

October 4, 2012

North Slope Borough  
Department of Public Works  
3000 C Street, Suite 104  
Anchorage, Alaska 99503

Attn: Mr. Brian DellaBona

**RE: LIMITED SITE CHARACTERIZATION, WASHETERIA AREA,  
NUIQSUT, ALASKA**

This letter documents Shannon & Wilson's recent site visit to Nuiqsut, Alaska, to conduct a limited site characterization of a utility trench. We performed this work under our North Slope Borough (NSB) term contract 2012-139 for Areawide Fuel/Oil Spill Response/Contaminated Soils Environmental Management Services, Task Order 2012-NUI-01. The field work was conducted in accordance with our proposal dated July 31, 2012.

### **BACKGROUND**

NSB contractor, SKW Eskimos, Inc. (SKW), encountered possibly petroleum-contaminated soil while excavating a trench to install a new underground diesel-piping system in Nuiqsut, Alaska, between the Nuiqsut Washeteria and the community's power plant. Both the washeteria and the power plant are adjacent to the community's school (Figure 1). The locations of the trench and adjacent structures are shown in Figure 2.

On July 30, 2012, during the excavation process, SKW's site superintendent, Mr. Delane Martin, noted a hydrocarbon odor emanating from the trench, approximately 25 feet from the washeteria. He stopped excavating and contacted the NSB for guidance.

At the request of the NSB, Shannon & Wilson submitted a proposal, dated July 31, 2012, to conduct a limited site characterization of the trench and its side-cast excavated soil. The NSB informed Shannon & Wilson soil removed from the trench could be temporarily stored on-site; however, due to the trench's proximity to the school, it would need to be backfilled prior to the start of the school year.

The limited site characterization consisted of:

- documenting site conditions by collecting photographs and creating a site map;
- collecting soil for headspace field-screening from the trenches and side-cast soil removed from Trench A using a photoionization detector (PID) in accordance with Alaska Department of Environmental Conservation (ADEC) Draft Field Sampling Guidance;
- collecting analytical soil samples based on PID measurements;
- providing recommendations to SKW for placement of excavated contaminated soil requiring disposal; and
- writing a report summarizing Shannon & Wilson's activities.

The following is a summary of our field observations and soil-sampling activities we conducted in accordance with our proposal.

### **FIELD ACTIVITIES**

Mr. Chris Locke, C.P.G., a geologist from Shannon & Wilson's Fairbanks office, conducted field activities at the Nuiqsut site August 1-2, 2012, accompanied by Mr. Martin. Upon arrival, we discovered two trenches. Trench A, adjacent to the washeteria (Figure 2), measured approximately 95 feet long, 4 feet wide, and 3.5 feet deep. We observed approximately 8 inches of groundwater in the northeast portion of the trench. Near the washeteria, there were three exposed 2-inch-diameter PVC utility pipes reportedly associated with the Warm Storage Building's aboveground storage tank. Perpendicular to the trench and approximately 40 feet from the washeteria, there were two 18-inch-diameter metal pipes reportedly containing glycol.

Trench B, north of the power plant (Figure 2), measured approximately 35 feet long, 4 feet wide, and 3.5 feet deep. Two sets of metal pipes that run perpendicular to Trench B were exposed during the excavation.

Photographs taken during our site visit are appended to this report. Photographs 1 and 2 show Trench A, associated groundwater, and underground piping. Photograph 3 shows Trench B.

Mr. Martin and Mr. Locke estimated approximately 25 to 30 cubic yards (cy) of soil were excavated from Trench A and placed between that trench and the Warm Storage Building. We

collected seven field-screening samples (Sample Locations #1 - #7) and five analytical samples (Sample Locations #2 - #6) from the excavated soil (Figure 2). Photographs 1 and 2 show locations of the side-cast soil stockpiles.

We calibrated the PID in accordance with the manufacturer's procedures prior to leaving Shannon & Wilson's Fairbanks office. We collected each headspace sample from at least 8 inches below the ground surface (bgs). Analytical sample locations were selected based upon the highest PID measurements.

Field and analytical data are presented on Table 1 and Table 2. Figure 2 shows the sample locations, PID field-screening results, and diesel range organics (DRO) laboratory results.

### **Test Pits**

In accordance with our proposal, we excavated test pits to delineate petroleum hydrocarbons within the trench's planned route. The two test pits, approximately 5 feet long, 4 feet wide, and 3.5 feet deep, were placed perpendicular to the trench's planned route. One headspace sample was collected from the bottom of each test pit (Sample Locations #16 and #17; Figure 2). Figure 2 shows the locations of the two test pits. Test Pits #1 and #2 are shown in Photographs 4 and 5, respectively.

No additional test pits beyond the trench's planned route were excavated due to the fact that a utility-locate was not conducted prior to our site visit.

### **Constraints**

Shannon & Wilson's proposal limited the scope of the delineation to the area within the planned route of the trench and side-cast soil from the Trench A. The extent and source of the contaminated soil were not determined or delineated.

Upon our arrival, we observed groundwater in the portion of Trench A from Sample Locations #11 - #18 (Figure 2, and Photographs 1 and 2), preventing us from collecting headspace and analytical samples from that portion of the trench. However, we did collect headspace and analytical samples (Sample Locations #3 - #6; Figure 2) from the side-cast soil excavated from the portion of the trench that contained groundwater. We consider the side-cast soil to be representative of soil removed from the trench.

## Sampling

We collected a 4-ounce jar for DRO and a 4-ounce jar for gasoline range organics (GRO)/benzene, toluene, ethylbenzene, and xylenes (BTEX) analysis from each sample location, with the exception of Sample Location #11, where we collected only a 4-ounce jar for polynuclear aromatic hydrocarbon (PAH) analysis. A 25-milliliter aliquot of methanol was added to the GRO/BTEX samples immediately after sample collection. We collected two field duplicates for DRO/GRO/BTEX analysis (Sample Location #2/#12) and PAH analysis (Sample Location #11/#15) as part of our sampling activities. The samples were placed inside a gel-ice-packed cooler for delivery to SGS North America, Inc. (SGS) in Fairbanks, Alaska. The cooler was labeled and custody-sealed prior to delivery on August 2.

We brought the sample cooler from Nuiqsut to Fairbanks, where it was hand-delivered to SGS on August 2, 2012. SGS personnel in Fairbanks took possession of the cooler and discovered no sample-handling anomalies. The samples were submitted for analysis of GRO by Alaska Method AK101, DRO by Alaska Method AK102, BTEX by Environmental Protection Agency (EPA) Method 8021B, and PAHs by EPA Method 8270 SIM.

## SCREENING LEVELS

Shannon & Wilson compared soil sample results to Alaska's 18 AAC 75.341 Table B1, Method Two – Soil Cleanup Levels for the Arctic Zone and Table A2, Method One - Petroleum Hydrocarbon Soil Cleanup Levels in the Arctic Zone. These screening levels are included in Tables 1 and 2.

## ANALYTICAL RESULTS

Analytical results are presented in Table 1 (DRO, GRO, and BTEX) and Table 2 (PAH).

GRO, BTEX, and PAHs were detected in all samples except Sample *1636-080212-18* (Sample Location #18), at levels not exceeding ADEC Method One or Method Two cleanup levels (Table 1). DRO were detected in all samples at concentrations exceeding ADEC Method One Table A2 cleanup levels, except *1636-080212-18* (Sample Location #18). DRO results ranged from 218 milligrams per kilogram (mg/kg; Sample Location #8) to 3,110 mg/kg (Sample Location #9), and GRO results ranged from 6.8 mg/kg (Sample Location #18) to 81.6 mg/kg (Sample Location #3). Benzene was not detected in any of the soil samples. Toluene's highest

concentration was 0.388 mg/kg (Sample Location #3), and ethylbenzene's highest concentration was 0.468 mg/kg (Sample Location #9). The highest o-xylene concentration was 0.998 mg/kg, and the highest p-&m-xylenes concentration was 1.59 mg/kg (Sample Location #3).

No PAH concentrations above ADEC Method Two Table B1 cleanup levels (Table 2) were detected. 1-Methylnaphthalene was detected at 0.626 mg/kg; 2-methylnaphthalene was measured at 0.643 mg/kg; fluorene was measured at 0.0109 mg/kg; naphthalene was measured at 0.289 mg/kg; and anthracene was detected at 0.00570 mg/kg. Chrysene and fluoranthene were not detected in duplicates from Sample Location #11 (Table 2).

The SGS laboratory case narrative states: "the pattern is consistent with weathered middle distillate" (i.e., diesel fuel) for the DRO samples from Sample Locations #2, #3, #4, #8, #9, #10, and #12 (Figure 2).

### **QUALITY ASSURANCE AND QUALITY CONTROL**

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results for laboratory QC samples, and also conducted our own QA assessment for this project. We reviewed chain-of-custody records and laboratory-receipt forms to check that custody was not breached, sample holding-times were met, and the samples were kept properly chilled (between 2 °C and 6 °C) during shipping. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels not exceeding regulatory standards.

Details regarding the results of our QA review are presented below.

#### **Analytical Sensitivity**

A trip blank accompanied the samples during sampling and transportation to SGS and was analyzed for BTEX and GRO. The trip blank was analyzed to determine if cross-contamination among samples or from an outside source could have occurred during shipment or storage of the project samples. No BTEX analytes exceeding the limit of detection (LOD) were detected in the trip blank, but GRO was detected at an estimated concentration below the limit of quantitation (LOQ). The trip-blank GRO concentration was less than one-fifth of any of the sample concentrations, so the data were unaffected.

Laboratory method blanks were also analyzed in association with samples collected for this project to check for contributions to analytical results possibly attributable to laboratory-based contamination. No analytes exceeding the LOD in the method blanks associated with our samples were detected.

### **Accuracy**

The laboratory assessed the accuracy of their analytical procedure through a variety of QA procedures. Analysis of matrix spike (MS) and MS duplicate (MSD) samples allowed the laboratory to assess the accuracy of their procedures by checking their ability to recover analytes added to field samples with matrices similar to our project samples. They also analyzed laboratory control samples (LCSs) and LCS duplicates (LCSDs); these are similar to MS/MSD samples, but evaluate the ability to recover analytes added to clean matrices, as opposed to field samples. The laboratory accuracy was also evaluated for each sample by assessing recovery of surrogate analytes added to individual project samples.

The laboratory case narrative noted the GRO surrogate was recovered above control limits in project samples *16136-080112-2*, *16136-080112-3*, *16136-080112-4*, *16136-080112-9*, *16136-080112-10*, and *16136-080112-12*. The GRO results for these samples should be considered estimates and biased high. We have flagged the results “JH” in Table 1.

The LCS/LCSD and MS/MSD recoveries for soil samples are within laboratory- or method-established limits.

