

ADEC File Number: 480.57.001
ADEC RecKey Number: *NA*
(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

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

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

2. Chain of Custody (COC)

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

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The temperature blank was 0.2° C.*

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

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes / No / NA** (please explain)
Comments: *The laboratory noted that the samples were in good condition.*

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

e. Data quality or usability affected? Please explain.
Comments: *The temperature was acceptable because the samples were not frozen.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments:

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments: *The MS/MSD recoveries for o-xylene and p&m-xylenes did not meet QC criteria due to matrix interference.*

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments: *Corrective actions were not performed.*

d. What is the effect on data quality/usability, according to the case narrative?
Comments: *The case narrative refers the reader to the LCS/LSCS (presumably LCS/LCSD) for accuracy.*

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? **NA** 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: *However, a J-flagged toluene concentration less than the LOQ was reported in the method blank sample.*

iii. If above LOQ, what samples are affected?
Comments: *Samples SP10 and SP25.*

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes / No / NA (please explain)
Comments:

v. Data quality or usability affected? Please explain. ***NA***
Comments: *Due to toluene concentrations within 5 times the toluene concentration in the method blank, toluene is considered not detected in Samples SP10 and SP25. The sample results are flagged with a B in Table 2 of the report.*

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

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples?
(LCS/LCSD required per AK methods, LCS required per SW846) **Yes / No / NA**
(please explain)
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **Yes / No / NA** (please explain)
Comments:

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

Comments:

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? ***NA***
Comments:

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

vii. Data quality or usability affected? Please explain. ***NA***
Comments:

c. Surrogates - Organics Only

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

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

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

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

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

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

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

Comments: *The samples were delivered in one cooler.*

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

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

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

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No NA (please explain)
Comments:

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

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

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

f. Decontamination or Equipment Blank (if not applicable)
Yes / No / NA (please explain)
Comments: *Dedicated stainless steel spoons were used to collect analytical samples.*

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

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

iii. Data quality or usability affected? Please explain. ***NA***
Comments:

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

a. Defined and appropriate? **Yes / No / NA** (please explain)
Comments: *A key is provided on page 5 of the laboratory report.*

ATTACHMENT 5

IMPORTANT INFORMATION ABOUT YOUR

GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 32-1-17480-002

Date:	November 2012
To:	ADEC
Re:	Kobuk Abandoned Tank Farm, Kobuk, Alaska

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