

**RELEASE INVESTIGATION
ALASKA DEPARTMENT OF
TRANSPORTATION
AND PUBLIC FACILITIES
TAZLINA
MAINTENANCE STATION
GLENALLEN, ALASKA**

May 2004

Submitted To:
Alaska Department of Transportation and Public Facilities
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TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Site Description	1
1.2 Project Objectives.....	2
1.3 Cleanup Levels.....	2
2.0 FIELD WORK	3
2.1 Soil Borings and Split-Spoon Sampling.....	3
2.2 Decontamination Procedures.....	4
2.3 Water Well Sampling	4
3.0 LABORATORY ANALYSES	4
4.0 RESULTS	5
4.1 Subsurface Conditions.....	5
4.2 Soil Samples.....	5
4.3 Water Sample	5
4.4 Quality Assurance/Quality Control	5
5.0 DISCUSSION.....	7
6.0 CONCLUSIONS AND RECOMMENDATIONS	8
7.0 LIMITATIONS.....	8

LIST OF TABLES

Table 1	Soil Sample Results
Table 2	Water Sample Results

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Site Map and Boring Locations

LIST OF APPENDICES

Appendix A - Aerial Photograph
Appendix B - Sample Location Maps and Analytical Summary Tables (historical)
Appendix C - Soil Boring Logs
Appendix D - SGS Analytical Laboratory Report

**RELEASE INVESTIGATION
ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
TAZLINA MAINTENANCE STATION
GLENALLEN, ALASKA**

1.0 INTRODUCTION

This release investigation report has been prepared to present our findings at the Alaska Department of Transportation and Public Facilities (ADOT&PF) Tazlina Maintenance Station, Glenallen, Alaska. The release investigation was conducted in general accordance with our Release Investigation Management Plan dated September 2003; the Alaska Department of Environmental Conservation (ADEC) Underground Storage Tank Regulations, 18 AAC 78, and current UST Procedures Manual; and our ADOT&PF Term Contract, Statewide Hazardous Waste and Environmental Term Services, Agreement No. P22011.

1.1 Site Description

The ADOT&PF Tazlina Maintenance Facility (ADEC Facility No. 1546) is located at Mile 110 on the Richardson Highway, approximately 5 miles south of Glenallen, Alaska (Figure 1). The facility is located on a terrace about 200 feet above the Tazlina River, which is within about 400 feet of the site. The depth to groundwater is more than 100 feet below the ground surface. Groundwater is anticipated to flow toward the southeast. A water well is present on the site. An aerial photograph of the facility is presented in Appendix A.

In 1993 Dames & Moore removed one 8,000-gallon diesel UST (Tank #1) and one 8,000-gallon gasoline UST (Tank #2) from the Tazlina Maintenance Station. Approximately 2,000 cubic yards of contaminated soil were removed from a single excavation, which extended to a depth of 25 feet at the diesel UST and 32 feet at the gasoline UST. Soil encountered in the excavation consisted of sandy gravel to a depth of 8 feet, which was underlain by about 8 feet gray clay. The clay was underlain by 12 feet of sandy gravel, and frozen silt was encountered at the base of the excavation. Soil from the excavation contained benzene at 40 to 120 milligram per kilogram (mg/kg); diesel range organics (DRO) from 63 to 960 mg/kg; and gasoline range organics (GRO) from 3,100 to 7,500 mg/kg. A water sample collected from the on-site well did not contain total petroleum hydrocarbons, benzene, ethylbenzene, or xylenes above the practical quantitation limits (PQLs); although toluene was detected at 0.6 micrograms per liter ($\mu\text{g/L}$), slightly above

the PQL. A description of their field methods and results is presented in the report *Preliminary Site Assessment Report for UST Closure, ADOT&PF Tazlina Maintenance Station, Glennallen, Alaska*, dated December 17, 1993. The contaminated soil stockpile was reportedly spread within the property boundaries.

In August 1997, Shannon & Wilson observed the removal of one, 2,000-gallon, used-oil UST (Tank #3). The excavation measured 13 feet by 18 feet by 9 feet deep. Surficial soils (to 7 feet) consisted of sandy gravel with trace silt underlain by stiff clay. Approximately 10 cubic yards of contaminated soil were stockpiled at the site. Samples collected from the base of the Tank #3 excavation contained DRO ranging from 250 mg/kg to 1,000 mg/kg, RRO ranging from 570 to 2,400 mg/kg, and benzene ranging from less than the PQL to 0.047 mg/kg. The results of the site assessment are presented in the report *UST Closure Site Assessment, ADOT&PF Maintenance Station, Tazlina, Alaska*, dated October 1997. Clean soil removed from the excavation was used as backfill. The contaminated soil stockpile was reportedly spread within the property boundaries.

Appendix B contains sample location maps and analytical sample summary tables from the Dames & Moore and Shannon & Wilson reports.

1.2 Project Objectives

The objective of the release investigation at the Tazlina Maintenance Station was to determine the depth of soil contamination under Tanks #1 and #2, the lateral extent of soil contamination toward the on-site drinking water well, and if the operation of the USTs have affected the water well.

1.3 Cleanup Levels

Soil cleanup levels are now regulated by the ADEC under 18 AAC 75.340 and 18 AAC 75.341. Method One soil cleanup levels are based on a site-specific matrix score. Method Two soil cleanup levels are based on values contained in Tables B1 and B2. The Method Two soil cleanup levels are tabulated below.

Tables B1 and B2 Method Two			
	Under 40-inch Zone		
	Ingestion (mg/kg)	Inhalation (mg/kg)	Migration to Groundwater (mg/kg)
Benzene	290	9	0.02
Toluene	20,300	180	5.4
Ethylbenzene	10,000	89	5.5
Total Xylenes	203,000	81	78
Gasoline Range Organics	1,400	1,400	300
Diesel Range Organics	10,250	12,500	250
Residual Range Organics	10,000	22,000	11,000

Groundwater cleanup levels are presented in Table C of the ADEC Oil and Hazardous Substances Regulations, 18 AAC 75.

2.0 FIELD WORK

2.1 Soil Borings and Split-Spoon Sampling

Two soil borings were drilled on October 8 and 9, 2003, under the supervision of Andrea Carlson, a geologist with our firm. The locations of the borings are shown in Figure 2. The borings were advanced with a hollow-stem auger using Shannon & Wilson's B-61 drill rig. Boring T-1 was drilled at the former location of Tank #2, and boring T-2 was drilled approximately 30 feet south of T-1, toward the on-site drinking water well. Soil samples were obtained by driving a split-spoon sampler into the soil ahead of the auger at 2.5-foot intervals beginning at 32.5 feet (coincident with the base of 1993 Tank #2 excavation) in T-1 and 30 feet in T-2. Boring T-1 and T-2 extended to depths of 44 and 46.5 feet, respectively, at which point the augers met refusal. Due to the dense nature of the soil, sample recovery was poor. Drill cuttings were used to backfill the borings. Logs of the borings are provided in Appendix C.

Using a new or decontaminated stainless steel spoon, portions of the sample from the split-spoon were placed in sample jars provided by the laboratory for analysis. Analytical samples for GRO/benzene, toluene, ethylbenzene, and xylenes (BTEX) were immediately preserved with methanol. Samples for DRO were collected with no headspace in the jar. The samples were placed into a cooler with an ice substitute to maintain a temperature near 4 degrees Celsius.

Another portion of each sample was placed in a resealable plastic bag for headspace screening with a photoionization detector (PID). A Photovac HL-2020 PID was used to detect volatile compounds present in the headspace of the bag, providing a semiquantitative measure of the petroleum hydrocarbon concentration. The PID was calibrated to a 100 ppm isobutylene-in-air standard.

2.2 Decontamination Procedures

Drilling equipment, including the rear end of the drill rig, was cleaned with a high-pressure hot-water wash prior to mobilizing to the site. Drill rods, bits, and augers were washed between borings. Sampling equipment was decontaminated prior to sampling and between sample locations to avoid cross-contamination. The soil sampling tools were scrubbed with a stiff brush in a solution of water and detergent followed by tap water and distilled water rinses. Water generated during the decontamination process was discharged to the ground surface in the area of the former USTs.

2.3 Water Well Sampling

Mark Lockwood, a Shannon & Wilson geologist, visited the site on January 12, 2004. Mr. Lockwood collected a water sample (*1192-011204-TAZWELL*) from the water supply well at the facility. The depth to water is reportedly at least 100 feet. Prior to sampling, approximately 400 gallons of water were purged from the sink in the janitor closet on the first floor of the shop building to obtain a sample representative of the groundwater at the site. The water flow was reduced prior to sampling to avoid turbulence that would affect the quality of the sample. The sample was collected into laboratory-supplied containers, placed into a cooler, and kept cold during transport to the analytical laboratory in Fairbanks. The water sample and a trip blank were submitted to SGS for analysis of DRO, GRO, and BTEX, as described below.

3.0 LABORATORY ANALYSES

The samples were submitted to SGS for analytical testing. Sample analyses were selected based on types of known source(s) of contamination associated with the former UST location. Soil and water samples were analyzed for GRO by Alaska Method AK 101, DRO by Alaska Method AK 102, and BTEX by EPA 8021.

4.0 RESULTS

4.1 Subsurface Conditions

Soils encountered in Boring T-1 consisted of fill from the 1993 Tank #1 and Tank #2 excavation to a depth of about 32 feet. This fill was underlain by very dense, frozen, grayish brown, sandy silty gravel/gravelly silt to a depth of 37.5 feet below the ground surface (bgs). This gravel/silt was underlain by very dense, frozen, sandy silt to a depth of 42 feet, at which point the augers met refusal. The results of PID field screening ranged from greater than 2,000 parts per million (ppm) to 98 ppm, generally decreasing with depth. Soils encountered in Boring T-2 consisted of frozen gravelly/sandy silt between 32 and 46.5 feet bgs. The results of PID field screening ranged from 198 ppm to 3 ppm, generally decreasing with depth. Groundwater was not encountered in the borings.

4.2 Soil Samples

Three soil samples were collected from boring T-1 from depths of 35 feet, 37.5 feet, and 42.5 feet bgs. Three soil samples were collected from boring T-2 from depths of 30 feet, 37.5 feet, and 42.5 feet bgs. A summary of soil analytical results is presented in Table 1. Complete analytical laboratory reports are presented in Appendix D. In boring T-1, GRO ranged from 6.98 mg/kg to 217 mg/kg; DRO ranged from less than the PQL to 1,180; and benzene ranged from 0.676 mg/kg to 7.21 mg/kg. In boring T-2, GRO ranged from 3.41 mg/kg to 5.65 mg/kg; DRO was not detected in excess of the PQL; and benzene ranged from 0.345 mg/kg to 0.674 mg/kg.

4.3 Water Sample

The water sample from the on-site drinking water well did not contain GRO, DRO, or the BTEX analytes at concentrations above their respective PQLs. A summary of water analytical results is presented in Table 2.

4.4 Quality Assurance/Quality Control

Field quality control (QC) procedures for this project included the analysis of a trip blank. Poor recovery (small sample size) precluded the collection of a field duplicate. The analysis of the trip blank indicated no analytes above the PQL; thus, there is no indication that cross-contamination occurred.

Laboratory QC included the procedures outlined in the laboratory's ADEC-approved standard operating procedures documentation. As presented in the laboratory report's QC data package summary sheet for soil and water samples, the majority of the laboratory QC parameters fell within the accepted limits with the exception of the following:

Sample Number	DRO - MS/MSD do not meet QC goals. Recoveries outside allowable limits. LCS recoveries within control limits	GRO/BTEX - BFB surrogate recovery is biased high due to matrix interference.	GRO/BTEX - MS/MSD do not meet QC goals. Recoveries outside allowable limits. LCS recoveries within control limits.	GRO/BTEX - MS/MSD RPD for GRO outside QC goals	DRO - LCS/LCSD do not meet QC goals. Spike recoveries outside allowable limits. Re-analysis past hold time confirmed results.
522240 (MS)	✓				
522241 (MSD)	✓				
522508 (MS)		✓	✓	✓	
522509 (MSD)		✓	✓	✓	
522969 (MS)			✓		
522970 (MSD)			✓		
523107 (MS)	✓				
523108 (MSD)	✓				
1192-1000903-T1-2		✓			
1192-1000903-T1-3		✓			
536090 (LCS) - water					✓
536091 (LCSD) - water					✓
1192-011204-TAZWELL - water					✓

It is our opinion the overall utility of the laboratory data has not been compromised by these QC anomalies, and the results are valid for interpreting the soil and groundwater quality within the study area. The SGS laboratory reports, including the case narratives and QA/QC data, are included as an attachment to this report.