### **Precision**

We collected two sets of field-duplicate samples (Sample Location #2/#12 for DRO/GRO/BTEX and Sample Location #11/#15 for PAH) to evaluate the precision of analytical measurements and the reproducibility of our sampling technique. To evaluate precision of the data, we calculated the relative percent difference (RPD; the difference between the sample and its field duplicate divided by the mean of the two); RPD can be evaluated only if the results of the analysis for both the sample and its duplicate exceed method detection limits. The data quality objective for precision in soil samples is 50 percent.

Results of RPD calculations for duplicate soil samples *1636-080112-2* and *1636-080112-12* ranged from 2 percent (GRO) to 77 percent (toluene). Results of RPD calculations for duplicate

PAH soil samples *1636-080112-11* and *1636-080112-15* ranged from 2 percent (naphthalene) to 39 percent (fluorene). The data for DRO, the primary contaminant of concern, are not affected. Toluene in the duplicate samples was present at concentrations below the screening level; therefore the toluene RPD failure does not affect the regulatory status of the samples. The data are considered usable for the purposes of this project.

Laboratory analytical precision can also be evaluated by RPD calculations. The laboratory MS/MSD RPDs and LCS/LCSD RPDs provide information regarding the reproducibility of their procedures and are therefore a measure of analytical precision. The MS/MSD RPDs and LCS/LCSD RPDs for the soil analyses fell within laboratory- or method-established limits.

### **Data Quality Summary**

By working in accordance with our proposed scope of services, the samples we collected are considered to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures, and our completeness goal of obtaining 85-percent useable data was met. In general, the quality of analytical data for this project does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

The laboratory report for the project samples collected in August 2012, including the case narrative describing the laboratory QA results in detail, is included with the ADEC laboratory review checklist as an attachment to this report.

### **DISCUSSION**

PID readings and DRO analytical results are depicted on Figure 2. PID readings were below 20 parts per million (ppm) in Trench B (Sample Locations #13 and #14), and there was an isolated elevated PID reading of 235 ppm in Test Pit #2 (Sample Location #17). PID readings above 20 ppm also occurred in an area near Sample Location #18, along Trench A to the washeteria. Mr. Martin informed us that diesel-fueled equipment is routinely parked in the vicinity of Test Pit #2, possibly explaining the isolated elevated PID reading at Sample Location #17.

With the exception of Sample Location #18, all sample locations collected along Trench A contain GRO, though not at concentrations exceeding screening levels. DRO results for each

sample collected along Trench A, from Sample Location #8 northeast to approximately Sample Location #5 (Figure 2), indicate diesel contamination was present in that area. The laboratory report's case narrative states the DRO "pattern was consistent with a weathered middle distillate" (i.e., weathered diesel fuel). We also collected headspace and analytical samples at Sample Location #18, even though PID results were below 20 ppm, to document and delineate the extent of petroleum contamination in Trench A.

### **CONCLUSION AND RECOMMENDATIONS**

Based on PID measurements in Trench A and of side-cast soils, soils from the trench adjacent to Sample Locations #5, #6, and #7 (Figure 2) do not appear to be contaminated by diesel fuel. Trench soils from 0 feet to 4 feet bgs, between Sample Locations #8 northeast through Sample Location #5, are likely contaminated with diesel fuel, based on elevated PID results for side-cast soils.

SKW created a lined stockpile for soil exceeding PID readings of 20 ppm, on the eastern end of the Warm Storage Building and north of the school (Photograph #6). Due to the stockpiled soil's proximity to the school, the soil should be containerized (e.g., put in Super-sacks) and moved away from the school.

Comparing the analytical results from Shannon & Wilson's 2012 limited site characterization to the ADEC Method Two Table B1 and Table B2 Arctic Zone Cleanup levels indicates no analytes exceed appropriate limits (i.e., GRO are less than 1,400 mg/kg and DRO are less than 12,500 mg/kg). With ADEC approval, the lined soil stockpile could be spread in an area where it will not come in contact with surface water or groundwater, and no further action would be recommended.

If ADEC were to apply the Method One Table A2, or Method Two Table B1 Under 40 Inch Zone cleanup levels to the site, stockpiled soil would be considered contaminated and need to be sent to a soil-treatment facility for proper disposal, and additional soil sampling would be needed to delineate the source of the contamination.

Based on elevated PID readings and analytical results, diesel range petroleum-hydrocarbon contamination at a depth of at least 3.5 feet bgs, extends from the washeteria along Trench A to a



location between Sampling Location #5 and Sampling Location #18 (Figure 2). The extent of this contamination is unknown.

### **LIMITATIONS**

The data presented in this report are based on the sampling and analysis we performed; they should not be construed as a guarantee of the soil quality at the site. It is possible surface tests do not represent the highest levels of contamination. In addition, conclusions cannot be drawn on the presence or absence of contaminants for which laboratory analyses were not performed. As a result, the sampling and analysis performed can only provide the environmental characteristics of the site, and in no way guarantees an agency or its staff will reach the same conclusions.

Changes due to natural forces or human activity can occur on the site. The data presented in this report should be considered representative only of the time the data were collected. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond control, observations and interpretations may need to be revised.

This report was prepared for the exclusive use of our client. All documents prepared by Shannon & Wilson are instruments of service with respect to the project for the sole use of our Client. Only our Client shall have the right to rely upon such documents. Such documents are not intended or represented to be suitable for reuse by our Client or others after the passage of time, on extensions of the project, or on any other project. Any such reuse without written verification or adaptation by Shannon & Wilson, as appropriate for the specific purpose intended, shall be at the user's sole risk.

Copies of documents that may be relied upon by our Client are limited to the printed copies (also known as hard copies) signed or sealed by Shannon & Wilson. Text, data, or graphics files in electronic media format are furnished solely for the convenience of our 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, the hard copies govern.

Because data stored in electronic media can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the Client should perform acceptance tests or procedures within 60 days after its receipt, after which, unless notice of any errors are given in writing to Shannon & Wilson, the Client shall be deemed to have accepted the data thus

North Slope Borough  
Mr. Brian DellaBona  
October 4, 2012  
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When transferring documents in electronic media format, Shannon & Wilson does not make any representations as to long-term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used for the document's creation.

We trust this information is sufficient for your needs at the present time. If you have any questions or we can be of further assistance, please contact me or Jon Lindstrom.


Sincerely,

SHANNON & WILSON, INC.



Chris Locke, CPG  
Geologist

Reviewed by:



Jon Lindstrom, Ph.D.  
Associate

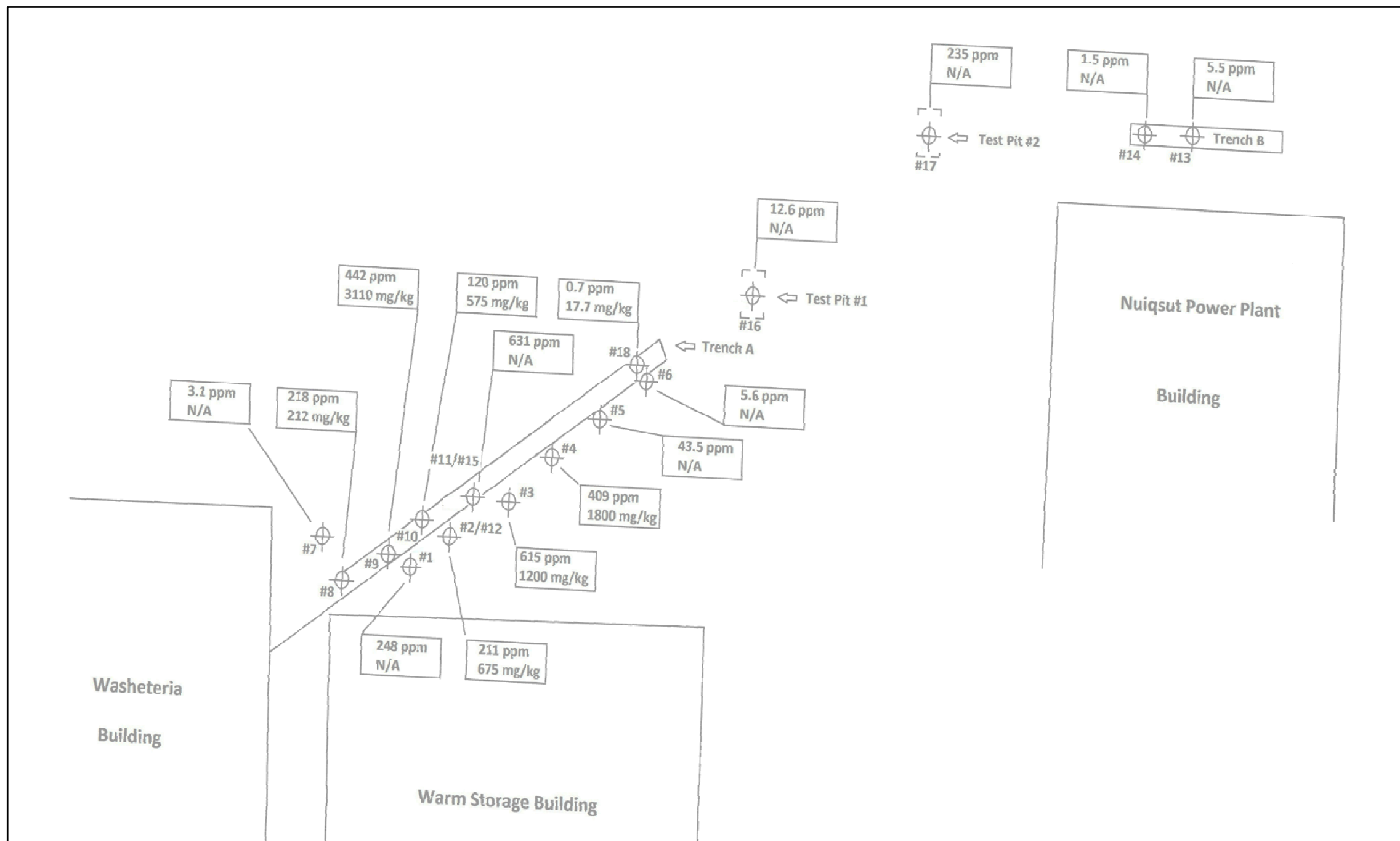
Enclosures: Figure 1. Site Vicinity  
Figure 2. Soil Sample Locations  
Nuiqsut Site Characterization Photographs  
Table 1. August 2012 Soil Analytical Results for DRO, GRO, and BTEX  
Table 2. August 2012 Soil Analytical Results for PAH  
SGS Analytical Lab Results  
ADEC Quality Control Checklist

31-1-11636-001



FIGURE 1. SITE VICINITY



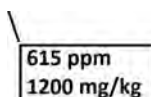


**Legend**

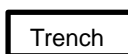
Sample location and sample number



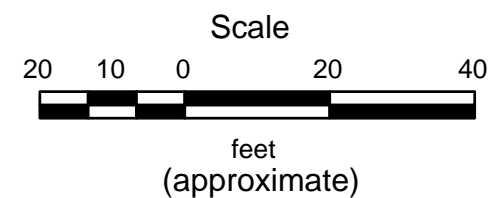
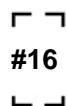
Field and analytical results



PID reading  
DRO result  
\* N/A indicates sample not analyzed



Test Pit with sample location



Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth™ Mapping Service:™ Google™  
Image © 2009 Digital Globe

Limited Site Characterization  
Nuiqsut, Alaska

**SOIL SAMPLE LOCATIONS**

October 2012 31-1-11636-001

SHANNON & WILSON, INC.  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Fig. 2



Photograph 1. Trench A looking toward Nuiqsut Power Plant Building.



