100.26.030
GR

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Alaska
Colorado
Florida
Missouri
Oregon
Washington

July 26, 2007

Wright Air Service
P.O. Box 60142
Fairbanks, Alaska

Attn: Mr. Bob Bursiel

RE: ENVIRONMENTAL SITE CONDITIONS AND CONCEPTUAL SITE MODEL, FORMER ERA HANGAR, FAIRBANKS INTERNATIONAL AIRPORT, FAIRBANKS, ALASKA

We are pleased to provide this summary of environmental conditions at the former ERA hangar site at the Fairbanks International Airport, Fairbanks, Alaska. This report includes a review of the corrective action conducted by Gilfilian Engineering & Environmental Testing, Inc. (Gilfilian) on the site's former underground storage tanks (USTs), the results of limited groundwater sampling we conducted at the site, and a Conceptual Site Model (CSM) addressing the possible routes of exposure to contaminants at the site.

The objective of our work was to address the Alaska Department of Environmental Conservation's (ADEC's) request for an evaluation of current site conditions. Our work was conducted in general accordance with ADEC regulations and our proposal to you, dated May 17, 2006.

BACKGROUND

Gilfilian Engineering & Environmental Testing, Inc. (Gilfilian) implemented corrective actions and groundwater monitoring at the site beginning in 1991. This included performing a tank-closure site assessment, conducting on-site soil treatment, installing a soil-vapor-extraction system (VES) for *in situ* remediation of soils and groundwater, and performing periodic groundwater monitoring. The last groundwater-sampling event occurred in August 1999 and was

reported in a Gifilian report (*1999 Annual Monitoring Event, Era Helicopters Fairbanks Base Facility*), dated January 4, 2000.

The corrective actions conducted by Gilfilian included removal of five USTs. Three 500-gallon gasoline USTs were removed in 1991, a 5000-gallon jet-fuel UST was removed in 1992, and another 5000-gallon jet-fuel UST was removed in 1994.

Contaminated soils associated with these UST removals were stockpiled, and an *ex situ* soil-treatment (vapor extraction) cell was used to treat them on site. Our review of the ADEC records indicated that the stockpile-treatment program was working well through 1995, and several batches of contaminated soil had been successfully treated. We did not review any documentation indicating all excavated soils were properly treated and disposed. No stockpile currently exists on the site, suggesting that continued treatment yielded acceptable levels of soil contamination for its ultimate disposal.

Gilfilian also installed an air-injection (AI)/VES system for *in situ* treatment of contaminated soils and groundwater associated with the USTs. The AI/VES was installed in 1993 to treat contamination associated with releases from the 5,000-gallon UST removed from near the southwest corner of the hangar (Figure 1), and was in continuous use through at least June 2000. The VES system was adjusted in August 1999 to extract vapors only from the area of monitoring well G-8 (Figure 1). This well has contained non-aqueous phase liquid (NAPL) hydrocarbon floating on the water table since it was installed.

The VES system was last monitored in June 2000, as documented in Gilfilian's letter report (*Soil Vapor Extraction System, Former Era Helicopters Fairbanks Base Facility*), dated September 11, 2000. That report noted air samples were collected from the VES system in August 1999 and June 2000 for analysis of gasoline range organic compounds (GRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX). The 1999 air sample contained detectable concentrations of each BTEX analyte and GRO, with benzene measured at 1.24 parts per million (ppm) and GRO at 107 ppm. The June 2000 air sample did not contain detectable benzene or ethylbenzene, and the other analytes had decreased from their 1999 levels. We understand VES operations continue, and that NAPL has been periodically removed from well G-8 by hand-bailing since 1996.

Gilfilian installed eight groundwater monitoring wells (Figure 1) in 1991 and 1992, and conducted groundwater monitoring through 1999. The 1999 sampling event involved collecting water samples from monitoring wells G-1, G-2, G-3, G-4, G-5, G-6, and G-7 (Figure 1) to determine concentrations of GRO, diesel range organic compounds (DRO), and BTEX. The GRO, DRO, benzene, and toluene concentrations in the 1999 samples from well G-2 exceeded ADEC groundwater-cleanup levels, and benzene was detected at a concentration below its cleanup level (5 µg/L) in monitoring well G-6. The other samples did not contain contaminants at concentrations above their respective laboratory practical quantitation limit (PQLs). NAPL was observed floating on the water table in monitoring well G-8, so water samples were not collected from that well for analysis in 1999. Our review of historical groundwater monitoring data found that benzene concentrations in monitoring well G-2 have decreased over time.

The 1999 sampling event provided the latest groundwater data set prior to our efforts reported here; Gilfilian's reports are on file with the ADEC. The ADEC reviewed the ERA contaminated-site file (100.26.030) in March 2006 and requested a current evaluation of site conditions including a CSM. We report below the results of a limited groundwater sampling effort at the site, and provide a CSM based on the results of our and previous sampling efforts.

FIELD ACTIVITIES

This section describes the various field activities undertaken prior to and during our site assessment effort.

Initial Site Visit

On August 9, 2006, Angela Miller from our Fairbanks office visited the facility to observe the condition of the remediation infrastructure and the monitoring wells. She observed the remediation system, and noted that the VES was in apparently good condition. The VES was operating but the AI system was not. She also observed monitoring well G-8 (Figure 1), used for recovery of NAPL, and obtained a record of groundwater depth and volume of NAPL recovered from that well. She also noted that well G-2 contained NAPL at that time.