5.0 DISCUSSION

Soils encountered in the borings were very dense, fine-grained, and frozen. The thickness of the frozen silt was not evaluated due to difficult drilling, and to avoid the possibility of breaching the confining layer. The maintenance shop is located atop a rise that allows rain and meltwater to drain away from the former location of the Tanks #1, #2, and #3, thereby limiting infiltration. The depth to groundwater at the site is greater than 100 feet, and no receptors are located down gradient. Water samples collected from the on-site drinking water well have not exceeded the groundwater cleanup level for the analytes tested.

Since Tanks #1 and #2 were removed in 1993, the concentration of petroleum hydrocarbons at the base of the excavation appears to have decreased or remain similar. GRO decreased from 7,500 mg/kg at the base of the excavation in 1993 to 217 mg/kg at 35 feet in boring T-1. DRO was unchanged at 32 feet, ranging from 960 mg/kg in 1993 to 1,000 mg/kg at 35 feet in boring T-1. Benzene decreased from 120 mg/kg to 7.21 mg/kg. The concentration of petroleum hydrocarbons decreases with depth below the former location of Tanks #1 and #2. The sample collected at 42.5 feet in boring T-1 contained 6.98 mg/kg GRO and 0.676 mg/kg benzene, and DRO was not detected above the PQL. GRO and benzene were detected in the boring T-2; the concentration of these compounds also generally decreased with depth. None of the samples exceeded the ingestion/inhalation cleanup levels.

The corrective action completed at the site in 1993 removed contaminated soil to the extent practicable due to depth limitations and proximity to the shop building. Results of this release investigation show that soil exceeding the ADEC migration to groundwater cleanup level for DRO and benzene is present in the area of Tanks #1 and #2. The depth to water and the presence of a frozen, very dense, silt layer indicates the groundwater migration pathway may not be complete. Soil samples collected from the borings did not exceed the inhalation/ingestion cleanup levels for the analytes tested.

Soil samples collected at the base of the used-oil UST (Tank #3) excavation in 1997 did not exceed the ingestion/inhalation cleanup levels. Since Tank #3 was adjacent to the building, contamination was removed to the extent practicable at the time of closure.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our field observations and the analytical test results, Shannon & Wilson presents the following conclusions and recommendations:

- Soil samples collected from the borings in the area of former Tanks #1 and #2 did not exceed the inhalation/ingestion soil cleanup levels. The inhalation/ingestion cleanup levels are appropriate for the site due the depth to groundwater (at least 100 feet bgs), lack of receptors, and the fine-grained and frozen nature of the soils.
- Soil collected from the limits of the Tank #3 excavation in 1997 did not exceed the inhalation/ingestion soil cleanup levels.
- A water sample collected in 2004 from the on-site water well did not contain BTEX, DRO, or GRO compounds above their PQLs.
- We recommend that the ADOT&PF sample the area within the yard where the stockpiles were spread to determine the treatment effectiveness.
- We recommend an additional sample from the on-site drinking water well be collected to evaluate the seasonal variability in groundwater quality. The water sample should be analyzed for GRO, DRO, and BTEX by AK 101, AK 102, and EPA 8021B, respectively.

7.0 LIMITATIONS

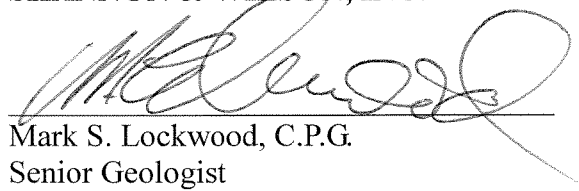
The conclusions we have presented in this report are based on the sampling and analysis that we performed. They should not be construed as a guarantee of the soil or water quality at the site. Our sampling was intended to confirm the presence or absence of selected contaminants at the sampled locations. It is possible that our subsurface 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 run. As a result, the analysis and sampling performed can only provide you with our judgment as to the environmental characteristics of the site, and in no way guarantees that an agency or its staff will reach the same conclusions.

Changes in site conditions can occur with time because of natural forces or human activity. 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 our control, our observations and interpretations may need to be revised.

This report was prepared for the exclusive use of ADOT&PF and their agents, for an UST release investigation in accordance with the scope of work. If it is made available to others, it should be for information on factual data only and not as a warranty of described conditions, such as those interpreted from the discussions of subsurface conditions included in this report.

SHANNON & WILSON, INC.


Mark S. Lockwood, C.P.G.
Senior Geologist

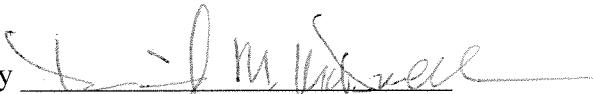
Reviewed by 
David M. McDowell
Vice President
Environmental Services

Table 1
SOIL SAMPLE RESULTS
ADOT&PF Tazlina Maintenance Station

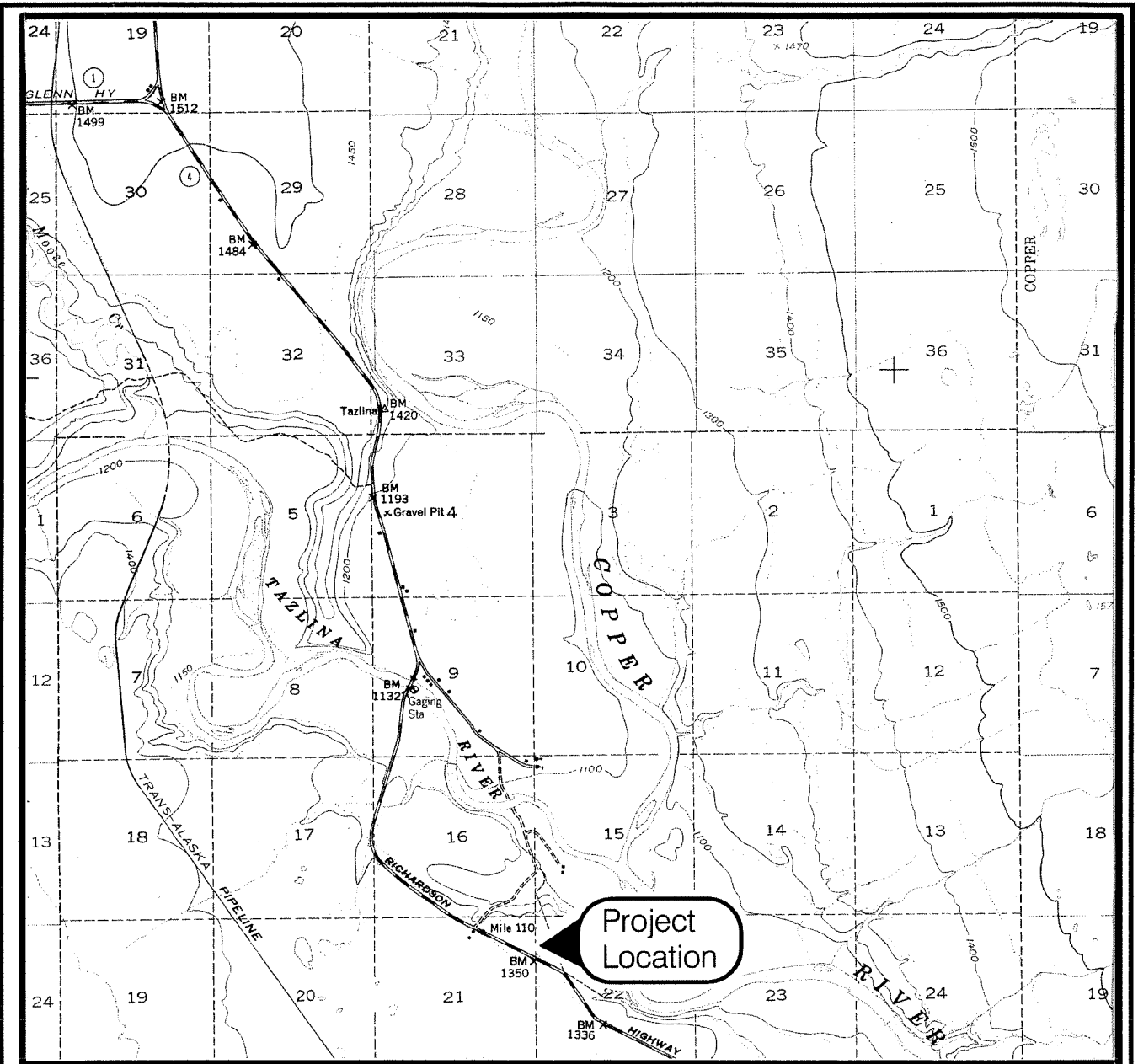
SHANNON & WILSON, INC.

Sample Number	Sample Location	Depth (ft)	DRO (mg/kg)	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	p&m Xylenes (mg/kg)	o-Xylene (mg/kg)
1192-100903-T1-2	Boring T-1	35	1000	217	7.21	51.8	11.6	43.6	17.5
1192-100903-T1-3	Boring T-1	37.5	1180	10.4	0.848	2.81	0.481	1.94	0.778
1192-100903-T1-5	Boring T-1	42.5	<21.5	6.98	0.676	2.26	0.319	1.29	0.494
1192-100803-T2-1	Boring T-2	30	<21.3	5.29	0.345	1.44	0.286	1.23	0.547
1192-100903-T2-4	Boring T-2	37.5	<20.7	5.65	0.674	1.91	0.251	1.06	0.425
1192-100903-T2-6	Boring T-2	42.5	<21.1	3.41	0.391	1.18	0.130	0.513	0.192

Table 2
WATER SAMPLE RESULTS
ADOT1F Tazlina Maintenance Station

SHANNO & WILSON, INC.

Sample Number	DRO (mg/L)	GRO (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	p&m Xylenes (µg/L)	o-Xylene (µg/L)
1192-011204-TAZWELL	<0.300	<0.0900	<0.500	<2.00	<2.00	<2.00	<2.00