Photograph 2. Trench A looking toward Nuiqsut Washeteria Building. Groundwater visible in trench.



Photograph 3. Trench B looking toward Warm Storage Building.



Photograph 4. Excavating Test Pit #1 (Sample Location #16). Looking toward Warm Storage Building.



Photograph 5. Excavating Test Pit #2 (Sample Location #17). Looking toward Nuiqsut Power Plant Building.



Photograph 6. Stockpile of soil exceeding 20 ppm on PID. Looking toward the school.

**Table 1**  
**August 2012 Soil Analytical Results for DRO, GRO, and BTEX**  
**Nuiqsut, Alaska**

Sample Location	Sample Number	Location (see Figure 1)	Sample Depth (feet bgs)	AK102	AK101	BTEX (SW8021B)					PID (ppm)
				DRO (mg/kg)	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl- benzene (mg/kg)	o-Xylene (mg/kg)	p-&m- Xylenes (mg/kg)	
Soil screening level				200	100	17	220	110	63		—
2	1636-080112-2	Stockpile A	0.85	<b>675</b>	23.6 JH	<0.0134	<0.0268	0.0565	0.164	0.239	211
3	1636-080112-3	Stockpile A	0.85	<b>1,200</b>	81.6 JH	<0.00732	0.0388	0.195	0.998	1.59	615
4	1636-080112-4	Stockpile A	0.85	<b>1,800</b>	25.8 JH	<0.00689	<0.0138	0.023	0.184	0.105	409
8	1636-080112-8	Bottom of trench A	3.5	<b>218</b>	6.8	<0.00748	<0.0150	0.0251	0.0456	0.0917	212
9	1636-080112-9	Bottom of trench A (sidewall)	3.4	<b>3,110</b>	50.6 JH	<0.0108	<0.0215	0.468	0.14	1.08	442
10	1636-080112-10	Bottom of trench A, under Blue Board	3.4	<b>575</b>	14.6 JH	<0.00761	<0.0152	0.0489	0.20	0.168	120
12	1636-080112-12 †	Stockpile A	0.85	<b>615</b>	24.2 JH	<0.00975	<0.0195	0.0476	0.177	0.13	211
18	1636-080212-18	Bottom of trench A	3.5	<21.9	<1.58	<0.00791	<0.0158	<0.0158	<0.0158	<0.0316	0.7

Notes: Soil screening levels from 18 AAC 75.341 Tables A2 and B1, Arctic Zone

DRO Diesel range organics

GRO Gasoline range organics

BTEX Benzene, toluene, ethylbenzene, and xylenes

PID Photoionization detector (field screening)

mg/kg milligrams per kilogram

ppm parts per million

bgs below ground surface

**bold** Sample concentration exceeds the soil screening level

† Field duplicate of 1636-080112-2

< Analyte not reported above laboratory Limit of Detection (LOD)

JH Concentration is estimated and biased high



**Table 2**  
**August 2012 Soil Analytical Results for PAHs**  
**Nuiqsut, Alaska**

Sample Location	Sample Number	Location (see Figure 1)	Sample Depth (ft. bgs)	PAH 8270 SIM						PID (ppm)	
				1-Methyl naphthalene (mg/kg)	2-Methyl naphthalene (mg/kg)	Anthracene (mg/kg)	Fluorene (mg/kg)	Naphthalene (mg/kg)	Chrysene (mg/kg)		Fluoranthene (mg/kg)
Soil screening level				380	380	27,800	3,200	42	660	2,500	—
11	1636-080112-11	Trench A sidewall, near bottom	3.5	0.626	0.643	<0.00558	0.0109	0.289	<0.00558	<0.00558	631
15	1636-080112-15 †	Trench A sidewall, near bottom	3.5	0.513	0.474	0.00570	0.00731	0.282	<0.00544	<0.00544	631

Notes: Soil screening levels from 18 AAC 75.341 Table B1, Arctic Zone

Only detected PAH analytes are tabulated. See laboratory report for complete list of analytes.

PAH Polynuclear aromatic hydrocarbons

PID Photoionization detector (field screening)

mg/kg milligrams per kilogram

ppm parts per million

bgs below ground surface

† Field duplicate of 1636-080112-11

< Analyte not reported above laboratory Limit of Detection (LOD)





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

Project: NUIQSUT  
Client: Shannon & Wilson-Fairbanks  
SGS Work Order: 1128307

Released by:

A handwritten signature in black ink that reads "Stephen C. Ede".

Alaska Division Technical Director

Stephen Ede  
2012.08.16  
13:39:11 -08'00'

**Contents:**

Cover Page  
Case Narrative  
Final Report Pages  
Quality Control Summary Forms  
Chain of Custody/Sample Receipt Forms



CASE NARRATIVE

Print Date: 8/16/2012

Client Name: Shannon & Wilson-Fairbanks

Project Name: NUIQSUT

Workorder No.: 1128307

Sample Comments

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

<u>Lab Sample ID</u>	<u>Sample Type</u>	<u>Client Sample ID</u>
1128307001	PS	1636-080112-2
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307002	PS	1636-080112-3
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307003	PS	1636-080112-4
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307004	PS	1636-080112-8
	AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307005	PS	1636-080112-9
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307006	PS	1636-080112-10
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307007	PS	1636-080112-12
	AK101 - BFB (surrogate) recovery does not meet QC criteria (biased high) due to hydrocarbon interference. AK102 - The pattern is consistent with a weathered middle distillate. Revised Reports: Reports reissued without J flagging per client request.	
1128307008	PS	1636-080212-11
	Revised Reports: Reports reissued without J flagging per client request.	
1128307009	PS	1636-080212-15
	Revised Reports: Reports reissued without J flagging per client request.	
1128307010	PS	1636-080212-18
	Revised Reports: Reports reissued without J flagging per client request.	
1128307011	* TB	1636-TB
	Revised Reports: Reports reissued without J flagging per client request.	
1104741	* CCV	CCV for HBN 1361361 [XMS/6873]
	8270D-SIM - CCV recovery for benzo(a)anthracene does not meet QC criteria (biased high). This analyte was not reported above the LOQ in the associated samples.	

8270D-SIM - CCV recovery for benzo(a)pyrene does not meet QC criteria (biased high). This analyte was not reported in the associated samples.

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



## Laboratory Analytical Report

Client: **Shannon & Wilson-Fairbanks**  
2355 Hill Road  
Fairbanks, AK 99706

Attn: **Jon Lindstrom**  
T: (907)479-0600 F:  
jel@shanwil.com

Project: **NUIQSUT**

Workorder No.: **1128307**

### 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):

- Cover Page
- Glossary
- Sample Summary Forms
- Case Narrative
- Sample Results Forms
- Batch Summary Forms (by method)
- Quality Control Summary Forms (by method)
- Chain of Custody/Sample Receipt Forms
- Attachments (if applicable)

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/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: 8/16/2012 11:29 am

**Client Name: Shannon & Wilson-Fairbanks**

**Project Name: NUIQSUT**

**Workorder No.: 1128307**

### Analytical Methods

Method Description

8270 PAH SIM Semi-Volatiles GC/MS

AK101/8021 Combo. (S)

AK101/8021 Combo. (S)

Diesel Range Organics (S)

Percent Solids SM2540G

Analytical Method

8270D SIMS (PAH)

AK101

SW8021B

AK102

SM21 2540G

### Sample ID Cross Reference

Lab Sample ID

Client Sample ID

1128307001	1636-080112-2
1128307002	1636-080112-3
1128307003	1636-080112-4
1128307004	1636-080112-8
1128307005	1636-080112-9
1128307006	1636-080112-10
1128307007	1636-080112-12
1128307008	1636-080212-11
1128307009	1636-080212-15
1128307010	1636-080212-18
1128307011	1636-TB



## Detectable Results Summary

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-2**

SGS Ref. #: 1128307001

### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	23.6	mg/Kg
Ethylbenzene	0.0565	mg/Kg
o-Xylene	0.164	mg/Kg
P & M -Xylene	0.239	mg/Kg

### Semivolatile Organic Fuels Department

Diesel Range Organics	675	mg/Kg
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Client Sample ID: **1636-080112-3**

SGS Ref. #: 1128307002

### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	81.6	mg/Kg
Toluene	0.0388	mg/Kg
Ethylbenzene	0.195	mg/Kg
o-Xylene	0.998	mg/Kg
P & M -Xylene	1.59	mg/Kg

### Semivolatile Organic Fuels Department

Diesel Range Organics	1200	mg/Kg
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Client Sample ID: **1636-080112-4**

SGS Ref. #: 1128307003

### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	25.8	mg/Kg
Ethylbenzene	0.0230	mg/Kg
o-Xylene	0.184	mg/Kg
P & M -Xylene	0.105	mg/Kg

### Semivolatile Organic Fuels Department

Diesel Range Organics	1800	mg/Kg
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### Detectable Results Summary

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-8**

SGS Ref. #: 1128307004

#### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	6.83	mg/Kg
Ethylbenzene	0.0251	mg/Kg
o-Xylene	0.0456	mg/Kg
P & M -Xylene	0.0917	mg/Kg

#### Semivolatile Organic Fuels Department

Diesel Range Organics	218	mg/Kg
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Client Sample ID: **1636-080112-9**

SGS Ref. #: 1128307005

#### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	50.6	mg/Kg
Ethylbenzene	0.468	mg/Kg
o-Xylene	0.140	mg/Kg
P & M -Xylene	1.08	mg/Kg

#### Semivolatile Organic Fuels Department

Diesel Range Organics	3110	mg/Kg
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Client Sample ID: **1636-080112-10**

SGS Ref. #: 1128307006

#### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	14.6	mg/Kg
Ethylbenzene	0.0489	mg/Kg
o-Xylene	0.200	mg/Kg
P & M -Xylene	0.168	mg/Kg