Base Map: USGS Gulkana (A-3), 1973

Scale: 1 inch = 1 mile



ADOT&PF Tazlina Maintenance Station
Glennallen, Alaska

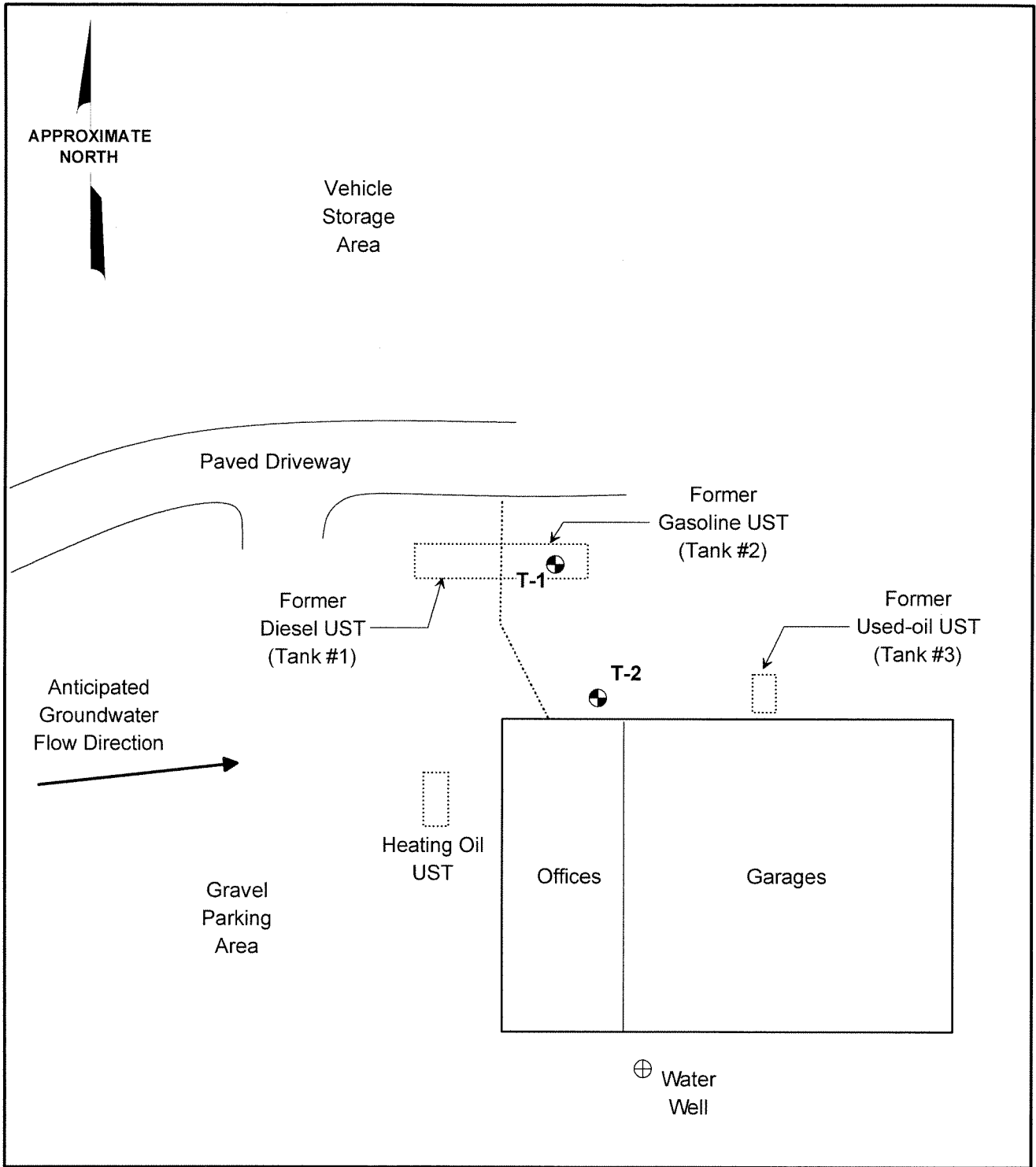
SITE LOCATION MAP

May 2004

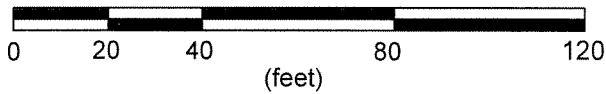
31-1-11192-005

 SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



APPROXIMATE SCALE: 1 inch = 40 feet



Boring Location



Approximate location of buried electrical line

ADOT&PF Tazlina Maintenance Station
Glennallen, Alaska

**SITE MAP
AND BORING LOCATIONS**

May 2004

31-1-11192-005



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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

APPENDIX A

Aerial Photographs

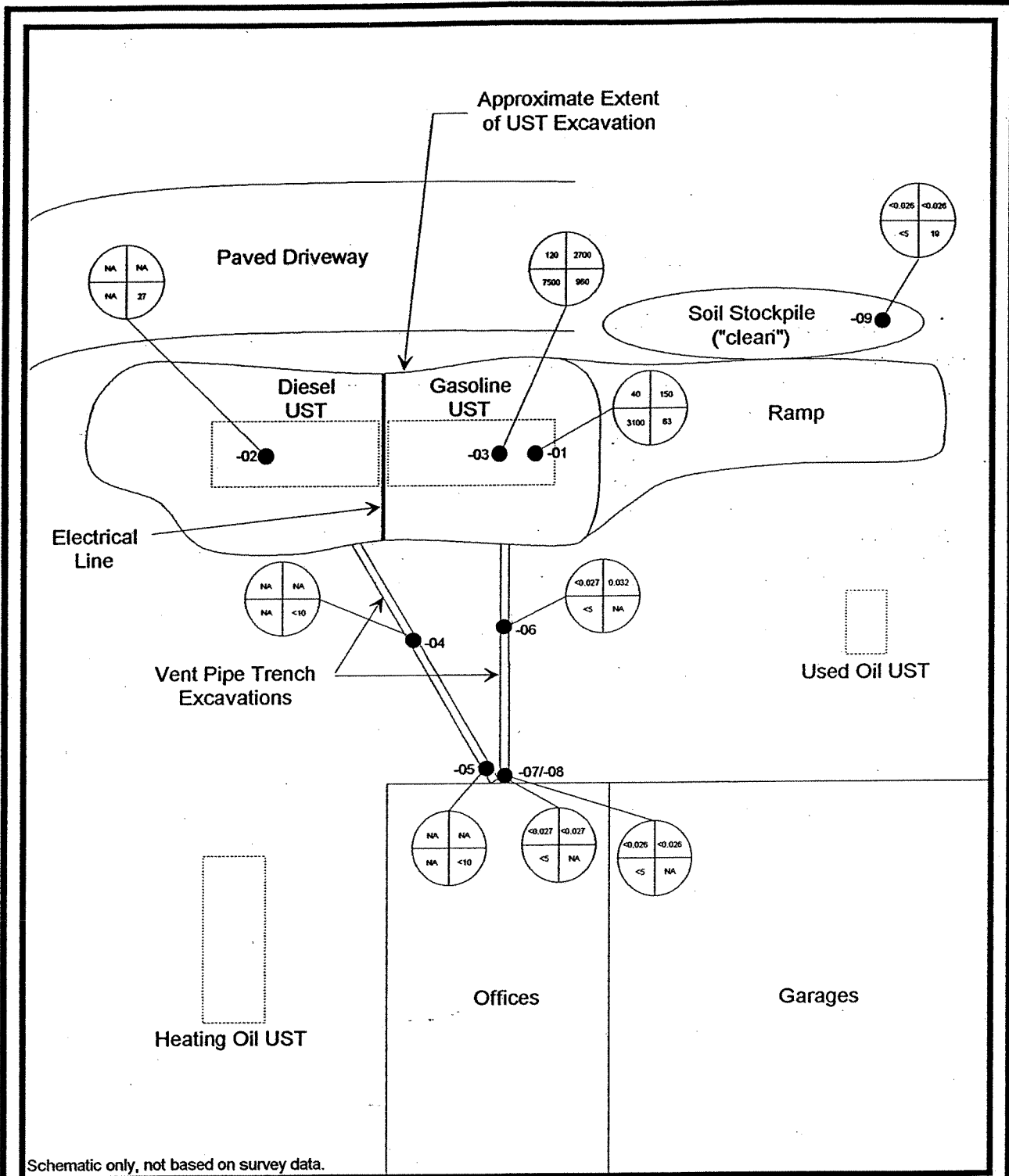
GLENNALLEN



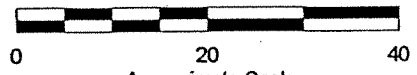
Alaska Dept. of Transportation & Public Facilities
Tazlina Maintenance Station
110 Mile, Richardson Highway, Alaska

APPENDIX B

Sample Location Map and Analytical Summary Tables (historical)



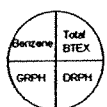
Schematic only, not based on survey data.



Approximate Scale
1 inch = 20 feet



Analytical soil sample location. Sample number prefixed by 23696-008.



Analytical results for benzene, total BTEX, GRPH, and DRPH analyses, reported in mg/kg. NA indicates analysis not performed.



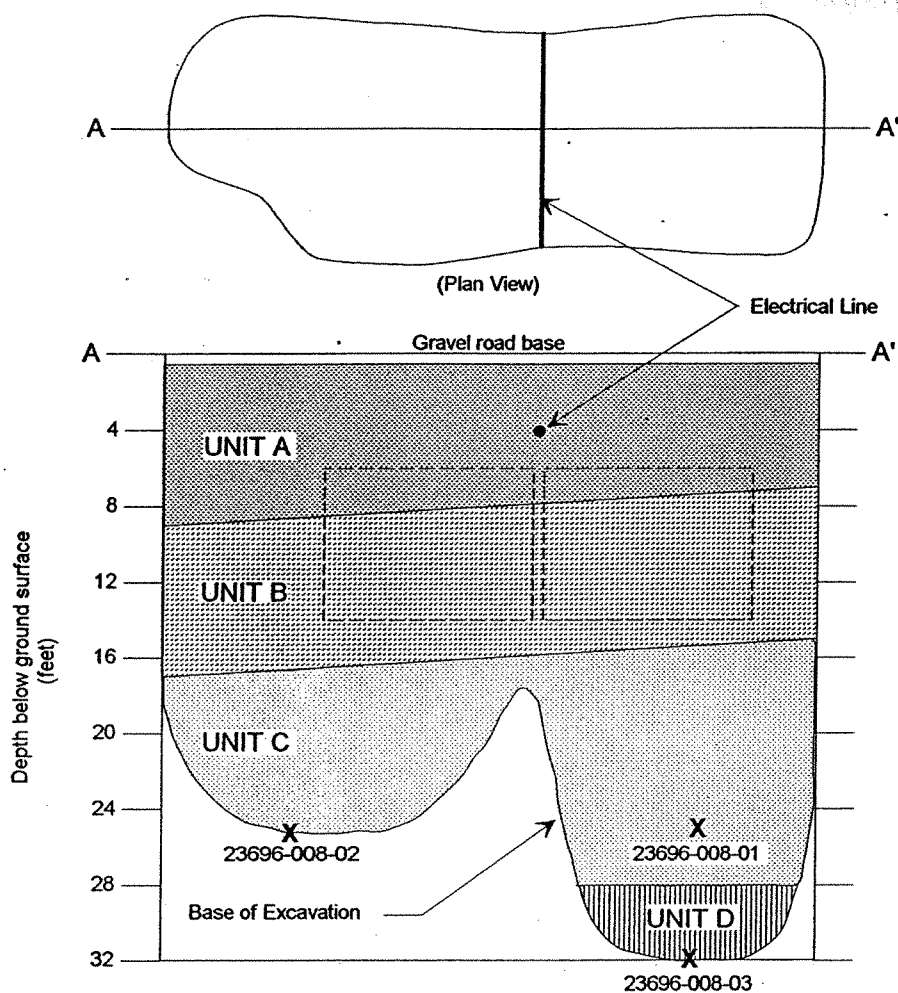
Approximate North

Alaska Department of Transportation & Public Facilities
Tazlina Maintenance Facility
Glennallen, Alaska

FIGURE 3
Soil Sample Locations



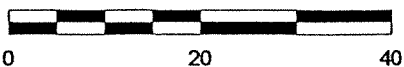
DAMES & MOORE



DESCRIPTIONS

- UNIT A:** Brown stratified Sand and Gravel with alternating layers of gravelly sand, sandy gravel, and gray clay. Soil is damp to dry and loosely packed. Hydrocarbon odor persists throughout the unit.
- UNIT B:** Greenish gray, massive, stiff, blocky clay. Variable hydrocarbon odor throughout the unit, typically increasing with depth. The lowest one foot of the unit is frozen but contains no visible ice.
- UNIT C:** Black stratified coarse sand and gravel with alternating layers of fine to coarse sand and coarse gravel which dip to the east at 20 to 30 degrees. The soil is dry and loosely packed. A strong hydrocarbon odor is present throughout the exposed portions of the unit.
- UNIT D:** Light gray, dry, powdery, frozen silt with no visible ice. The soil exhibits a strong hydrocarbon odor where exposed.

Schematic only, not based on survey data.



Approximate Horizontal Scale
1 inch = 20 feet
(Vertical exaggeration: 2 times)

X Soil sample location.

[] Location of former UST.



Approximate North

Alaska Department of Transportation
& Public Facilities
Tazlina Maintenance Facility
Glennallen, Alaska

FIGURE 4
Cross-section of UST Excavation



DAMES & MOORE

TABLE 1

**Headspace Gas Concentrations, Volatile Organic Compounds,
Gasoline Range Petroleum Hydrocarbons (GRPH),
Diesel Range Petroleum Hydrocarbons (DRPH), and
Hydrocarbon-degrading Bacteria Population in Soil,
Tazlina Maintenance Facility, Glennallen, Alaska**

Sample Number	Headspace Gas Concentration (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	GRPH (mg/kg)	DRPH (mg/kg)	Hydrocarbon-degrading bacteria (#/mg)
23696-008-01	1400	40	350 (a)	110	480 (a)	150	3100	63	-
23696-008-02	108	-	-	-	-	-	-	27	-
23696-008-03	1800	120	910	270	1400	2700	7500	960	-
23696-008-04	3	-	-	-	-	-	-	<10	-
23696-008-05	3	-	-	-	-	-	-	<10	-
23696-008-06	3	<0.027	0.032	<0.027	<0.027	0.032	<5	-	-
23696-008-07	5	<0.027	<0.027	<0.027	<0.027	<0.027	<5	-	-
23696-008-08	-	<0.026	<0.026	<0.026	<0.026	<0.026	<5	-	-
23696-008-09	<1	<0.026	<0.026	<0.026	<0.026	<0.026	<5	19	-
23696-008-10	-	-	-	-	-	-	-	-	58

- Indicates analysis not performed.

(a) Value from a 100 fold diluted analysis.

BTEX analysis by EPA Method 8020 (soil) and EPA Method 602 (water).

GRPH analysis by EPA Method 8015 Modified/ADEC Method AK 101.

DRPH analysis by EPA Method 8100 Modified/ADEC Method AK 102.

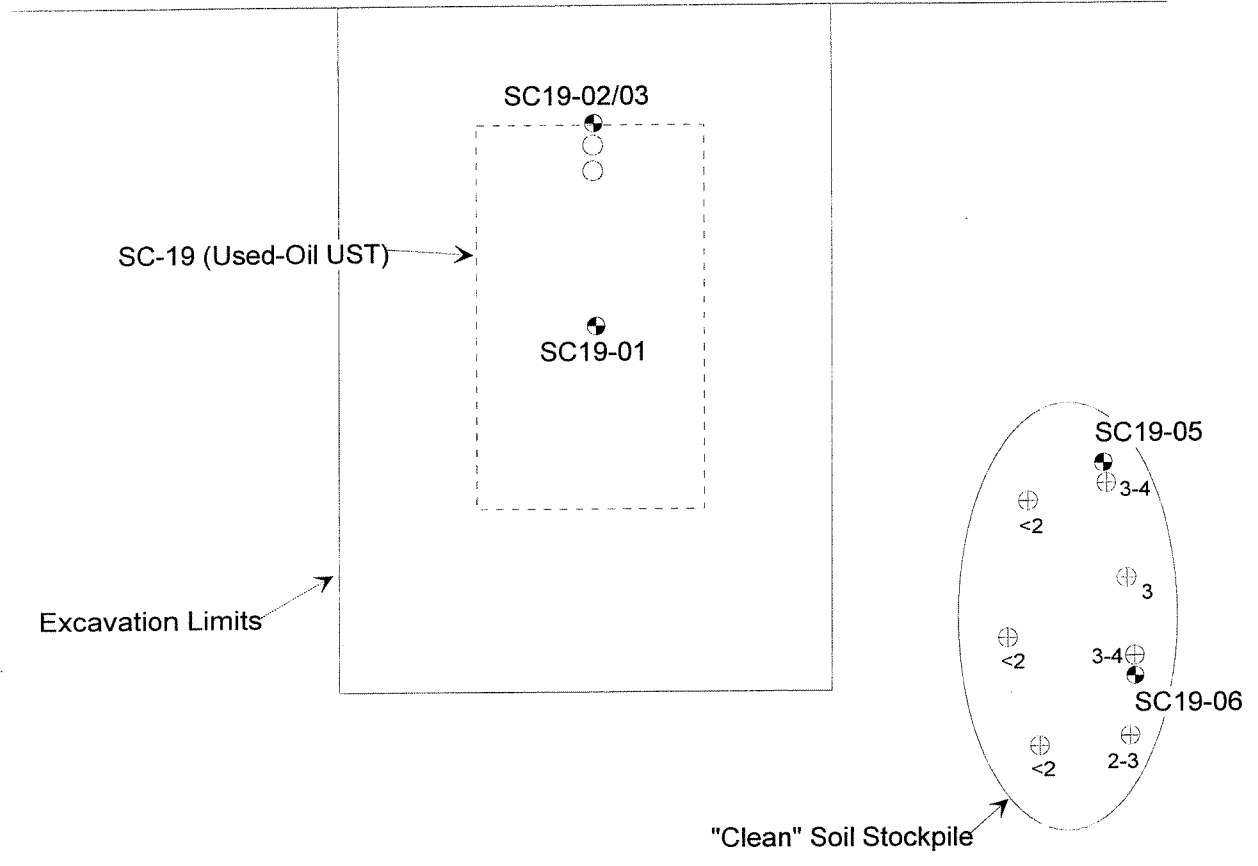


Building

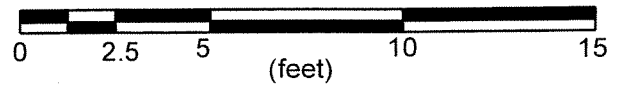
Bay Door

Bay Door

Concrete Walk



APPROXIMATE SCALE: 1 inch = 5 feet



- Sample Location and Number
- ⊕ Field Screening Location and PID Reading (ppm)

UST Closure Site Assessment ADOT&PF Maintenance Station, Tazlina, Alaska	
SOIL SAMPLE LOCATIONS TANK SC-19	
October 1997	X-0872
 SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	Fig. 2

**Table 2 - Soil Analytical Results
Tazlina Maintenance Station**

SHANNON & WILSON, INC.

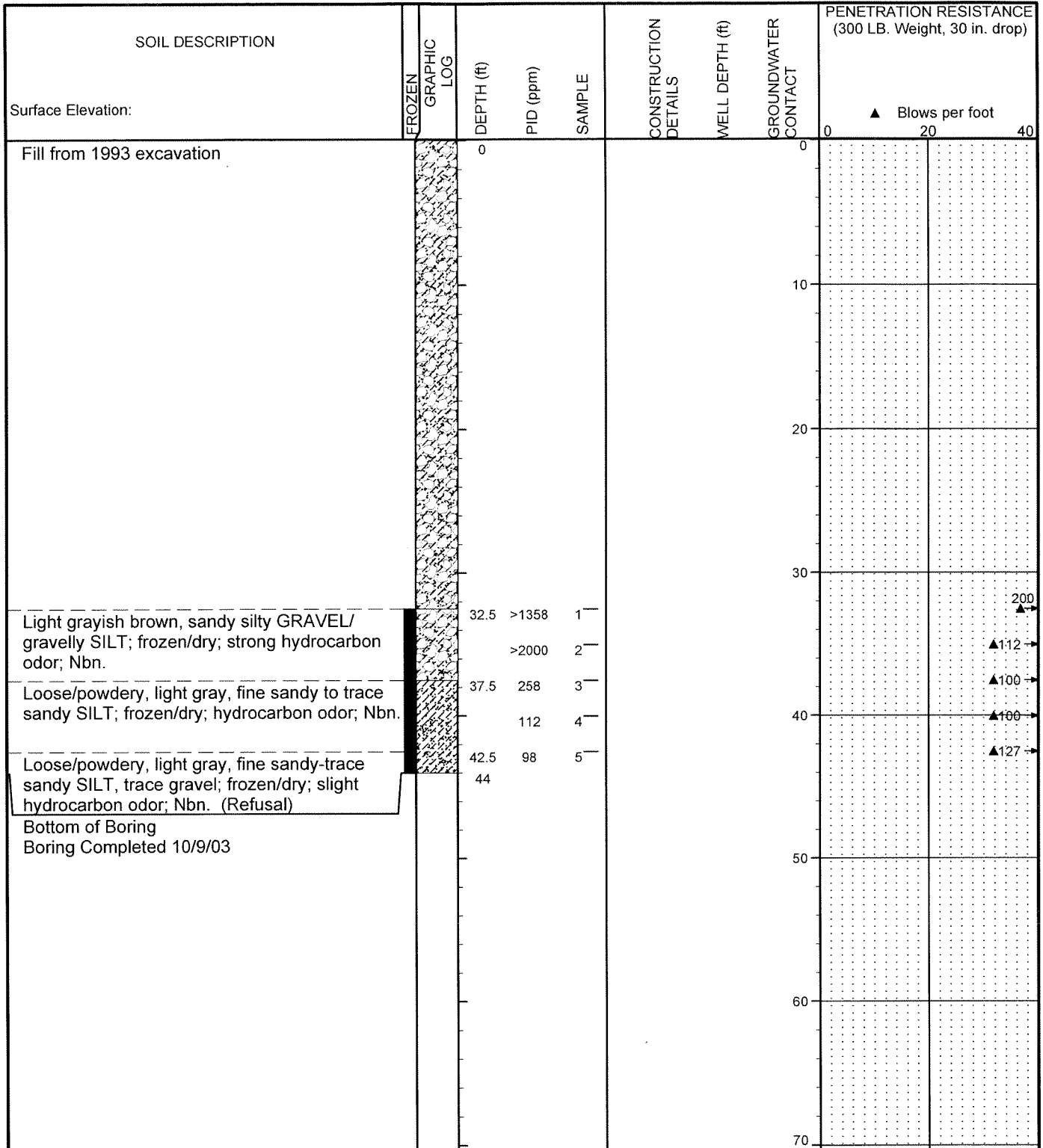
Soil Samples from Excavation Limits and Stockpiles (mg/dry kg) unless specified																
Sample #	Date	Sample		RRO	DRO	GRO	benzene	toluene	ethyl-	total	HVO	PCBs	arsenic	cadmium	chromium	lead
		Location	Depth (ft.)						benzene	xylenes						
SC19-01	8/9/97	Center of Tank	9.5	570	250	<2.0	0.047	0.058	<0.0099	<0.0099	ND	<0.035	4.2	<0.53	28	2.8
SC19-02	8/9/97	Fill End	9.5	790	340	<2.2	<0.011	0.026	<0.011	0.017	ND	<0.036	4.5	<0.54	28	4.3
SC19-03	8/9/97	duplicate of -02	9.5	2400	1000	<2.3	<0.011	0.02	<0.011	0.02	ND	<0.036	3.2	<0.55	23	3.7
SC19-04	8/9/97	Contaminated Stockpile	1.5	4900	1900	<2.4	<0.012	<0.012	<0.012	0.02	0.026*	<0.035	3.9	<0.57	23	4.8
SC19-05	8/9/97	Temporary Stockpile	1.5	190	62	---	---	---	---	---	ND	---	---	---	---	---
SC19-06	8/9/97	Temporary Stockpile	1.5	240	79	---	---	---	---	---	ND	---	---	---	---	---

Note:

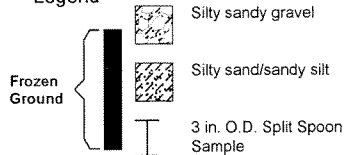
- Depth - Measured from ground surface
- RRO = Residual range organics
- DRO = Diesel range organics
- GRO = Gasoline range organics
- HVO = Halogenated volatile organics
- PCBs = Polychlorinated biphenols
- = Parameter or analytes not analyzed
- < 11 = Concentration not in excess of laboratory detection limit shown
- ND = Analysis includes a number of analytes with various detection limits, see laboratory report for detection limits
- * = Result corresponds to tetrachloroethylene

APPENDIX C

Soil Boring Logs



Legend



Note: Stratification lines represent approximate boundaries between soil types and transition may be gradual.

ADOT&PF Tazlina Maintenance Station
Glennallen, Alaska

LOG OF BORING T-1

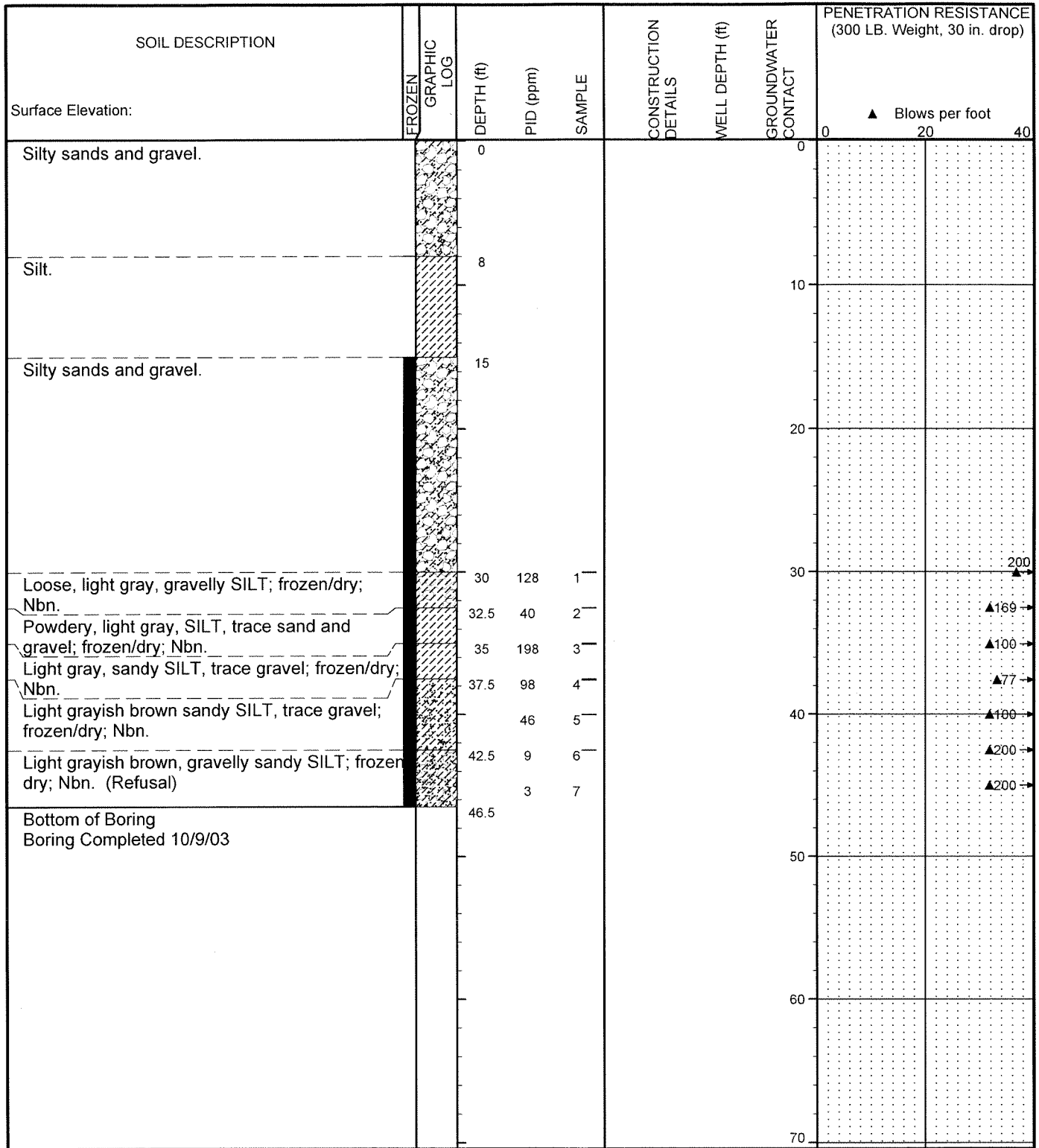
May 2004

31-1-11192-005

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure C-1

Sheet 1 of 1



Legend

- Silty sandy gravel
 - Silt
 - Silty gravel
 - Silty sand/sandy silt
 - 3 in. O.D. Split Spoon Sample
- Frozen Ground

Note: Stratification lines represent approximate boundaries between soil types and transition may be gradual.