#### Semivolatile Organic Fuels Department

Diesel Range Organics	575	mg/Kg
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Client Sample ID: **1636-080112-12**

SGS Ref. #: 1128307007

#### Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	24.2	mg/Kg
Ethylbenzene	0.0476	mg/Kg
o-Xylene	0.177	mg/Kg
P & M -Xylene	0.130	mg/Kg

#### Semivolatile Organic Fuels Department

Diesel Range Organics	615	mg/Kg
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### Detectable Results Summary

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080212-11**

SGS Ref. #: 1128307008

#### Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Naphthalene	0.289	mg/Kg
2-Methylnaphthalene	0.643	mg/Kg
1-Methylnaphthalene	0.626	mg/Kg
Fluorene	0.0109	mg/Kg
Anthracene	0.00865	mg/Kg

Client Sample ID: **1636-080212-15**

SGS Ref. #: 1128307009

#### Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Naphthalene	0.282	mg/Kg
2-Methylnaphthalene	0.474	mg/Kg
1-Methylnaphthalene	0.513	mg/Kg
Fluorene	0.00731	mg/Kg
Anthracene	0.00570	mg/Kg



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-2

SGS Ref. #: 1128307001

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.5

Collection Date/Time: 08/01/12 16:11

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	0.0134 U	0.0134	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.0565	0.0268	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	23.6	2.68	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.164	0.0268	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	0.239	0.0535	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0268 U	0.0268	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <surr>	93.4	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <surr>	177	* 50-150	%	1	VFC11093	VXX23825	

Batch Information

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 64.317 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 31.1414 mL
Analysis Date/Time: 08/03/12 14:41	Prep Date/Time: 08/01/12 16:11	Container ID: 1128307001-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 64.317 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 31.1414 mL
Analysis Date/Time: 08/03/12 14:41	Prep Date/Time: 08/01/12 16:11	Container ID: 1128307001-B
Dilution Factor: 1		Analyst: HM



Client Sample ID: **1636-080112-2**

SGS Ref. #: 1128307001

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.5

Collection Date/Time: 08/01/12 16:11

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	675	22.1	mg/Kg	1	XFC10503	XXX27599	
5a Androstane <sur>	100	50-150	%	1	XFC10503	XXX27599	

**Batch Information**

Analytical Batch: XFC10503

Analytical Method: AK102

Analysis Date/Time: 08/04/12 21:30

Dilution Factor: 1

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.019 g

Prep Extract Vol.: 1 mL

Container ID:1128307001-A

Analyst: MEM



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-2**

SGS Ref. #: 1128307001

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.5

Collection Date/Time: 08/01/12 16:11

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	90.5		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307001-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-3**

SGS Ref. #: 1128307002

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.9

Collection Date/Time: 08/01/12 16:14

Receipt Date/Time: 08/03/12 09:15

**Volatile Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Benzene	0.00732 U	0.00732	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.195	0.0146	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	81.6	14.6	mg/Kg	10	VFC11094	VXX23831	
o-Xylene	0.998	0.0146	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	1.59	0.0293	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0388	0.0146	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <sur>	98	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <sur>	2050	* 50-150	%	10	VFC11094	VXX23831	

**Batch Information**

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 116.918 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 32.1487 mL
Analysis Date/Time: 08/03/12 15:36	Prep Date/Time: 08/01/12 16:14	Container ID: 1128307002-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11094	Prep Batch: VXX23831	Initial Prep Wt./Vol.: 116.918 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 32.1487 mL
Analysis Date/Time: 08/07/12 00:36	Prep Date/Time: 08/01/12 16:14	Container ID: 1128307002-B
Dilution Factor: 10		Analyst: HM



Client Sample ID: **1636-080112-3**

SGS Ref. #: 1128307002

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.9

Collection Date/Time: 08/01/12 16:14

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	1200	104	mg/Kg	5	XFC10506	XXX27599	
5a Androstane <sur>	97.6	50-150	%	5	XFC10506	XXX27599	

**Batch Information**

Analytical Batch: XFC10506

Analytical Method: AK102

Analysis Date/Time: 08/06/12 19:49

Dilution Factor: 5

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.78 g

Prep Extract Vol.: 1 mL

Container ID:1128307002-A

Analyst: MEM



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-3**

SGS Ref. #: 1128307002

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.9

Collection Date/Time: 08/01/12 16:14

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	93.9		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307002-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-4

SGS Ref. #: 1128307003

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 95.7

Collection Date/Time: 08/01/12 16:19

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Benzene	0.00689 U	0.00689	mg/Kg	1	VFC11093		
Ethylbenzene	0.0230	0.0138	mg/Kg	1	VFC11093		
Gasoline Range Organics	25.8	1.38	mg/Kg	1	VFC11094	VXX23831	
o-Xylene	0.184	0.0138	mg/Kg	1	VFC11093		
P & M -Xylene	0.105	0.0276	mg/Kg	1	VFC11093		
Toluene	0.0138 U	0.0138	mg/Kg	1	VFC11093		
1,4-Difluorobenzene <sur>	97	72-119	%	1	VFC11093		
4-Bromofluorobenzene <sur>	346	* 50-150	%	1	VFC11094	VXX23831	

Batch Information

Analytical Batch: VFC11093  
 Analytical Method: SW8021B  
 Analysis Date/Time: 08/03/12 15:54  
 Dilution Factor: 1

Initial Prep Wt./Vol.: 112.945 g  
 Container ID: 1128307003-B  
 Analyst: HM

Analytical Batch: VFC11094  
 Analytical Method: AK101  
 Analysis Date/Time: 08/07/12 00:54  
 Dilution Factor: 1

Prep Batch: VXX23831  
 Prep Method: SW5035A  
 Prep Date/Time: 08/01/12 16:19

Initial Prep Wt./Vol.: 112.945 g  
 Prep Extract Vol.: 29.8076 mL  
 Container ID: 1128307003-B  
 Analyst: HM





Client Sample ID: **1636-080112-4**

SGS Ref. #: 1128307003

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 95.7

Collection Date/Time: 08/01/12 16:19

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	1800	103	mg/Kg	5	XFC10506	XXX27599	
5a Androstane <sur>	103	50-150	%	5	XFC10506	XXX27599	

**Batch Information**

Analytical Batch: XFC10506

Analytical Method: AK102

Analysis Date/Time: 08/06/12 19:59

Dilution Factor: 5

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.415 g

Prep Extract Vol.: 1 mL

Container ID:1128307003-A

Analyst: MEM



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080112-4**  
SGS Ref. #: 1128307003  
Project ID: NUIQSUT  
Matrix: Soil/Solid (dry weight)  
Percent Solids: 95.7

Collection Date/Time: 08/01/12 16:19  
Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	95.7		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739  
Analytical Method: SM21 2540G  
Analysis Date/Time: 08/03/12 16:30  
Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL  
Container ID:1128307003-A  
Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-8

SGS Ref. #: 1128307004

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.8

Collection Date/Time: 08/01/12 16:22

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	0.00748 U	0.00748	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.0251	0.0150	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	6.83	1.50	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.0456	0.0150	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	0.0917	0.0299	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0150 U	0.0150	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <sur>	94.4	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <sur>	148	50-150	%	1	VFC11093	VXX23825	

Batch Information

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 114.161 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 32.0497 mL
Analysis Date/Time: 08/03/12 16:12	Prep Date/Time: 08/01/12 16:22	Container ID: 1128307004-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 114.161 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 32.0497 mL
Analysis Date/Time: 08/03/12 16:12	Prep Date/Time: 08/01/12 16:22	Container ID: 1128307004-B
Dilution Factor: 1		Analyst: HM



Client Sample ID: **1636-080112-8**

SGS Ref. #: 1128307004

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.8

Collection Date/Time: 08/01/12 16:22

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	218	21.1	mg/Kg	1	XFC10503	XXX27599	
5a Androstane <sur>	95.6	50-150	%	1	XFC10503	XXX27599	

**Batch Information**

Analytical Batch: XFC10503

Analytical Method: AK102

Analysis Date/Time: 08/04/12 22:01

Dilution Factor: 1

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.26 g

Prep Extract Vol.: 1 mL

Container ID:1128307004-A

Analyst: MEM



Client Sample ID: **1636-080112-8**

SGS Ref. #: 1128307004

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.8

Collection Date/Time: 08/01/12 16:22

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	93.8		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307004-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-9

SGS Ref. #: 1128307005

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 85.6

Collection Date/Time: 08/01/12 16:25

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	0.0108 U	0.0108	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.468	0.0215	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	50.6	2.15	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.140	0.0215	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	1.08	0.0430	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0215 U	0.0215	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <surr>	98.4	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <surr>	612	* 50-150	%	1	VFC11093	VXX23825	

Batch Information

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 111.469 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 41.0436 mL
Analysis Date/Time: 08/03/12 16:31	Prep Date/Time: 08/01/12 16:25	Container ID: 1128307005-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 111.469 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 41.0436 mL
Analysis Date/Time: 08/03/12 16:31	Prep Date/Time: 08/01/12 16:25	Container ID: 1128307005-B
Dilution Factor: 1		Analyst: HM



Client Sample ID: **1636-080112-9**

SGS Ref. #: 1128307005

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 85.6

Collection Date/Time: 08/01/12 16:25

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	3110	115	mg/Kg	5	XFC10506	XXX27599	
5a Androstane <sur>	103	50-150	%	5	XFC10506	XXX27599	

**Batch Information**

Analytical Batch: XFC10506

Analytical Method: AK102

Analysis Date/Time: 08/06/12 20:09

Dilution Factor: 5

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.361 g

Prep Extract Vol.: 1 mL

Container ID:1128307005-A

Analyst: MEM



Client Sample ID: **1636-080112-9**

SGS Ref. #: 1128307005

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 85.6

Collection Date/Time: 08/01/12 16:25

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	85.6		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307005-A

Analyst: CNP





Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-10

SGS Ref. #: 1128307006

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.3

Collection Date/Time: 08/01/12 16:28

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Benzene	0.00761 U	0.00761	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.0489	0.0152	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	14.6	1.52	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.200	0.0152	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	0.168	0.0304	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0152 U	0.0152	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <sur>	94	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <sur>	242	* 50-150	%	1	VFC11093	VXX23825	

Batch Information

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 115.354 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 32.7544 mL
Analysis Date/Time: 08/03/12 16:49	Prep Date/Time: 08/01/12 16:28	Container ID: 1128307006-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 115.354 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 32.7544 mL
Analysis Date/Time: 08/03/12 16:49	Prep Date/Time: 08/01/12 16:28	Container ID: 1128307006-B
Dilution Factor: 1		Analyst: HM