ADOT&PF Tazlina Maintenance Station
Glennallen, Alaska

LOG OF BORING T-2

May 2004

31-1-11192-005

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure C-2

Sheet 1 of 1

APPENDIX D

SGS Analytical Laboratory Report



**SGS/CT&E Environmental Services
Alaska Division
Level I Data Report**

Project: 31-1-11192-005 Tazlina/DOT
Client: Shannon & Wilson-Fairbanks
CT&E Work Order: 1036817

Contents:

Case Narrative
Chain of Custody/Sample Rec Form
Final Report Pages
QC Summary Pages

Note:
Unless otherwise noted, all quality assurance/quality control criteria are in compliance with the proper regulatory authority and/or SGS's Quality Assurance Program Plan.



Case Narrative

Client SHANFBK Shannon & Wilson-Fairbanks
Workorder 1036817 31-1-11192-005 Tazlina/DOT

Printed Date/Time 10/24/2003 15:04

Sample ID	Client Sample ID
522240	MS
DRO - MS/MSD spike recoveries are outside controls. See the LCS for accuracy.	
522241	MSD
DRO - MS/MSD spike recoveries are outside controls. See the LCS for accuracy.	
522508	MS
GRO/BTEX - BFB surrogate recovery is biased high due to matrix interference. GRO/BTEX - MS recovery for o-xylene is biased low. GRO/BTEX - MS/MSD RPD for GRO is outside QC goals.	
522509	MSD
GRO/BTEX - BFB surrogate recovery is biased high due to matrix interference. GRO/BTEX - MSD recoveries for ethylbenzene, p&m-xylene Xo-xylene are biased low. GRO/BTEX - MSD recovery for GRO is biased high. GRO/BTEX - MS/MSD RPD for GRO is outside QC goals.	
522969	MS
GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control.	
522970	MSD
GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control.	
523107	MS
DRO - MS/MSD spike recoveries are outside controls. Sample recovery is greater than four times the spike concentration.	
523108	MSD
DRO - MS/MSD spike recoveries are outside controls. Sample recovery is greater than four times the spike concentration.	
1036817001	PS 1192-100903-T1-2
DRO - The pattern is consistent with a weathered gasoline. GRO/BTEX - BFB surrogate recovery is outside QC goals (biased high) due to hydrocarbon interference.	
1036817002	PS 1192-100903-T1-3
GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control. DRO - The pattern is consistent with a weathered middle distillate.	
1036817007	TB



Case Narrative

Client SHANFBK Shannon & Wilson-Fairbanks
Workorder 1036817 31-1-11192-005 Tazlina/DOT

Printed Date/Time 10/24/2003 15:04

Sample ID **Client Sample ID**
GRO/BTEX - Results are from 1036816007.

1036817

Shannon & Wilson, Inc.

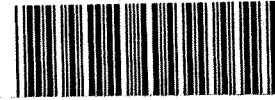
400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

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

Chain of Custody Record



Page 1 of 1
Laboratory SGS
Attn: Melody

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

Sample Identity	Lab No.	Time	Date Sampled	GRO/BTEX			DRO	Total Number of Containers	Remarks/Matrix
				Comp.	Grab				
1192-100903-T1-2	①A-B	3:45	10/9/03	X	X	X		SOIL ↓	
1192-100903-T1-3	②A-B	4:55	10/9/03	X	X	X			
1192-100903-T1-5	③A-B	5:45	10/9/03	X	X	X			
1192-100903-T2-4	④A-B	11:20	10/9/03	X	X	X			
1192-100903-T2-6	⑤A-B	12:10	10/9/03	X	X	X			
1192-100803-T2-1	⑥A-B	12:45	10/8/03	X	X	X			

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-1192-005</u>	Total Number of Containers: <u>12</u>	COC Seals/Intact? <u>Y/N/NA</u>	Received Good Cond./Cold: <u>48°C</u>	Signature: <u>[Signature]</u>	Time: <u>12:45</u>	Signature: <u>[Signature]</u>	Time: <u>4:30 PM</u>	Signature: _____	Time: _____
Project Name: <u>TARLINA/DOT</u>	Delivery Method: <u>Hand</u>	(attach shipping bill, if any)		Printed Name: <u>Andrea Carlson</u>	Date: <u>10/13/03</u>	Printed Name: <u>Melody Debenham</u>	Date: <u>10/13/03</u>	Printed Name: _____	Date: _____
Contact: <u>MARK LOCKWOOD</u>	Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>			Company: <u>SRW</u>		Company: <u>SGS</u>		Company: _____	
Sampler: <u>ANDREA CARLSON</u>				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turn Around Time: <u>STANDARD</u>				Signature: <u>[Signature]</u>	Time: <u>12:45</u>	Signature: _____	Time: _____	Signature: _____	Time: <u>0850</u>
Special Instructions: <u>LEVEL I & EDD</u>				Printed Name: <u>Melody Debenham</u>	Date: <u>10/13/03</u>	Printed Name: _____	Date: _____	Printed Name: <u>James Johnson</u>	Date: <u>10-14-03</u>
Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File				Company: <u>SGS</u>		Company: _____		Company: <u>SGS</u>	



SGS

SAMPLE RECEIPT FORM

CT&E WO#:

1036817



Yes	No	NA	
	<input checked="" type="checkbox"/>		Are samples RUSH, priority, or within 72 hrs. of hold time?
		<input checked="" type="checkbox"/>	If yes have you done e-mail notification?
	<input checked="" type="checkbox"/>		Are samples within 24 hrs. of hold time or due date?
		<input checked="" type="checkbox"/>	If yes, have you spoken with Supervisor?
	<input checked="" type="checkbox"/>		Archiving bottles - if required, are they properly marked?
	<input checked="" type="checkbox"/>		Are there any problems? PM Notified? _____
<input checked="" type="checkbox"/>			Were samples preserved correctly and pH verified? <u>MD</u>
	<input checked="" type="checkbox"/>		If this is for PWS, provide PWSID. _____
	<input checked="" type="checkbox"/>		Will courier charges apply? _____
	<input checked="" type="checkbox"/>		Method of payment? _____
	<input checked="" type="checkbox"/>		Data package required? (Level: <u>1</u> 2 / 3)
	<input checked="" type="checkbox"/>		Notes: _____
	<input checked="" type="checkbox"/>		Is this a DoD project? (USACE, Navy, AFCEE)

Due Date: 10/20/03

Received Date: 10/13/03

Received Time: 1245 pm

Is date/time conversion necessary? NO

of hours from AK Standard Time:

Received Temperature*: _____ °C

Thermometer ID: long stem

Cooler ID	Temp Blank	Cooler Temp
<u>1</u>	<u>4.8</u> °C	<u>4.7</u> °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C

*Temperature readings include thermometer correction factors

Delivery method (circle all that apply): Client

Alert Courier / UPS / FedEx / USPS /
AA Goldstreak / NAC / ERA / PenAir / Carlie
Lynden / SGS-CT&E / Other: _____

Airbill # _____

Additional Sample Remarks: (✓ if applicable)

Extra Sample Volume? _____

Limited Sample Volume? _____

Field preserved for volatiles?

Field-filtered for dissolved? _____

Lab-filtered for dissolved? _____

Ref Lab required? _____

Foreign Soil? _____

This section must be filled out for DoD projects. (USACE, Navy, AFCEE)

Yes	No	
_____	_____	Is received temperature 4 ± 2°C?
_____	_____	Exceptions: _____ Samples/Analyses Affected: _____
_____	_____	_____
_____	_____	_____
_____	_____	Rad. Screen performed?
_____	_____	Result: _____
_____	_____	Was there an airbill? (Note # above in the right hand column)
_____	_____	Was cooler sealed with custody seals? Faxed to COE? _____
_____	_____	# / where: _____
_____	_____	Were seal(s) intact upon arrival?
_____	_____	Was there a COC with cooler?
_____	_____	Was the COC filled out properly?
_____	_____	Did the COC indicate ACOE / AFCEE project? (if applicable)
_____	_____	Did the COC and samples correspond?
_____	_____	Were all sample packed to prevent breakage?
_____	_____	Packing material: _____
_____	_____	Were all samples unbroken and clearly labeled?
_____	_____	Were all samples sealed in separate plastic bags?
_____	_____	Were all bottles for volatiles free of headspace?
_____	_____	Were correct container / sample sizes submitted?
_____	_____	Is sample condition good?

This section must be filled if problems are found

Yes	No	
_____	_____	Was client notified of problems?
_____	_____	Individual contacted: _____
_____	_____	Date/Time: _____
_____	_____	Phone/Fax: _____
_____	_____	Reason for contact: _____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	SGS/CT&E Contact: _____

Notes: Associated trip blank on wo 1036816 (all samples were in the same cooler).

Completed by (sign): Melody Debenham (print): Melody Debenham

Login proof (check one): waived _____ required performed by: _____

SGS

CT&E WO#:

1036817



SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII.
NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: _____

Receipt Date / Time: 10-14-03 0850
Is Sample Date/Time Conversion Necessary? Yes _____ No
Number of Hours From Alaska Standard Time: _____
Foreign Soil? Yes _____ No

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank	Cooler	Cooler ID	Temp Blank	Cooler
<u>1</u>	<u>3.2</u>	<u>5.1</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

CUSTODY SEALS INTACT: YES / NO # / WHERE: Car front, loadback
COMPLETED BY (INITIAL): SLJ

*Temperature readings include thermometer correction factors.

1036817

Signature: Melody Debarhan
Date/Time: 10/13/03 @ 4:30 pm

CT&E Environmental Services Inc.
CUSTODY SEAL



TB=3.2
C=5.1

CT&E Environmental Services Inc.
CUSTODY SEAL

Signature: Melody Debarhan
Date/Time: 10/13/03 @ 4:30 pm



Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.sgsevenvironmental.com>

Mark Lockwood
Shannon & Wilson-Fairbanks
2355 Hill Rd
Fairbanks, AK 99709

Work Order: 1036817
31-1-11192-005 Tazlina/DOT
Client: Shannon & Wilson-Fairbanks
Report Date: October 24, 2003

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Control Manual that outlines this program is available at your request. The laboratory ADEC certification numbers are AK08-03 (DW), UST-005 (CS) and AK0008 (Micro).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference.

If you have any questions regarding this report or if we can be of any other assistance, please call your SGS Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- PQL Practical Quantitation Limit (reporting limit).
- U Indicates the analyte was analyzed for but not detected.
- F Indicates an estimated value that falls below PQL, but is greater than the MDL.
- J The quantitation is an estimation.
- B Indicates the analyte is found in a blank associated with the sample.
- * The analyte has exceeded allowable regulatory or control limits.
- GT Greater Than
- D The analyte concentration is the result of a dilution.
- LT Less Than
- ! Surrogate out of control limits.
- Q QC parameter out of acceptance range.
- M A matrix effect was present.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- E The analyte result is high outside of calibrated range.