Client Sample ID: **1636-080112-10**

SGS Ref. #: 1128307006

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.3

Collection Date/Time: 08/01/12 16:28

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	575	21.0	mg/Kg	1	XFC10503	XXX27599	
5a Androstane <surr>	105	50-150	%	1	XFC10503	XXX27599	

**Batch Information**

Analytical Batch: XFC10503

Analytical Method: AK102

Analysis Date/Time: 08/04/12 22:21

Dilution Factor: 1

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.596 g

Prep Extract Vol.: 1 mL

Container ID:1128307006-A

Analyst: MEM



Client Sample ID: **1636-080112-10**

SGS Ref. #: 1128307006

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 93.3

Collection Date/Time: 08/01/12 16:28

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	93.3		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307006-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-080112-12

SGS Ref. #: 1128307007

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 88.7

Collection Date/Time: 08/01/12 16:30

Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Benzene	0.00975 U	0.00975	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.0476	0.0195	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	24.2	1.95	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.177	0.0195	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	0.130	0.0390	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0195 U	0.0195	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <surr>	94.6	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <surr>	254	* 50-150	%	1	VFC11093	VXX23825	

Batch Information

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 107.347 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 37.1274 mL
Analysis Date/Time: 08/03/12 17:07	Prep Date/Time: 08/01/12 16:30	Container ID: 1128307007-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 107.347 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 37.1274 mL
Analysis Date/Time: 08/03/12 17:07	Prep Date/Time: 08/01/12 16:30	Container ID: 1128307007-B
Dilution Factor: 1		Analyst: HM



Client Sample ID: **1636-080112-12**

SGS Ref. #: 1128307007

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 88.7

Collection Date/Time: 08/01/12 16:30

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	615	21.9	mg/Kg	1	XFC10503	XXX27599	
5a Androstane <sur>	100	50-150	%	1	XFC10503	XXX27599	

**Batch Information**

Analytical Batch: XFC10503

Analytical Method: AK102

Analysis Date/Time: 08/04/12 22:31

Dilution Factor: 1

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.893 g

Prep Extract Vol.: 1 mL

Container ID:1128307007-A

Analyst: MEM



Client Sample ID: **1636-080112-12**

SGS Ref. #: 1128307007

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 88.7

Collection Date/Time: 08/01/12 16:30

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	88.7		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307007-A

Analyst: CNP



Client Sample ID: 1636-080212-11
SGS Ref. #: 1128307008
Project ID: NUIQSUT
Matrix: Soil/Solid (dry weight)
Percent Solids: 88.8

Collection Date/Time: 08/02/12 08:15
Receipt Date/Time: 08/03/12 09:15

Polynuclear Aromatics GC/MS

Table with 9 columns: Parameter, Result, LOQ/CL, Units, DF, Analytical Batch, Prep Batch, Qualifiers. Lists various polynuclear aromatic hydrocarbons and their concentrations.

Batch Information

Analytical Batch: XMS6873
Analytical Method: 8270D SIMS (PAH)
Analysis Date/Time: 08/06/12 21:49
Dilution Factor: 1
Prep Batch: XXX27598
Prep Method: SW3550C
Prep Date/Time: 08/03/12 19:30
Initial Prep Wt./Vol.: 22.713 g
Prep Extract Vol.: 1 mL
Container ID: 1128307008-A
Analyst: JDH

Analytical Batch: XMS6875
Analytical Method: 8270D SIMS (PAH)
Analysis Date/Time: 08/07/12 11:01
Dilution Factor: 10
Prep Batch: XXX27598
Prep Method: SW3550C
Prep Date/Time: 08/03/12 19:30
Initial Prep Wt./Vol.: 22.713 g
Prep Extract Vol.: 1 mL
Container ID: 1128307008-A
Analyst: JDH



Client Sample ID: **1636-080212-11**

SGS Ref. #: 1128307008

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 88.8

Collection Date/Time: 08/02/12 08:15

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	88.8		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307008-A

Analyst: CNP





Client Sample ID: 1636-080212-15  
SGS Ref. #: 1128307009  
Project ID: NUIQSUT  
Matrix: Soil/Solid (dry weight)  
Percent Solids: 90.5

Collection Date/Time: 08/02/12 08:25  
Receipt Date/Time: 08/03/12 09:15

Polynuclear Aromatics GC/MS

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
1-Methylnaphthalene	0.513	0.0544	mg/Kg	10	XMS6875	XXX27598	
2-Methylnaphthalene	0.474	0.0544	mg/Kg	10	XMS6875	XXX27598	
Acenaphthene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Acenaphthylene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Anthracene	0.00570	0.00544	mg/Kg	1	XMS6873	XXX27598	
Benzo(a)Anthracene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Benzo[a]pyrene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Benzo[b]Fluoranthene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Benzo[g,h,i]perylene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Benzo[k]fluoranthene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Chrysene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Dibenzo[a,h]anthracene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Fluoranthene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Fluorene	0.00731	0.00544	mg/Kg	1	XMS6873	XXX27598	
Indeno[1,2,3-c,d] pyrene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Naphthalene	0.282	0.0544	mg/Kg	10	XMS6875	XXX27598	
Phenanthrene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
Pyrene	0.00544 U	0.00544	mg/Kg	1	XMS6873	XXX27598	
2-Fluorobiphenyl <surr>	75.5	45-105	%	1	XMS6873	XXX27598	
Terphenyl-d14 <surr>	86.2	30-125	%	1	XMS6873	XXX27598	

Batch Information

Analytical Batch: XMS6873	Prep Batch: XXX27598	Initial Prep Wt./Vol.: 22.855 g
Analytical Method: 8270D SIMS (PAH)	Prep Method: SW3550C	Prep Extract Vol.: 1 mL
Analysis Date/Time: 08/06/12 22:07	Prep Date/Time: 08/03/12 19:30	Container ID:1128307009-A
Dilution Factor: 1		Analyst: JDH

Analytical Batch: XMS6875	Prep Batch: XXX27598	Initial Prep Wt./Vol.: 22.855 g
Analytical Method: 8270D SIMS (PAH)	Prep Method: SW3550C	Prep Extract Vol.: 1 mL
Analysis Date/Time: 08/07/12 11:19	Prep Date/Time: 08/03/12 19:30	Container ID:1128307009-A
Dilution Factor: 10		Analyst: JDH



Client Sample ID: **1636-080212-15**

SGS Ref. #: 1128307009

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.5

Collection Date/Time: 08/02/12 08:25

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	90.5		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307009-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080212-18**  
 SGS Ref. #: 1128307010  
 Project ID: NUIQSUT  
 Matrix: Soil/Solid (dry weight)  
 Percent Solids: 90.6

Collection Date/Time: 08/02/12 09:35  
 Receipt Date/Time: 08/03/12 09:15

**Volatile Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Benzene	0.00791 U	0.00791	mg/Kg	1	VFC11093	VXX23825	
Ethylbenzene	0.0158 U	0.0158	mg/Kg	1	VFC11093	VXX23825	
Gasoline Range Organics	1.58 U	1.58	mg/Kg	1	VFC11093	VXX23825	
o-Xylene	0.0158 U	0.0158	mg/Kg	1	VFC11093	VXX23825	
P & M -Xylene	0.0316 U	0.0316	mg/Kg	1	VFC11093	VXX23825	
Toluene	0.0158 U	0.0158	mg/Kg	1	VFC11093	VXX23825	
1,4-Difluorobenzene <sur>	94.8	72-119	%	1	VFC11093	VXX23825	
4-Bromofluorobenzene <sur>	133	50-150	%	1	VFC11093	VXX23825	

**Batch Information**

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 129.989 g
Analytical Method: AK101	Prep Method: SW5035A	Prep Extract Vol.: 37.2349 mL
Analysis Date/Time: 08/03/12 17:26	Prep Date/Time: 08/02/12 09:35	Container ID: 1128307010-B
Dilution Factor: 1		Analyst: HM

Analytical Batch: VFC11093	Prep Batch: VXX23825	Initial Prep Wt./Vol.: 129.989 g
Analytical Method: SW8021B	Prep Method: SW5035A	Prep Extract Vol.: 37.2349 mL
Analysis Date/Time: 08/03/12 17:26	Prep Date/Time: 08/02/12 09:35	Container ID: 1128307010-B
Dilution Factor: 1		Analyst: HM



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: **1636-080212-18**

SGS Ref. #: 1128307010

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.6

Collection Date/Time: 08/02/12 09:35

Receipt Date/Time: 08/03/12 09:15

**Semivolatile Organic Fuels Department**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Diesel Range Organics	21.9 U	21.9	mg/Kg	1	XFC10503	XXX27599	
5a Androstane <surr>	100	50-150	%	1	XFC10503	XXX27599	

**Batch Information**

Analytical Batch: XFC10503

Analytical Method: AK102

Analysis Date/Time: 08/04/12 22:41

Dilution Factor: 1

Prep Batch: XXX27599

Prep Method: SW3550C

Prep Date/Time: 08/03/12 19:00

Initial Prep Wt./Vol.: 30.28 g

Prep Extract Vol.: 1 mL

Container ID:1128307010-A

Analyst: MEM



Client Sample ID: **1636-080212-18**

SGS Ref. #: 1128307010

Project ID: NUIQSUT

Matrix: Soil/Solid (dry weight)

Percent Solids: 90.6

Collection Date/Time: 08/02/12 09:35

Receipt Date/Time: 08/03/12 09:15

**Solids**

<u>Parameter</u>	<u>Result</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Analytical Batch</u>	<u>Prep Batch</u>	<u>Qualifiers</u>
Total Solids	90.6		%	1	SPT8739		

**Batch Information**

Analytical Batch: SPT8739

Analytical Method: SM21 2540G

Analysis Date/Time: 08/03/12 16:30

Dilution Factor: 1

Initial Prep Wt./Vol.: 1 mL

Container ID:1128307010-A

Analyst: CNP



Shannon & Wilson-Fairbanks

Print Date: 8/16/2012 11:29 am

Client Sample ID: 1636-TB
SGS Ref. #: 1128307011
Project ID: NUIQSUT
Matrix: Soil/Solid (dry weight)

Collection Date/Time: 08/01/12 16:11
Receipt Date/Time: 08/03/12 09:15

Volatile Fuels Department

Table with 9 columns: Parameter, Result, LOQ/CL, Units, DF, Analytical Batch, Prep Batch, Qualifiers. Rows include Benzene, Ethylbenzene, Gasoline Range Organics, o-Xylene, P & M -Xylene, Toluene, 1,4-Difluorobenzene <surr>, and 4-Bromofluorobenzene <surr>.