Note: Soil samples are reported on a dry weight basis unless otherwise specified.



SGS Ref.# 1036817001
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Client Sample ID 1192-100903-T1-2
Matrix Soil/Solid

All Dates/Times are Alaska Standard Time
Printed Date/Time 10/24/2003 15:04
Collected Date/Time 10/09/2003 15:45
Received Date/Time 10/13/2003 12:45
Technical Director Stephen C. Ede

Released By 

Sample Remarks:

DRO - The pattern is consistent with a weathered gasoline.
 GRO/BTEX - BFB surrogate recovery is outside QC goals (biased high) due to hydrocarbon interference.

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		217	22.1	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		7.21	0.110	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		51.8	0.442	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		11.6	0.442	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		43.6	0.442	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		17.5	0.442	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		112		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		! 818		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		1000	217	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		132		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		93.6		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817002
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina/DOT
 Client Sample ID 1192-100903-T1-3
 Matrix Soil/Solid

All Dates/Times are Alaska Standard Time
 Printed Date/Time 10/24/2003 15:04
 Collected Date/Time 10/09/2003 16:55
 Received Date/Time 10/13/2003 12:45
 Technical Director Stephen C. Ede
 Released By *[Signature]*

Sample Remarks:

GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control.
 DRO - The pattern is consistent with a weathered middle distillate.

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		10.4	2.39	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		0.848	0.0120	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		2.81	0.0478	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		0.481	0.0478	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		1.94	0.0478	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		0.778	0.0478	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		102		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		103		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		1180	224	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		77.4		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		93.7		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817003
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Client Sample ID 1192-100903-T1-5
Matrix Soil/Solid

All Dates/Times are Alaska Standard Time

Printed Date/Time 10/24/2003 15:04
Collected Date/Time 10/09/2003 17:45
Received Date/Time 10/13/2003 12:45
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		6.98	2.05	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		0.676	0.0103	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		2.26	0.0410	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		0.319	0.0410	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		1.29	0.0410	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		0.494	0.0410	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		106		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		94		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		21.5 U	21.5	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		79.2		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		95.1		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817004
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina/DOT
 Client Sample ID 1192-100903-T2-4
 Matrix Soil/Solid

All Dates/Times are Alaska Standard Time

Printed Date/Time 10/24/2003 15:04
 Collected Date/Time 10/09/2003 11:20
 Received Date/Time 10/13/2003 12:45
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		5.65	2.17	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		0.674	0.0109	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		1.91	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		0.251	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		1.06	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		0.425	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		105		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		82		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		20.7 U	20.7	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		70.6		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		93.8		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817005
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina/DOT
 Client Sample ID 1192-100903-T2-6
 Matrix Soil/Solid

All Dates/Times are Alaska Standard Time
 Printed Date/Time 10/24/2003 15:04
 Collected Date/Time 10/09/2003 12:10
 Received Date/Time 10/13/2003 12:45
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		3.41	2.13	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		0.391	0.0107	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		1.18	0.0426	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		0.130	0.0426	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		0.513	0.0426	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		0.192	0.0426	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		101		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		86.3		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		21.1 U	21.1	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		68.3		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		93.4		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817006
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Client Sample ID 1192-100903-T2-1
Matrix Soil/Solid

All Dates/Times are Alaska Standard Time

Printed Date/Time 10/24/2003 15:04
Collected Date/Time 10/09/2003 12:45
Received Date/Time 10/13/2003 12:45
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		5.29	2.18	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Benzene		0.345	0.0109	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Toluene		1.44	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Ethylbenzene		0.286	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
P & M -Xylene		1.23	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
o-Xylene		0.547	0.0435	mg/Kg	AK101 8021B	A		10/09/03	10/19/03	MCM
Surrogates										
1,4-Difluorobenzene <surr>		102		%	AK101 8021B	A	76-113	10/09/03	10/19/03	MCM
4-Bromofluorobenzene <surr>		77.6		%	AK101 8021B	A	50-150	10/09/03	10/19/03	MCM
Semivolatile Organic Fuels Department										
Diesel Range Organics		21.3 U	21.3	mg/Kg	AK102	B		10/20/03	10/23/03	MCM
Surrogates										
5a Androstane <surr>		77.2		%	AK102	B	50-150	10/20/03	10/23/03	MCM
Solids										
Total Solids		92.7		%	SM20 2540G	B			10/14/03	CMT



SGS Ref.# 1036817007
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina/DOT
 Client Sample ID Trip Blank
 Matrix Soil/Solid

All Dates/Times are Alaska Standard Time
 Printed Date/Time 10/24/2003 15:04
 Collected Date/Time 10/07/2003 0:00
 Received Date/Time 10/13/2003 12:45
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:
 GRO/BTEX - Results are from 1036816007.

Parameter	Qualifiers	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics		2.55 U	2.55	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
Benzene		0.0128 U	0.0128	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
Toluene		0.0510 U	0.0510	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
Ethylbenzene		0.0510 U	0.0510	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
P & M -Xylene		0.0510 U	0.0510	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
o-Xylene		0.0510 U	0.0510	mg/Kg	AK101 8021B	A		10/07/03	10/16/03	MML
Surrogates										
1,4-Difluorobenzene <surr>		85.1		%	AK101 8021B	A	76-113	10/07/03	10/16/03	MML
4-Bromofluorobenzene <surr>		84.5		%	AK101 8021B	A	50-150	10/07/03	10/16/03	MML
Solids										
Total Solids		100		%	SM20 2540G	A			10/23/03	YHW



SGS Ref.# 522506 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch VXX 11020
Method AK101PR
Date 10/15/2003

QC results affect the following production samples:
1036817007

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Fuels Department					
Gasoline Range Organics	2.50 U	2.50	mg/Kg	10/15/03	MML
Benzene	0.0125 U	0.0125	mg/Kg	10/15/03	MML
Toluene	0.0500 U	0.0500	mg/Kg	10/15/03	MML
Ethylbenzene	0.0500 U	0.0500	mg/Kg	10/15/03	MML
P & M -Xylene	0.0500 U	0.0500	mg/Kg	10/15/03	MML
o-Xylene	0.0500 U	0.0500	mg/Kg	10/15/03	MML
Surrogates					
1,4-Difluorobenzene <surr>	85.8		%	10/15/03	MML
4-Bromofluorobenzene <surr>	86		%	10/15/03	MML
Batch	VFC 6073				
Method	AK101 8021B				
Instrument	HP 5890 Series II PID+FID VDA				



SGS Ref.# 522507 Lab Control Sample

Printed Date/Time 10/24/2003 15:04
Prep Batch VXX 11020
Method AK101PR
Date 10/15/2003

Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

QC results affect the following production samples:
1036817007

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department								
Gasoline Range Organics	LCS	7.74	69	(60-120)		11.3 mg/Kg	10/15/03	MML
Benzene	LCS	0.559	94	(65-125)		0.595 mg/Kg	10/15/03	MML
Toluene	LCS	1.79	87	(75-122)		2.07 mg/Kg	10/15/03	MML
Ethylbenzene	LCS	0.321	89	(81-120)		0.363 mg/Kg	10/15/03	MML
P & M -Xylene	LCS	1.15	93	(85-121)		1.23 mg/Kg	10/15/03	MML
o-Xylene	LCS	0.438	95	(85-118)		0.46 mg/Kg	10/15/03	MML
Surrogates								
1,4-Difluorobenzene <surr>	LCS		98	(76-113)		1.25 mg/Kg	10/15/03	MML
4-Bromofluorobenzene <surr>	LCS		94	(60-120)		1.25 mg/Kg	10/15/03	MML

Batch VFC 6073
Method AK101 8021B
Instrument HP 5890 Series II PID+FID VDA



SGS Ref.# 522508 Matrix Spike
522509 Matrix Spike Duplicate

Printed Date/Time 12/01/2003 12:40
Prep Batch VXX 11020
Method AK101 Extraction (S)
Date 10/15/2003

Original 1036816001
Matrix Soil/Solid

QC results affect the following production samples:
1036817007

Sample Remarks:

MS GRO/BTEX - BFB surrogate recovery is biased high due to matrix interference.
GRO/BTEX - MS recovery for o-xylene is biased low.
GRO/BTEX - MS/MSD RPD for GRO is outside QC goals.

MSD GRO/BTEX - BFB surrogate recovery is biased high due to matrix interference.
GRO/BTEX - MSD recoveries for ethylbenzene, p&m-xylene Xo-xylene are biased low.
GRO/BTEX - MSD recovery for GRO is biased high.
GRO/BTEX - MS/MSD RPD for GRO is outside QC goals.

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department										
o-Xylene	MS	1.18	1.40		82 * (85-118)			.387 mg/Kg	10/16/03	MML
	MSD		1.36		72 *	3	(< 20)	.387 mg/Kg	10/16/03	MML
Toluene	MS	0.0527	1.68		94 (75-122)			1.75 mg/Kg	10/16/03	MML
	MSD		1.65		92	2	(< 20)	1.75 mg/Kg	10/16/03	MML
P & M -Xylene	MS	2.36	3.15		97 (85-121)			1.04 mg/Kg	10/16/03	MML
	MSD		3.02		84 *	4	(< 20)	1.04 mg/Kg	10/16/03	MML
Ethylbenzene	MS	1.13	1.31		91 (81-120)			.305 mg/Kg	10/16/03	MML
	MSD		1.26		76 *	4	(< 20)	.305 mg/Kg	10/16/03	MML
Benzene	MS	0.0214	0.507		97 (65-125)			.501 mg/Kg	10/16/03	MML
	MSD		0.495		95	3	(< 20)	.501 mg/Kg	10/16/03	MML
Surrogates										
1,4-Difluorobenzene <surr>	MS				109 (76-113)			1050 ug/Kg	10/16/03	MML
	MSD				106	2		1050 ug/Kg	10/16/03	MML
4-Bromofluorobenzene <surr>	MS				2010 (50-150)			1050 ug/Kg	10/16/03	MML
	MSD				2020	1		1050 ug/Kg	10/16/03	MML

Batch VFC 6073
Method AK101 8021B
Instrument HP 5890 Series II PID+FID VDA



SGS Ref.# 522967 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch VXX 11038
Method AK101PR
Date 10/18/2003

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Fuels Department					
Gasoline Range Organics	2.50 U	2.50	mg/Kg	10/18/03	MCM
Benzene	0.0125 U	0.0125	mg/Kg	10/18/03	MCM
Toluene	0.0500 U	0.0500	mg/Kg	10/18/03	MCM
Ethylbenzene	0.0500 U	0.0500	mg/Kg	10/18/03	MCM
P & M -Xylene	0.0500 U	0.0500	mg/Kg	10/18/03	MCM
o-Xylene	0.0500 U	0.0500	mg/Kg	10/18/03	MCM
Surrogates					
1,4-Difluorobenzene <surr>	96.5		%	10/18/03	MCM
4-Bromofluorobenzene <surr>	79.5		%	10/18/03	MCM
Batch	VFC 6078				
Method	AK101 8021B				
Instrument	HP 5890 Series II PID+HECD VBA				



SGS Ref.# 522968 Lab Control Sample

Printed Date/Time 10/24/2003 15:04
Prep Batch VXX 11038
Method AK101PR
Date 10/18/2003

Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

QC results affect the following production samples:
1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department								
Gasoline Range Organics	LCS	8.45	75	(60-120)		11.3 mg/Kg	10/18/03	MCM
Benzene	LCS	0.660	111	(65-125)		0.595 mg/Kg	10/18/03	MCM
Toluene	LCS	2.14	103	(75-122)		2.07 mg/Kg	10/18/03	MCM
Ethylbenzene	LCS	0.405	112	(81-120)		0.363 mg/Kg	10/18/03	MCM
P & M -Xylene	LCS	1.37	111	(85-121)		1.23 mg/Kg	10/18/03	MCM
o-Xylene	LCS	0.517	112	(85-118)		0.46 mg/Kg	10/18/03	MCM
Surrogates								
1,4-Difluorobenzene <surr>	LCS		107	(76-113)		1.25 mg/Kg	10/18/03	MCM
4-Bromofluorobenzene <surr>	LCS		89	(60-120)		1.25 mg/Kg	10/18/03	MCM

Batch VFC 6078
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 522969
522970

Matrix Spike
Matrix Spike Duplicate

Printed Date/Time 10/24/2003 15:04
Prep Batch VXX 11038
Method AK101 Extraction (S)
Date 10/18/2003

Original 1036817002
Matrix Soil/Solid

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

MS GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control.
MSD GRO/BTEX - MS and MSD recovery for BTEX is outside QC goals (biased high) due to hydrocarbon interference. See LCS for control.

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department										
Ethylbenzene	MS	0.481	0.878		132 * (81-120)			0.325 mg/Kg	10/19/03	MCM
	MSD		0.949		153 *	8	(< 20)	0.325 mg/Kg	10/19/03	MCM
o-Xylene	MS	0.778	1.26		130 * (85-118)			0.412 mg/Kg	10/19/03	MCM
	MSD		1.35		151 *	7	(< 20)	0.412 mg/Kg	10/19/03	MCM
Toluene	MS	2.81	4.70		112 (75-122)			1.85 mg/Kg	10/19/03	MCM
	MSD		5.02		129 *	7	(< 20)	1.85 mg/Kg	10/19/03	MCM
Gasoline Range Organics	MS	10.4	18.1		84 (60-120)			10.1 mg/Kg	10/19/03	MCM
	MSD		19.2		94	5	(< 20)	10.1 mg/Kg	10/19/03	MCM
Benzene	MS	0.848	1.56		144 * (65-125)			0.532 mg/Kg	10/19/03	MCM
	MSD		1.66		163 *	6	(< 20)	0.532 mg/Kg	10/19/03	MCM
P & M -Xylene	MS	1.94	3.18		123 * (85-121)			1.11 mg/Kg	10/19/03	MCM
	MSD		3.42		145 *	7	(< 20)	1.11 mg/Kg	10/19/03	MCM
Surrogates										
4-Bromofluorobenzene <surr>	MS				105 (50-150)			1.12 mg/Kg	10/19/03	MCM
	MSD				109	3		1.12 mg/Kg	10/19/03	MCM
1,4-Difluorobenzene <surr>	MS				106 (76-113)			1.12 mg/Kg	10/19/03	MCM
	MSD				108	2		1.12 mg/Kg	10/19/03	MCM

Batch VFC 6078
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 522112 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch XXX 12700
Method SW3550B
Date 10/15/2003

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Semivolatile Organic Fuels Department					
Diesel Range Organics	2.96F	20.0	mg/Kg	10/17/03	MCM
Residual Range Organics	20.0 U	20.0	mg/Kg	10/17/03	MCM
Surrogates					
n-Triacontane-d62 <surr>	72.4		%	10/17/03	MCM
5a Androstane <surr>	57.4		%	10/17/03	MCM
Batch	XFC 5980				
Method	AK102 103				
Instrument	HP 5890 Series II FID SV C F				



SGS Ref.# 522113 Lab Control Sample

Printed Date/Time 10/24/2003 15:04
Prep Batch XXX 12700
Method SW3550B
Date 10/15/2003

Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS	181	108	(75-125)		167 mg/Kg	10/17/03	MCM
Residual Range Organics	LCS	138	83	(60-120)		167 mg/Kg	10/17/03	MCM
Surrogates								
n-Triacontane-d62 <surr>	LCS		76	(60-120)		3.33 mg/Kg	10/17/03	MCM
5a Androstane <surr>	LCS		88	(60-120)		3.33 mg/Kg	10/17/03	MCM

Batch XFC 5980
Method AK102 103
Instrument HP 5890 Series II FID SV C F



SGS Ref.# 522240 Matrix Spike
522241 Matrix Spike Duplicate

Printed Date/Time 10/24/2003 15:04
Prep Batch XXX 12700
Method Sonication Extraction Soil AK
Date 10/15/2003

Original 1036818005
Matrix Soil/Solid

QC results affect the following production samples:
1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:
MS DRO - MS/MSD spike recoveries are outside controls. See the LCS for accuracy.
MSD DRO - MS/MSD spike recoveries are outside controls. See the LCS for accuracy.

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Semivolatile Organic Fuels Department										
Diesel Range Organics	MS	188	626		158 * (60-140)			281 mg/Kg	10/20/03	MCM
	MSD		639		148 *	2	(< 50)	310 mg/Kg	10/20/03	MCM
Surrogates										
n-Triacontane-d62 <surr>	MS				96 (50-150)			5.63 mg/Kg	10/20/03	MCM
	MSD				94	8		6.21 mg/Kg	10/20/03	MCM
5a Androstane <surr>	MS				126 (50-150)			5.63 mg/Kg	10/20/03	MCM
	MSD				120	5		6.21 mg/Kg	10/20/03	MCM
Batch	XFC 5981									
Method	AK102 103									
Instrument	HP 5890 Series II FID SV C F									



SGS Ref.# 523092 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch XXX 12722
Method SW3550B
Date 10/20/2003

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Semivolatile Organic Fuels Department					
Diesel Range Organics	20.0 U	20.0	mg/Kg	10/23/03	MCM
Residual Range Organics	6.68F	20.0	mg/Kg	10/23/03	MCM
Surrogates					
5a Androstane <surr>	80		%	10/23/03	MCM
n-Triacontane-d62 <surr>	76.7		%	10/23/03	MCM
Batch	XFC 5987				
Method	AK102 103				
Instrument	HP 5890 Series II FID SV C F				



SGS Ref.# 523093 Lab Control Sample
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina/DOT
 Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
 Prep Batch XXX 12722
 Method SW3550B
 Date 10/20/2003

QC results affect the following production samples:
 1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:
 LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS	152	92	(75-125)		167 mg/Kg	10/23/03	MCM
Residual Range Organics	LCS	125	75	(60-120)		167 mg/Kg	10/23/03	MCM
Surrogates								
n-Triacontane-d62 <surr>	LCS		69	(60-120)		3.33 mg/Kg	10/23/03	MCM
5a Androstane <surr>	LCS		72	(60-120)		3.33 mg/Kg	10/23/03	MCM

Batch XFC 5987
 Method AK102 103
 Instrument HP 5890 Series II FID SV C F



SGS Ref.# 522118 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch
Method
Date

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Solids					
Total Solids	100		%	10/14/03	CMT
Batch	SPT 5273				
Method	SM20 2540G				
Instrument					



SGS Ref.# 522119 Duplicate
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Original 1036817006
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch
Method
Date

QC results affect the following production samples:

1036817001, 1036817002, 1036817003, 1036817004, 1036817005, 1036817006

Sample Remarks:

Parameter	Original Result	QC Result	RPD	RPD Limits	Analysis Date	Init
Solids						
Total Solids	92.7	92.5	0	(< 5)	10/14/03	CMT
Batch	SPT 5273					
Method	SM20 2540G					
Instrument						



SGS Ref.# 523675 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Matrix Soil/Solid

Printed Date/Time 10/24/2003 15:04
Prep Batch
Method
Date

QC results affect the following production samples:

1036817007

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Solids					
Total Solids	100		%	10/23/03	YHW
Batch	SPT 5291				
Method	SM20 2540G				
Instrument					



SGS Ref.# 523676 Duplicate
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina/DOT
Original 1036778002
Matrix Soil/Solid

Printed Date/Time 10/27/2003 14:19
Prep Batch
Method
Date

QC results affect the following production samples:

1036817007

Sample Remarks:

Parameter	Original Result	QC Result	RPD	RPD Limits	Analysis Date	Init
Solids						
Total Solids	90.7	90.1	1	(< 5)	10/23/03	YHW
Batch	SPT 5291					
Method	SM20 2540G					
Instrument						



**SGS/CT&E Environmental Services
Alaska Division
Level I Laboratory Data Report**

Project: 31-1-11192-005 Tazlina ADOT
Client: Shannon & Wilson-Fairbanks
SGS/CT&E Work Order: 1040064

Released by: (Signature) Stephen C. Ede
(Printed Name) Stephen C. Ede
(Title) Technical Director
(Date) 1/24/04

Contents:

Case Narrative
Chain of Custody/Sample Rec Form
Final Report Pages
QC Summary Pages

Note:

Unless otherwise noted, all quality assurance/quality control criteria are in compliance with the standards set forth by the proper regulatory authority, the SGS Quality Assurance Program Plan, and the National Environmental Laboratory Accreditation Conference.

This report contains a total number of 17 pages.



Case Narrative

Client SHANFBK Shannon & Wilson-Fairbanks
Workorder 1040064 31-1-11192-005 Tazlina ADOT

Printed Date/Time 1/22/2004 10:33

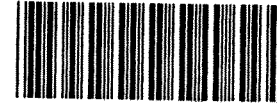
Sample ID Client Sample ID

536090 LCS
DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls.

536091 LCSD
DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls.

1040064001 PS 1192-011204-TAZWELL
DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls. Samples re-extracted past hold time, results confirm.

1040064



Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020
 11500 Olive Blvd., Suite 276 St. Louis, MO 63141 (314) 872-8170
 2055 Hill Road Fairbanks, AK 99707 (907) 479-0600
 5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120

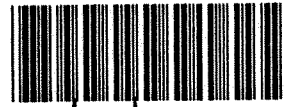
Chain of Custody Record

Page 1 of 1
 Laboratory SGS
 Attn: Melody

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	DRO	GRO	BTEX	Total Number of Containers	Remarks/Matrix
1192-011204-TAZWELL	① A-E	17:25	1/12/04			X	X	X	5	water

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-1192-005</u>	Total Number of Containers	COC Seals/Intact? Y/N/NA		Signature: <u>[Signature]</u>	Time: <u>15:05</u>	Signature: <u>Melody Debenham</u>	Time: <u>4:30 PM</u>	Signature: _____	Time: _____
Project Name: <u>Tazlina ADOT</u>	Received Good Cond./Cold	Delivery Method:		Printed Name: <u>MARK LOCKWOOD</u>	Date: <u>1/14/04</u>	Printed Name: <u>Melody Debenham</u>	Date: <u>1/14/04</u>	Printed Name: _____	Date: _____
Contact: <u>MARK LOCKWOOD</u>	(attach shipping bill, if any)	Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Company: <u>SEW</u>		Company: <u>SGS</u>		Company: _____	
Sampler: <u>[Signature]</u>	Instructions		Received By: 1.		Received By: 2.		Received By: 3.		
Requested Turn Around Time: <u>STANDARD</u>	Special Instructions: <u>report trip blank from 0063</u>		Signature: <u>Melody Debenham</u>	Time: <u>15:05</u>	Signature: _____	Time: _____	Signature: _____	Time: <u>0900</u>	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File			Printed Name: <u>Melody Debenham</u>	Date: <u>1/14/04</u>	Printed Name: _____	Date: _____	Printed Name: <u>[Signature]</u>	Date: <u>1-15-04</u>	
			Company: <u>SGS</u>		Company: _____		Company: <u>SGS</u>		



SAMPLE RECEIPT FORM

CT&E WO#:

Yes No NA

- Are samples RUSH, priority, or within 72 hrs. of hold time?
- If yes have you done e-mail notification?
- Are samples within 24 hrs. of hold time or due date?
- If yes, have you spoken with Supervisor?
- Archiving bottles – if required, are they properly marked?
- Are there any problems? PM Notified? _____
- Were samples preserved correctly and pH verified?

Due Date: 1/21/04
 Received Date: 1/14/04
 Received Time: 3:05 PM
 Is date/time conversion necessary? NO
 # of hours from AK Standard Time: _____
 Received Temperature*: _____ °C
 Thermometer ID: long stem

Cooler ID	Temp Blank	Cooler Temp
<u>1</u>	<u>3.3</u> °C	<u>3.1</u> °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C

- If this is for PWS, provide PWSID. _____
- Will courier charges apply?
- Method of payment? _____
- Data package required? (Level: 1 / 2 / 3)
- Notes: _____
- Is this a DoD project? (USACE, Navy, AFCEE)

*Temperature readings include thermometer correction factors
 Delivery method (circle all that apply): Client
 Alert Courier / UPS / FedEx / USPS /
 AA Goldstreak / NAC / ERA / PenAir / Carlisle
 Lynden / SGS-CT&E / Other: _____

This section must be filled out for DoD projects (USACE, Navy, AFCEE)

Yes	No		Samples/Analyses Affected:
_____	_____	Is received temperature $4 \pm 2^\circ\text{C}$?	_____
_____	_____	Exceptions:	_____
_____	_____	Rad Screen performed?	_____
_____	_____	Result:	_____
_____	_____	Was there an airbill? (Note # above in the right hand column)	_____
_____	_____	Was cooler sealed with custody seals? Faxed to COE? # / where:	_____
_____	_____	Were seal(s) intact upon arrival?	_____
_____	_____	Was there a COC with cooler?	_____
_____	_____	Was the COC filled out properly?	_____
_____	_____	Did the COC indicate ACOE / AFCEE project? (if applicable)	_____
_____	_____	Did the COC and samples correspond?	_____
_____	_____	Were all sample packed to prevent breakage?	_____
_____	_____	Packing material:	_____
_____	_____	Were all samples unbroken and clearly labeled?	_____
_____	_____	Were all samples sealed in separate plastic bags?	_____
_____	_____	Were all bottles for volatiles free of headspace?	_____
_____	_____	Were correct container / sample sizes submitted?	_____
_____	_____	Is sample condition good?	_____

Airbill # _____
 Additional Sample Remarks: (if applicable)
 Extra Sample Volume?
 Limited Sample Volume?
 Field preserved for volatiles?
 Field-filtered for dissolved?
 Lab-filtered for dissolved?
 Ref Lab required?
 Foreign Soil?