Batch Information

Analytical Batch: VFC11093
Analytical Method: SW8021B
Analysis Date/Time: 08/03/12 18:03
Dilution Factor: 1
Prep Batch: VXX23825
Prep Method: SW5035A
Prep Date/Time: 08/01/12 16:11
Initial Prep Wt./Vol.: 49.643 g
Prep Extract Vol.: 25 mL
Container ID: 1128307011-A
Analyst: HM

Analytical Batch: VFC11097
Analytical Method: AK101
Analysis Date/Time: 08/06/12 22:30
Dilution Factor: 1
Prep Batch: VXX23834
Prep Method: SW5035A
Prep Date/Time: 08/01/12 16:11
Initial Prep Wt./Vol.: 49.643 g
Prep Extract Vol.: 25 mL
Container ID: 1128307011-A
Analyst: HM



SGS Ref.# 1104212 Method Blank  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch XXX27598  
Method SW3550C  
Date 08/03/2012

QC results affect the following production samples:  
1128307008, 1128307009

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
<b><u>Polynuclear Aromatics GC/MS</u></b>					
1-Methylnaphthalene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
2-Methylnaphthalene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Acenaphthene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Acenaphthylene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Anthracene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Benzo(a)Anthracene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Benzo[a]pyrene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Benzo[b]Fluoranthene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Benzo[g,h,i]perylene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Benzo[k]fluoranthene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Chrysene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Dibenzo[a,h]anthracene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Fluoranthene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Fluorene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Indeno[1,2,3-c,d] pyrene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Naphthalene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Phenanthrene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
Pyrene	0.00300 U	0.00500	0.00150	mg/Kg	08/06/12
<b>Surrogates</b>					
2-Fluorobiphenyl <surr>	60.1	45-105		%	08/06/12
Terphenyl-d14 <surr>	83.7	30-125		%	08/06/12
Batch	XMS6873				
Method	8270D SIMS (PAH)				
Instrument	HP 6890/5973 MS SVQA				



SGS Ref.# 1104221 Method Blank  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch XXX27599  
Method SW3550C  
Date 08/03/2012

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
<b><u>Semivolatile Organic Fuels Department</u></b>					
Diesel Range Organics	12.4 U	20.0	6.20	mg/Kg	08/04/12
<b>Surrogates</b>					
5a Androstane <surr>	96.3	60-120		%	08/04/12
Batch	XFC10503				
Method	AK102				
Instrument	HP 6890 Series II FID SV D F				





SGS Ref.# 1104393 Method Blank  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch  
Method  
Date

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307008, 1128307009,  
1128307010

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
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**Solids**

Total Solids	100			%	08/03/12
Batch	SPT8739				
Method	SM21 2540G				
Instrument					



**SGS Ref.#** 1104401 Method Blank  
**Client Name** Shannon & Wilson-Fairbanks  
**Project Name/#** NUIQSUT  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 08/16/2012 11:29  
**Prep Batch** VXX23825  
**Method** SW5035A  
**Date** 08/03/2012

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010, 1128307011

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
<b><u>Volatile Fuels Department</u></b>					
Gasoline Range Organics	1.50 U	2.50	0.750	mg/Kg	08/03/12
<b>Surrogates</b>					
4-Bromofluorobenzene <surr>	102	50-150		%	08/03/12
<b>Batch</b>	VFC11093				
<b>Method</b>	AK101				
<b>Instrument</b>	Agilent 7890 PID/FID				
Benzene	0.00800 U	0.0125	0.00400	mg/Kg	08/03/12
Ethylbenzene	0.0156 U	0.0250	0.00780	mg/Kg	08/03/12
o-Xylene	0.0156 U	0.0250	0.00780	mg/Kg	08/03/12
P & M -Xylene	0.0300 U	0.0500	0.0150	mg/Kg	08/03/12
Toluene	0.0156 U	0.0250	0.00780	mg/Kg	08/03/12
<b>Surrogates</b>					
1,4-Difluorobenzene <surr>	95	72-119		%	08/03/12
<b>Batch</b>	VFC11093				
<b>Method</b>	SW8021B				
<b>Instrument</b>	Agilent 7890 PID/FID				



SGS Ref.# 1104678 Method Blank  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch VXX23831  
Method SW5035A  
Date 08/06/2012

QC results affect the following production samples:  
1128307002, 1128307003

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
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**Volatile Fuels Department**

Gasoline Range Organics	1.50 U	2.50	0.750	mg/Kg	08/06/12
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**Surrogates**

4-Bromofluorobenzene <surr>	104	50-150		%	08/06/12
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Batch VFC11094  
Method AK101  
Instrument Agilent 7890A PID/FID

**Surrogates**

1,4-Difluorobenzene <surr>	95	72-119		%	08/06/12
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Batch VFC11094  
Method SW8021B  
Instrument Agilent 7890A PID/FID



SGS Ref.# 1104721 Method Blank  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch VXX23834  
Method SW5035A  
Date 08/06/2012

QC results affect the following production samples:  
1128307011

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
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**Volatile Fuels Department**

Gasoline Range Organics	1.50 U	2.50	0.750	mg/Kg	08/06/12
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**Surrogates**

4-Bromofluorobenzene <surr>	102	50-150		%	08/06/12
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Batch VFC11097  
Method AK101  
Instrument Agilent 7890 PID/FID

**Surrogates**

1,4-Difluorobenzene <surr>	93.6	72-119		%	08/06/12
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Batch VFC11097  
Method SW8021B  
Instrument Agilent 7890 PID/FID



SGS Ref.# 1104394 Duplicate  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Original 1123348002  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch  
Method  
Date

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307008, 1128307009, 1128307010

Parameter	Original Result	QC Result	Units	RPD	RPD Limits	Analysis Date
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**Solids**

Total Solids	98.5	98.6	%	0	(< 15)	08/03/2012
Batch	SPT8739					
Method	SM21 2540G					
Instrument						



SGS Ref.# 1104213 Lab Control Sample  
 Client Name Shannon & Wilson-Fairbanks  
 Project Name/# NUIQSUT  
 Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
 Prep Batch XXX27598  
 Method SW3550C  
 Date 08/03/2012

QC results affect the following production samples:  
 1128307008, 1128307009

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b><u>Polynuclear Aromatics GC/MS</u></b>							
1-Methylnaphthalene	LCS	0.0123	56 ( 44-107 )			0.0222 mg/Kg	08/06/2012
2-Methylnaphthalene	LCS	0.0130	58 ( 45-105 )			0.0222 mg/Kg	08/06/2012
Acenaphthene	LCS	0.0132	60 ( 45-110 )			0.0222 mg/Kg	08/06/2012
Acenaphthylene	LCS	0.0132	59 ( 45-105 )			0.0222 mg/Kg	08/06/2012
Anthracene	LCS	0.0133	60 ( 55-105 )			0.0222 mg/Kg	08/06/2012
Benzo(a)Anthracene	LCS	0.0203	91 ( 50-110 )			0.0222 mg/Kg	08/06/2012
Benzo[a]pyrene	LCS	0.0161	72 ( 50-110 )			0.0222 mg/Kg	08/06/2012
Benzo[b]Fluoranthene	LCS	0.0212	96 ( 45-115 )			0.0222 mg/Kg	08/06/2012
Benzo[g,h,i]perylene	LCS	0.0187	84 ( 40-125 )			0.0222 mg/Kg	08/06/2012
Benzo[k]fluoranthene	LCS	0.0176	79 ( 45-125 )			0.0222 mg/Kg	08/06/2012
Chrysene	LCS	0.0184	83 ( 55-110 )			0.0222 mg/Kg	08/06/2012
Dibenzo[a,h]anthracene	LCS	0.0188	85 ( 40-125 )			0.0222 mg/Kg	08/06/2012
Fluoranthene	LCS	0.0168	76 ( 55-115 )			0.0222 mg/Kg	08/06/2012
Fluorene	LCS	0.0139	62 ( 50-110 )			0.0222 mg/Kg	08/06/2012
Indeno[1,2,3-c,d] pyrene	LCS	0.0191	86 ( 40-120 )			0.0222 mg/Kg	08/06/2012
Naphthalene	LCS	0.0125	56 ( 40-105 )			0.0222 mg/Kg	08/06/2012
Phenanthrene	LCS	0.0161	73 ( 50-110 )			0.0222 mg/Kg	08/06/2012
Pyrene	LCS	0.0162	73 ( 45-125 )			0.0222 mg/Kg	08/06/2012
<b>Surrogates</b>							
2-Fluorobiphenyl <surr>	LCS		66 ( 45-105 )				08/06/2012



SGS Ref.# 1104213 Lab Control Sample

Printed Date/Time 08/16/2012 11:29

Client Name Shannon & Wilson-Fairbanks

Prep Batch XXX27598

Project Name/# NUIQSUT

Method SW3550C

Matrix Soil/Solid (dry weight)

Date 08/03/2012

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Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
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**Polynuclear Aromatics GC/MS**

Terphenyl-d14 <surr>	LCS	84	( 30-125 )				08/06/2012
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Batch XMS6873

Method 8270D SIMS (PAH)

Instrument HP 6890/5973 MS SVQA



**SGS Ref.#** 1104222 Lab Control Sample  
 1104223 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson-Fairbanks  
**Project Name/#** NUIQSUT  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 08/16/2012 11:29  
**Prep Batch** XXX27599  
**Method** SW3550C  
**Date** 08/03/2012

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
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**Semivolatile Organic Fuels Department**

Diesel Range Organics	LCS	150	90	( 75-125 )			167 mg/Kg 08/04/2012
	LCSD	145	87		4	(< 20 )	167 mg/Kg 08/04/2012

**Surrogates**

5a Androstane <surr>	LCS		93	( 60-120 )			08/04/2012
	LCSD		86		8		08/04/2012

**Batch** XFC10503  
**Method** AK102  
**Instrument** HP 6890 Series II FID SV D F





**SGS Ref.#** 1104402 Lab Control Sample  
 1104403 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson-Fairbanks  
**Project Name/#** NUIQSUT  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 08/16/2012 11:29  
**Prep Batch** VXX23825  
**Method** SW5035A  
**Date** 08/03/2012

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010, 1128307011

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b><u>Volatile Fuels Department</u></b>							
Benzene	LCS	1.37	110	( 75-125 )		1.25 mg/Kg	08/03/2012
	LCSD	1.40	112		2	(< 20 )	1.25 mg/Kg 08/03/2012
Ethylbenzene	LCS	1.36	109	( 75-125 )		1.25 mg/Kg	08/03/2012
	LCSD	1.38	110		1	(< 20 )	1.25 mg/Kg 08/03/2012
o-Xylene	LCS	1.32	105	( 75-125 )		1.25 mg/Kg	08/03/2012
	LCSD	1.33	106		1	(< 20 )	1.25 mg/Kg 08/03/2012
P & M -Xylene	LCS	2.69	108	( 80-125 )		2.50 mg/Kg	08/03/2012
	LCSD	2.73	109		1	(< 20 )	2.50 mg/Kg 08/03/2012
Toluene	LCS	1.38	111	( 70-125 )		1.25 mg/Kg	08/03/2012
	LCSD	1.40	112		1	(< 20 )	1.25 mg/Kg 08/03/2012
<b>Surrogates</b>							
1,4-Difluorobenzene <surr>	LCS		98	( 72-119 )			08/03/2012
	LCSD		99		1		08/03/2012