This section must be filled if problems are found.

Yes	No	
_____	_____	Was client notified of problems?
_____	_____	Individual contacted:
_____	_____	Date/Time:
_____	_____	Phone/Fax:
_____	_____	Reason for contact:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	SGS/CT&E Contact: _____

Notes: trip blank listed on 0063.

Completed by (sign): Melody Debenham (print): Melody Debenham
 Login proof (check one): waived _____ required performed by: _____

SGS

1040064

CT&E WO#:



SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII.
NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: please check pH

Receipt Date / Time: 1-15-04 0900
Is Sample Date/Time Conversion Necessary? Yes _____ No
Number of Hours From Alaska Standard Time: _____
Foreign Soil? Yes _____ No

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank	Cooler	Cooler ID	Temp Blank	Cooler
<u>1</u>	<u>5.2</u>	<u>3.6</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

CUSTODY SEALS INTACT: YES NO # / WHERE: 1 on front, 1 on back

COMPLETED BY (INITIAL): JSJ

*Temperature readings include thermometer correction factors.

C=3.6

SGS Environmental

CUSTODY SEAL

Signature: Melody DeBahan

Date/Time: 1/14/04 @ 4:30 pm

SGS Environmental

CUSTODY SEAL

Signature: Melody DeBahan

Date/Time: 1/14/04 @ 4:30 pm



Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.sgsevenvironmental.com>

Mark Lockwood
Shannon & Wilson-Fairbanks
2355 Hill Rd
Fairbanks, AK 99709

Work Order: 1040064
31-1-11192-005 Tazlina ADOT
Client: Shannon & Wilson-Fairbanks
Report Date: January 22, 2004

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Control Manual that outlines this program is available at your request. The laboratory ADEC certification numbers are AK08-03 (DW), UST-005 (CS) and AK00971 (Micro).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference.

If you have any questions regarding this report or if we can be of any other assistance, please call your SGS Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- PQL Practical Quantitation Limit (reporting limit).
- U Indicates the analyte was analyzed for but not detected.
- F Indicates an estimated value that falls below PQL, but is greater than the MDL.
- J The quantitation is an estimation.
- B Indicates the analyte is found in a blank associated with the sample.
- * The analyte has exceeded allowable regulatory or control limits.
- GT Greater Than
- D The analyte concentration is the result of a dilution.
- LT Less Than
- ! Surrogate out of control limits.
- Q QC parameter out of acceptance range.
- M A matrix effect was present.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- E The analyte result is high outside of calibrated range.

Note: Soil samples are reported on a dry weight basis unless otherwise specified.



SGS Ref.# 1040064001
 Client Name Shannon & Wilson-Fairbanks
 Project Name/# 31-1-11192-005 Tazlina ADOT
 Client Sample ID 1192-011204-TAZWELL
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 01/22/2004 10:33
 Collected Date/Time 01/12/2004 17:25
 Received Date/Time 01/14/2004 15:05
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls. Samples re-extracted past hold time, results confirm.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	88.5		%	AK101 8021B	A	73-124	01/16/04	01/16/04	MML
4-Bromofluorobenzene <surr>	97.3		%	AK101 8021B	A	50-150	01/16/04	01/16/04	MML
Semivolatile Organic Fuels Department									
Diesel Range Organics	0.300 U	0.300	mg/L	AK102	D		01/15/04	01/20/04	JC
Surrogates									
5a Androstane <surr>	79.1		%	AK102	D	50-150	01/15/04	01/20/04	JC



SGS Ref.# 1040063002
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-003 Ernestine ADOT
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 01/22/2004 10:57
Collected Date/Time 01/12/2004 13:25
Received Date/Time 01/14/2004 15:12
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

This trip blank is also associated with WO #'s 1040064, 1040065, & 1040066.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		01/16/04	01/16/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	91.4		%	AK101 8021B	A	73-124	01/16/04	01/16/04	MML
4-Bromofluorobenzene <surr>	97		%	AK101 8021B	A	50-150	01/16/04	01/16/04	MML



CT&E Ref.# 536404 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/22/2004 10:33
Prep Batch VXX 11362
Method SW5030
Date 01/16/2004

QC results affect the following production samples:

1040064001

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Fuels Department					
Gasoline Range Organics	0.0900 U	0.0900	mg/L	01/16/04	MML
Benzene	0.000500 U	0.00050	mg/L	01/16/04	MML
Toluene	0.00200 U	0.00200	mg/L	01/16/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	01/16/04	MML
P & M -Xylene	0.000594F	0.00200	mg/L	01/16/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	01/16/04	MML
Surrogates					
1,4-Difluorobenzene <surr>	88.7		%	01/16/04	MML
4-Bromofluorobenzene <surr>	102		%	01/16/04	MML

Batch VFC 6184
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 536405 Lab Control Sample

Printed Date/Time 01/22/2004 10:33
Prep Batch VXX 11362
Method SW5030
Date 01/16/2004

Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

QC results affect the following production samples:
1040064001

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
-----------	------------	-----------	-----------------	-----	------------	---------------	---------------	------

Volatile Fuels Department

Gasoline Range Organics	LCS	0.454	101	(60-120)		0.45 mg/L	01/16/04	MML
Benzene	LCS	0.0239	102	(86-124)		0.0234 mg/L	01/16/04	MML
Toluene	LCS	0.0767	100	(81-120)		0.0764 mg/L	01/16/04	MML
Ethylbenzene	LCS	0.0153	109	(85-127)		0.0141 mg/L	01/16/04	MML
P & M -Xylene	LCS	0.0522	111	(90-119)		0.047 mg/L	01/16/04	MML
o-Xylene	LCS	0.0200	104	(90-116)		0.0192 mg/L	01/16/04	MML

Surrogates

1,4-Difluorobenzene <surr>	LCS		103	(73-124)		0.05 mg/L	01/16/04	MML
4-Bromofluorobenzene <surr>	LCS		109	(60-120)		0.05 mg/L	01/16/04	MML

Batch VFC 6184
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 536406 Matrix Spike
 536407 Matrix Spike Duplicate

Printed Date/Time 01/22/2004 10:33
 Prep Batch VXX 11362
 Method Volatile Fuels Extraction (W)
 Date 01/16/2004

Original 1040063001
 Matrix Water (Surface, Eff., Ground)

QC results affect the following production samples:

1040064001

Sample Remarks:

MS

MSD

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department										
o-Xylene	MS	0.00200 U	0.0197	101	(90-116)			0.0192 mg/L	01/16/04	MML
	MSD		0.0197	101		0	(< 20)	0.0192 mg/L	01/16/04	MML
Benzene	MS	0.000500 U	0.0237	101	(86-124)			0.0234 mg/L	01/16/04	MML
	MSD		0.0235	100		1	(< 20)	0.0234 mg/L	01/16/04	MML
Ethylbenzene	MS	0.00200 U	0.0150	103	(85-127)			0.0141 mg/L	01/16/04	MML
	MSD		0.0150	103		0	(< 20)	0.0141 mg/L	01/16/04	MML
Gasoline Range Organics	MS	0.0900 U	0.449	98	(60-120)			0.45 mg/L	01/16/04	MML
	MSD		0.450	99		0	(< 20)	0.45 mg/L	01/16/04	MML
P & M -Xylene	MS	0.00200 U	0.0511	107	(90-119)			0.047 mg/L	01/16/04	MML
	MSD		0.0510	107		0	(< 20)	0.047 mg/L	01/16/04	MML
Toluene	MS	0.00200 U	0.0761	99	(81-120)			0.0764 mg/L	01/16/04	MML
	MSD		0.0758	99		0	(< 20)	0.0764 mg/L	01/16/04	MML
Surrogates										
4-Bromofluorobenzene <surr>	MS			108	(50-150)			0.05 mg/L	01/16/04	MML
	MSD			109		1		0.05 mg/L	01/16/04	MML
1,4-Difluorobenzene <surr>	MS			100	(73-124)			0.05 mg/L	01/16/04	MML
	MSD			101		0		0.05 mg/L	01/16/04	MML

Batch VFC 6184
 Method AK101 8021B
 Instrument HP 5890 Series II PID+HECD VBA



CT&E Ref.# 536089 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/22/2004 10:33
Prep Batch XXX 13064
Method SW3510C
Date 01/15/2004

QC results affect the following production samples:

1040064001

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Semivolatile Organic Fuels Department					
Diesel Range Organics	0.300 U	0.300	mg/L	01/20/04	JC
Residual Range Organics	0.157F	0.500	mg/L	01/20/04	JC
Surrogates					
n-Triacontane-d62 <surr>	99.4		%	01/20/04	JC
5a Androstane <surr>	75.5		%	01/20/04	JC
Batch	XFC 6078				
Method	AK102 103				
Instrument	HP 5890 Series II FID SV C F				



SGS Ref.# 536090 Lab Control Sample
 536091 Lab Control Sample Duplicate
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/22/2004 10:33
Prep Batch XXX 13064
Method SW3510C
Date 01/15/2004

QC results affect the following production samples:
 1040064001

Sample Remarks:
 LCS DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls.
 LCSD DRO - LCS/LCSD spike recoveries (70.4%, 69.3%) are outside controls.

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS 3.52	70	* (75-125)			5 mg/L	01/20/04	JC
	LCSD 3.47	69	* (75-125)	2	(< 20)	5 mg/L	01/20/04	JC
Residual Range Organics	LCS 3.95	79	(60-120)			5 mg/L	01/20/04	JC
	LCSD 4.07	81	(60-120)	3	(< 20)	5 mg/L	01/20/04	JC
Surrogates								
n-Triacontane-d62 <surr>	LCS	75	(60-120)			0.1 mg/L	01/20/04	JC
	LCSD	77	(60-120)	3		0.1 mg/L	01/20/04	JC
5a Androstane <surr>	LCS	76	(60-120)			0.1 mg/L	01/20/04	JC
	LCSD	70	(60-120)	8		0.1 mg/L	01/20/04	JC

Batch XFC 6078
Method AK102 103
Instrument HP 5890 Series II FID SV C F



CT&E Ref.# 536614 Method Blank
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/23/2004 8:22
Prep Batch XXX 13078
Method SW3510C
Date 01/21/2004

QC results affect the following production samples:

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Semivolatile Organic Fuels Department					
Diesel Range Organics	0.300 U	0.300	mg/L	01/21/04	JC
Residual Range Organics	0.184F	0.500	mg/L	01/21/04	JC
Surrogates					
n-Triacontane-d62 <surr>	94.1		%	01/21/04	JC
5a Androstane <surr>	82.4		%	01/21/04	JC
Batch	XFC 6080				
Method	AK102 103				
Instrument	HP 5890 Series II FID SV C F				



SGS Ref.# 536615 Lab Control Sample
 536616 Lab Control Sample Duplicate
Client Name Shannon & Wilson-Fairbanks
Project Name/# 31-1-11192-005 Tazlina ADOT
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/22/2004 10:33
Prep Batch XXX 13078
Method SW3510C
Date 01/21/2004

QC results affect the following production samples:

Sample Remarks:

LCS

LCSD

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Semivolatiles Organic Fuels Department								
Diesel Range Organics	LCS	94	(75-125)			5 mg/L	01/21/04	JC
	LCSD	100		6	(< 20)	5 mg/L	01/21/04	JC
Residual Range Organics	LCS	112	(60-120)			5 mg/L	01/21/04	JC
	LCSD	114		2	(< 20)	5 mg/L	01/21/04	JC
Surrogates								
5a Androstane <surr>	LCS	101	(60-120)			0.1 mg/L	01/21/04	JC
	LCSD	106		5		0.1 mg/L	01/21/04	JC
n-Triacontane-d62 <surr>	LCS	95	(60-120)			0.1 mg/L	01/21/04	JC
	LCSD	100		4		0.1 mg/L	01/21/04	JC

Batch XFC 6080
Method AK102 103
Instrument HP 5890 Series II FID SV C F