**Batch** VFC11093  
**Method** SW8021B  
**Instrument** Agilent 7890 PID/FID



SGS Ref.# 1104404 Lab Control Sample  
1104405 Lab Control Sample Duplicate  
Client Name Shannon & Wilson-Fairbanks  
Project Name/# NUIQSUT  
Matrix Soil/Solid (dry weight)

Printed Date/Time 08/16/2012 11:29  
Prep Batch VXX23825  
Method SW5035A  
Date 08/03/2012

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010, 1128307011

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
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**Volatile Fuels Department**

Gasoline Range Organics	LCS	10.6	106	( 60-120 )		10.0 mg/Kg	08/03/2012
	LCSD	10.9	109		2	(< 20 )	10.0 mg/Kg 08/03/2012

**Surrogates**

4-Bromofluorobenzene <surr>	LCS		100	( 50-150 )			08/03/2012
	LCSD		101		1		08/03/2012

Batch VFC11093  
Method AK101  
Instrument Agilent 7890 PID/FID



**SGS Ref.#** 1104679 Lab Control Sample  
 1104680 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson-Fairbanks  
**Project Name/#** NUIQSUT  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 08/16/2012 11:29  
**Prep Batch** VXX23831  
**Method** SW5035A  
**Date** 08/06/2012

QC results affect the following production samples:  
 1128307002, 1128307003

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b><u>Volatile Fuels Department</u></b>							
Gasoline Range Organics	LCS	9.84	98	( 60-120 )		10.0 mg/Kg	08/06/2012
	LCSD	10.1	101		2	(< 20 )	10.0 mg/Kg 08/07/2012
<b>Surrogates</b>							
4-Bromofluorobenzene <surr>	LCS		107	( 50-150 )			08/06/2012
	LCSD		108		2		08/07/2012

**Batch** VFC11094  
**Method** AK101  
**Instrument** Agilent 7890A PID/FID



**SGS Ref.#** 1104724 Lab Control Sample  
 1104725 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson-Fairbanks  
**Project Name/#** NUIQSUT  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 08/16/2012 11:29  
**Prep Batch** VXX23834  
**Method** SW5035A  
**Date** 08/06/2012

QC results affect the following production samples:  
 1128307011

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b><u>Volatile Fuels Department</u></b>								
Gasoline Range Organics	LCS	10.6	106	( 60-120 )			10.0 mg/Kg	08/06/2012
	LCSD	11.1	111		4	(< 20 )	10.0 mg/Kg	08/06/2012
<b>Surrogates</b>								
4-Bromofluorobenzene <surr>	LCS		101	( 50-150 )				08/06/2012
	LCSD		103		1			08/06/2012

**Batch** VFC11097  
**Method** AK101  
**Instrument** Agilent 7890 PID/FID



SGS Ref.# 1104214 Matrix Spike  
 1104215 Matrix Spike Duplicate

Printed Date/Time 08/16/2012 11:29  
 Prep Batch XXX27598  
 Method Sonication Extraction Soil 8270  
 Date 08/03/2012

Original 1128249031  
 Matrix Soil/Solid (dry weight)

QC results affect the following production samples:  
 1128307008, 1128307009

Parameter	Qualifiers	Original Result	QC Result	Pet Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b>Polynuclear Aromatics GC/MS</b>									
1-Methylnaphthalene	MS	(0.00746) U	0.0328	61	(44-107)			0.0542 mg/Kg	08/06/2012
	MSD		0.0388	70		17	(< 30)	0.0554 mg/Kg	08/06/2012
2-Methylnaphthalene	MS	(0.00746) U	0.0334	62	(45-105)			0.0542 mg/Kg	08/06/2012
	MSD		0.0383	69		14	(< 30)	0.0554 mg/Kg	08/06/2012
Acenaphthene	MS	(0.00746) U	0.0343	63	(45-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0382	69		11	(< 30)	0.0554 mg/Kg	08/06/2012
Acenaphthylene	MS	(0.00746) U	0.0357	66	(45-105)			0.0542 mg/Kg	08/06/2012
	MSD		0.0377	68		6	(< 30)	0.0554 mg/Kg	08/06/2012
Anthracene	MS	(0.00746) U	0.0374	69	(55-105)			0.0542 mg/Kg	08/06/2012
	MSD		0.0390	71		4	(< 30)	0.0554 mg/Kg	08/06/2012
Benzo(a)Anthracene	MS	(0.00746) U	0.0492	91	(50-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0499	90		2	(< 30)	0.0554 mg/Kg	08/06/2012
Benzo[a]pyrene	MS	(0.00746) U	0.0406	75	(50-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0427	77		5	(< 30)	0.0554 mg/Kg	08/06/2012
Benzo[b]Fluoranthene	MS	(0.00746) U	0.0482	89	(45-115)			0.0542 mg/Kg	08/06/2012
	MSD		0.0492	89		2	(< 30)	0.0554 mg/Kg	08/06/2012
Benzo[g,h,i]perylene	MS	(0.00746) U	0.0432	80	(40-125)			0.0542 mg/Kg	08/06/2012
	MSD		0.0438	79		2	(< 30)	0.0554 mg/Kg	08/06/2012
Benzo[k]fluoranthene	MS	(0.00746) U	0.0426	79	(45-125)			0.0542 mg/Kg	08/06/2012
	MSD		0.0439	79		3	(< 30)	0.0554 mg/Kg	08/06/2012
Chrysene	MS	(0.00746) U	0.0427	79	(55-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0446	81		5	(< 30)	0.0554 mg/Kg	08/06/2012
Dibenzo[a,h]anthracene	MS	(0.00746) U	0.0442	82	(40-125)			0.0542 mg/Kg	08/06/2012
	MSD		0.0443	80		0	(< 30)	0.0554 mg/Kg	08/06/2012
Fluoranthene	MS	(0.00746) U	0.0413	76	(55-115)			0.0542 mg/Kg	08/06/2012
	MSD		0.0446	81		8	(< 30)	0.0554 mg/Kg	08/06/2012
Fluorene	MS	(0.00746) U	0.0373	69	(50-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0399	72		7	(< 30)	0.0554 mg/Kg	08/06/2012
Indeno[1,2,3-c,d] pyrene	MS	(0.00746) U	0.0449	83	(40-120)			0.0542 mg/Kg	08/06/2012
	MSD		0.0462	83		3	(< 30)	0.0554 mg/Kg	08/06/2012
Naphthalene	MS	(0.00746) U	0.0326	60	(40-105)			0.0542 mg/Kg	08/06/2012
	MSD		0.0357	64		9	(< 30)	0.0554 mg/Kg	08/06/2012
Phenanthrene	MS	(0.00746) U	0.0427	79	(50-110)			0.0542 mg/Kg	08/06/2012
	MSD		0.0479	87		11	(< 30)	0.0554 mg/Kg	08/06/2012
Pyrene	MS	(0.00746) U	0.0392	72	(45-125)			0.0542 mg/Kg	08/06/2012
	MSD		0.0426	77		8	(< 30)	0.0554 mg/Kg	08/06/2012



SGS Ref.# 1104214 Matrix Spike  
1104215 Matrix Spike Duplicate

Printed Date/Time 08/16/2012 11:29  
Prep Batch XXX27598  
Method Sonication Extraction Soil 8270  
Date 08/03/2012

Original 1128249031  
Matrix Soil/Solid (dry weight)

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
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**Polynuclear Aromatics GC/MS**

2-Fluorobiphenyl <surr>	MS	0.0365	67	( 45-105 )					08/06/2012
	MSD	0.0408	74			11			08/06/2012
Terphenyl-d14 <surr>	MS	0.0465	86	( 30-125 )					08/06/2012
	MSD	0.0462	83			1			08/06/2012

Batch XMS6873  
Method 8270D SIMS (PAH)  
Instrument HP 6890/5973 MS SVQA



<b>SGS Ref.#</b>	1104406	Matrix Spike	<b>Printed Date/Time</b>	08/16/2012 11:29
	1104407	Matrix Spike Duplicate	<b>Prep</b>	VXX23825
			<b>Batch</b>	AK101 Extraction (S)
			<b>Method</b>	08/03/2012
			<b>Date</b>	
<b>Original</b>	1128307001			
<b>Matrix</b>	Soil/Solid (dry weight)			

QC results affect the following production samples:

1128307001, 1128307002, 1128307003, 1128307004, 1128307005, 1128307006, 1128307007, 1128307010, 1128307011

Parameter	Qualifiers	Original Result	QC Result	Pet Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
<b>Volatile Fuels Department</b>									
Benzene	MS	(0.0134) U	1.15	107	( 75-125 )			1.07 mg/Kg	08/03/2012
	MSD		1.20	112		5	(< 20 )	1.07 mg/Kg	08/03/2012
Ethylbenzene	MS	0.0565	1.18	105	( 75-125 )			1.07 mg/Kg	08/03/2012
	MSD		1.25	111		5	(< 20 )	1.07 mg/Kg	08/03/2012
o-Xylene	MS	0.164	1.25	102	( 75-125 )			1.07 mg/Kg	08/03/2012
	MSD		1.31	107		4	(< 20 )	1.07 mg/Kg	08/03/2012
P & M -Xylene	MS	0.239	2.50	105	( 80-125 )			2.14 mg/Kg	08/03/2012
	MSD		2.62	111		5	(< 20 )	2.14 mg/Kg	08/03/2012
Toluene	MS	(0.0268) U	1.15	107	( 70-125 )			1.07 mg/Kg	08/03/2012
	MSD		1.20	112		5	(< 20 )	1.07 mg/Kg	08/03/2012
<b>Surrogates</b>									
1,4-Difluorobenzene <surr>	MS		1.04	97	( 72-119 )				08/03/2012
	MSD		1.04	97		0			08/03/2012
<b>Batch</b>	VFC11093								
<b>Method</b>	SW8021B								
<b>Instrument</b>	Agilent 7890 PID/FID								

**Long, Alesha (Anchorage)**

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**From:** Dawkins, Jennifer A (Anchorage)  
**Sent:** Thursday, August 02, 2012 4:38 PM  
**To:** Hurt, Amy L (Anchorage)  
**Cc:** Long, Alesha (Anchorage)  
**Subject:** 8307 Change Order

Please add a 3 day Rush to WO 1128307, per client (approved by Will).

Thanks  
Jen Dawkins

1128307







SGS N  
CHAIN O

1128307



- Alaska
  - Maryland
  - New Jersey
  - North Carolina
  - West Virginia
- Locations Nationwide  
www.us.sgs.com

Page 1 of 2

1 CLIENT: SHANNON AND WILSON  
 CONTACT: CHRIS LOCKE  
 PROJECT: NUISANCE  
 REPORTS TO:  
 INVOICE TO: S AND W  
 P.O. #:

PHONE NO: 907-351-6280  
 SITE/PWSID#: JEL  
 EMAIL: JEL  
 QUOTE #:  
 P.O. #:

SGS Reference #: \_\_\_\_\_ page 1 of 2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB M= Multi Incremental Samples	Preservatives Used	Analysis Required	REMARKS/ LOC ID
1	A-B 1636-080112-2	8-1-2012	1611	SOIL	2	G			
2	A-B 1636-080112-3	8-1-2012	1614	SOIL	2	G			
3	A-B 1636-080112-4	8-1-2012	1619	SOIL	2	G			
4	A-B 1636-080112-8	8-1-2012	1622	SOIL	2	G			
5	A-B 1636-080112-9	8-1-2012	1625	SOIL	2	G			
6	A-B 1636-080112-10	8-1-2012	1628	SOIL	2	G			
7	A-B 1636-080112-12	8-1-2012	1630	SOIL	2	G			
8	A 1636-080212-11	8-2-2012	0815	SOIL	1	G			
9	A 1636-080212-15	8-2-2012	0825	SOIL	1	G			
10	A-B 1636-080212-18	8-2-2012	0935	SOIL	2	G			

4

Special Deliverable Requirements:

DOD Project? YES NO  
 Cooler ID \_\_\_\_\_  
 Cooler Temp °C \_\_\_\_\_

Requested Turnaround Time and/or Special Instructions:

Temperature Blank Therm #  
 °C: 3.49 # 205  
 or Ambient

Chain of Custody Seal: (Circle)  
 INTACT BROKEN ABSENT

1128307

SHANNON & WILSON, INC. Geotechnical and Environmental Consultants

300 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020
2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660
5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 479-0600
1200 17th Street, Suite 1024 Portland, OR 97201-2498 (503) 223-6147

CHAIN OF CUSTODY RECORD

Laboratory Attn:

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

Table with columns: Sample Identity, Lab No., Date Sampled, Total Number of Containers, Remarks/Matrix. Includes handwritten entries like 'FRP BAST JEL' and '1636-TB'.

Project Information, Sample Receipt, Relinquished By (1, 2, 3), Received By (1, 2, 3), Instructions sections with signatures and dates.

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



## SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were <b>custody seals</b> intact? Note # & location, if applicable. COC accompanied samples?	Yes No <u>N/A</u> <u>Yes</u> No N/A	
<b>Temperature blank</b> compliant* (i.e., 0-6°C after correction factor)? <i>* Note: Exemption permitted for chilled samples collected less than 8 hours ago-</i> Cooler ID: _____ @ <u>3-9</u> w/ Therm.ID: <u>205</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ <i>Note: If non-compliant, use form FS-0029 to document affected samples/analyses.</i> If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & " <b>COOLER TEMP</b> " will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	<u>Yes</u> No N/A	
<b>If temperature(s) &lt;0°C, were all sample containers ice free?</b>	Yes No <u>N/A</u>	
Delivery method (specify all that apply): <u>Client</u> 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 <u>N/A</u>	
→ For samples received with payment, note amount (\$) and cash / check / <u>CC</u> (circle one) or note: → For samples <b>received in FBKS</b> , ANCH staff will verify all criteria are reviewed.		SRF Initiated by: <u>JP</u> <u>N/A</u>
Were samples received within hold time? <i>Note: Refer to form F-083 "Sample Guide" for hold time information.</i> Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)? <i>* Note: Exemption permitted if times differ &lt;1hr; in which case, use times on COC.</i> Were analyses requested unambiguous?	<u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No N/A	
Were samples in <b>good condition</b> (no leaks/cracks/breakage)? Packing material used (specify all that apply): <u>Bubble Wrap</u> Separate plastic bags Vermiculite Other:	<u>Yes</u> No N/A	
Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)? Were all soil VOAs <b>field extracted</b> with MeOH+BFB?	Yes No <u>N/A</u> Yes No <u>N/A</u>	
Were <b>proper containers</b> (type/mass/volume/preservative*) used? <i>* Note: Exemption permitted for waters to be analyzed for metals.</i> Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples?	<u>Yes</u> No N/A <u>Yes</u> No N/A	
For <b>special handling</b> (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No <u>N/A</u>	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No <u>N/A</u> <u>Yes</u> No <u>N/A</u>	
For <b>RUSH/SHORT Hold Time</b> or <b>site-specific QC</b> (e.g., BMS/BMSD/BDUP) samples, were the COC & bottles flagged (e.g., stickers) accordingly? For RUSH/SHORT HT, was email sent?	<u>Yes</u> No <u>N/A</u>	<u>BC 8/3/12 Rush due 8/7/12</u>
For any question answered " <b>No</b> ," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No <u>N/A</u>	SRF Completed by: <u>VWV3</u> PM = <u>N/A</u>
Was <b>PEER REVIEW</b> of <b>sample numbering/labeling</b> completed?	Yes No <u>N/A</u>	Peer Reviewed by: <u>N/A</u>
Additional notes (if applicable):		

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



**SAMPLE RECEIPT FORM FOR TRANSFERS**

**Note: This form is to be completed by Anchorage Sample Receiving staff for all shipments received at SGS-Anchorage from SGS-Fairbanks.**

Were samples received numbered with all criteria on Sample Receipt Form F0004 documented by Fairbanks Sample Receiving staff? If "No," <i>Anchorage Sample Receiving staff must complete the receiving process &amp; document pH verification, sample condition, etc. on the SRF initiated by Fairbanks staff</i> (attached).	Yes <input type="radio"/> No <input checked="" type="radio"/> N/A	Use space below for additional notes...
Review Criteria:	Condition:	Comments/Action Taken:
Were custody seals intact? Note # & location: COC accompanied samples?	Yes <input checked="" type="radio"/> No <input type="radio"/> N/A Yes <input checked="" type="radio"/> No <input type="radio"/> N/A	1 FIB
Temperature blank compliant (i.e., 0-6°C after correction factor)? Cooler ID: <u>1</u> @ <u>102</u> w/ Therm.ID: <u>206</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____	Yes <input checked="" type="radio"/> No <input type="radio"/> N/A	
Note: If non-compliant, use form FS-0029 to document affected samples/analyses. If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled." If temperature(s) <0°C, were all containers ice free?	Yes <input type="radio"/> No <input type="radio"/> N/A <input checked="" type="radio"/>	
Delivery method: <input checked="" type="radio"/> Lynden Other: _____		
Completed by: <u>Kath Bauer 0915 8/3/12</u>		

## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

1. Laboratory

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

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

2. Chain of Custody (COC)

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

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

3. Laboratory Sample Receipt Documentation

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

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:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes  No  NA (Please explain.)

Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality was unaffected; see above.

#### 4. Case Narrative

a. Present and understandable?

Yes  No  NA (Please explain.)

Comments:

b. Discrepancies, errors or QC failures identified by the lab?

Yes  No  NA (Please explain.)

Comments:

The laboratory indicates there was a BFB surrogate recovery failure for several samples. See section 6.c. for assessment. The lab also indicates "The patten is consistent with a weathered middle distallate" for several samples. This is just a laboratory note, and sample results or data quality are not affected.

Lab indicates "CCV recovery for benzo(a)anthracene does not meet QC criteria." Since the analyte as not reported above the LOQ in the associated samples, data quality is not affected.

c. Were all corrective actions documented?

Yes  No  NA (Please explain.)

Comments:

No corrective actions were required.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

See section 6.c. for surrogate recovery failure assessment.

#### 5. Samples Results

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

Yes  No  NA (Please explain.)

Comments:

b. All applicable holding times met?

Yes  No  NA (Please explain.)

Comments:

c. All soils reported on a dry weight basis?

Yes  No  NA (Please explain.)

Comments:

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

Yes  No  NA (Please explain.)

Comments:

LODs (reporting value) were below the ADEC established groundwater cleanup levels or project-specific requirements (sulfolane analysis SOP), where applicable (for non-detect results).

e. Data quality or usability affected?

Comments:

No

## 6. QC Samples

a. Method Blank

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

Yes  No  NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

Yes  No  NA (Please explain.)

Comments:

No analytes were detected in the method blank.

iii. If above PQL, what samples are affected?

Comments:

None, see above.

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

Yes  No  NA (Please explain.)

Comments:

N/A; see above.

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

Comments:

No; see above.

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

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

Yes  No  NA (Please explain.)                      Comments:

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

Yes  No  NA (Please explain.)                      Comments:

Metals were not submitted for 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 (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No  NA (Please explain.)                      Comments:

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

Comments:

N/A; percent recovery and RPD were within control limits.

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

Yes  No  NA (Please explain.)                      Comments:

No sample results were affected.

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

Comments:

Data quality and usability were not affected; see above.

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:

For all samples 1636-0801012-2, 3, 4, 9, 10 and 12, surrogate BFB was recovered outside QC criteria. These samples are considered estimated and biased-high and are flagged JH.

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

Comments:

Yes, see above.

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

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes  No  NA (Please explain.)      Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes  No  NA (Please explain.)      Comments:

- iii. All results less than PQL?

Yes  No  NA (Please explain.)      Comments:

Gasoline Range Oranics was detected at 0.850mg/Kg. Since all samples except 1636-080212-18 were detected at more then five times the amount in the trip blank, the data results are not affected. Sample 1636-0802012-18 had a detected amount of 1.32J mg/Kg, and since this is not more then five times the amount found in the trip blank, we will flag it UB.

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

See above.

Comments:

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

Comments:

See above.

e. Field Duplicate

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

Yes  No  NA (Please explain.)

Comments:

Field duplicate sets 1636-080112-02 / 1636-080112-12 and 1636-080212-11 / 1636-080212-15 were submitted with this work order.

ii. Submitted blind to lab?

Yes  No  NA (Please explain.)

Comments:

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

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

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes  No  NA (Please explain.)

Comments:

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

Comments:

No; see above.

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

Yes  No  NA (Please explain.)

Comments:

No equipment blanks were submitted in this work order.

i. All results less than PQL?

Yes  No  NA (Please explain.)

Comments:

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

N/A; see above.

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

a. Defined and appropriate?

Yes  No  NA (Please explain.)

Comments:

There were no other data flags/qualifiers.