Ms. Miller noted a number of problems with some of the existing groundwater monitoring wells. Monitoring well G-5's well monument was found to be filled with saturated bentonite, but the well casing was in good shape, and its casing cap was intact. The monument and casing of well G-6 showed evidence of frost-jacking, and she noted the casing would require cutting to allow it to fit in the monument. The G-6 monument was also full of saturated bentonite, but the casing cap was sufficiently intact to keep the bentonite out of the well. Ms. Miller also noted monitoring well G-7 also would require repair if it is to be kept for long-term use; the monument was in poor condition, and the well casing was shattered with no proper way to protect the well from surface-water infiltration.

Modifications or repairs to the wells were not included in our scope of work, and we made no repairs.

Monitoring Well Sampling

On August 23, 2006, Nathan Brennan of our Fairbanks office visited the site to collect groundwater samples from monitoring wells G-2, G-5, G-6, and G-7. He found approximately 2 inches of NAPL on the water table in monitoring well G-2, so no groundwater samples were collected from this well.

Prior to collecting the samples from monitoring wells G-5, G-6, and G-7 (Figure 1), Mr. Brennan checked the depth to the water table in each well using an electronic water-level indicator. He then aggressively surged and purged the wells to remove debris, sands, and silts that may have infiltrated the wells due to the poor conditions of their casings and monuments. Mr. Brennan purged each well until pH, conductivity, and temperature measurements had stabilized, and then collected samples using a decontaminated, battery-powered, submersible pump and new, disposable vinyl tubing. He collected duplicate samples (*1320-082606-003* and *1320-082306-004*) from monitoring well G-5, and single samples from wells G-6 (*1320-082306-002*), and G-7 (*1320-082306-001*). All purge water collected from the wells was discharged to the ground surface.

Mr. Brennan collected the samples into the appropriate laboratory-prepared sample containers, and samples were kept chilled between 2° and 6°C until they were delivered to SGS

Environmental Services, Inc. (SGS) in Fairbanks. The samples and associated trip blanks were then sent to and analyzed by the Anchorage SGS laboratory. The samples and trip blanks were analyzed to determine GRO concentrations by Alaska Method AK101 and BTEX concentrations by EPA Method 8021B. Samples also were analyzed to determine DRO concentrations by Alaska Method AK102. The analyses conducted on samples from each well are tabulated in Table 1, along with the analytical results.

RESULTS

This section of the report presents the laboratory data from our groundwater-sampling effort, as well as the NAPL-recovery data collected from well G-8 since 1996.

NAPL Recovery

The depth to the water table and the amount of fuel recovered from well G-8 have been tabulated by personnel at the ERA hangar since at least 1996. Angela Miller from our office obtained copies of these data on her visit to the site. Generally, the amount of recoverable product has diminished substantially in the years since recordkeeping began. We estimated the cumulative volume of NAPL recovered through 2006 was approximately 370 liters (about 100 gallons). The volume of NAPL recovered over time is plotted in Figure 2.

Groundwater Samples

We present the results of the groundwater-sample analyses in Table 1; the ADEC groundwater-cleanup levels are also shown in this table for reference. The groundwater samples from wells G5, G-6, and G-7 (Figure 1) did not contain BTEX, GRO, or DRO analytes at concentrations above their respective PQLs. As noted above, no groundwater sample was obtained from well G-2, as it contained about 2 inches of NAPL. A copy of the SGS laboratory report for this project is provided as an attachment to this report.

Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) procedures assist in producing groundwater-sample 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. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check that the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards. The laboratory report for this project's samples, including the case narrative describing the laboratory QA results in detail, is included as an attachment to this report. Details regarding the results of our QA review are presented below.

Sample Handling

GRO/BTEX and DRO samples were analyzed at SGS in Anchorage, Alaska. We reviewed the chain-of-custody records and laboratory receipt forms to confirm that custody was not breached. Temperature blanks and cooler temperatures were measured to confirm that the samples were kept properly chilled (between 2° and 6°C) during shipping. The cooler used to store the samples was hand-delivered to the SGS office in Fairbanks, and then shipped to their Anchorage laboratory; the cooler was received at both locations within the recommended temperature range. The samples were then processed within the procedures' appropriate laboratory holding times. We did not identify any sample-handling anomalies that would adversely affect data quality for this project.

Analytical Sensitivity

The data from the GRO/BTEX and DRO analyses had PQLs below the ADEC groundwater cleanup levels. Trip blanks shipped with the water samples were analyzed for volatile organic compounds to determine if cross-contamination or contamination from an outside source may have occurred during shipment or storage. Laboratory method blanks were run in association with the samples collected for this project to check for contributions to the analytical results possibly attributable to laboratory-based contamination. The trip and method blanks analyzed for this project did not contain target analytes at concentrations above the laboratory PQL, though the method blank for the DRO analyses contained DRO at an estimated concentration (78.9 µg/L) below the PQL. DRO were not detected in any sample, and the low-level DRO detection in the method blank did not affect our data quality.

The low PQLs, coupled with the absence of analytes detected above the PQL in the trip and method blanks, indicates the groundwater analyses were sufficiently sensitive to detect possible contamination in the groundwater samples.

Accuracy

Laboratory analytical accuracy may be assessed through evaluating the analyte recoveries from continuing calibration verification (CCV), matrix spike (MS) and MS duplicate (MSD), and laboratory control spike (LCS) and LCS duplicate (LCSD) analyses, as well as the recovery of analyte surrogates added to project samples.

The SGS laboratory report's case narrative noted that a DRO/residual range organics (RRO) billable matrix spike (BMS) and BMS duplicate (BMSD) were not spiked during laboratory preparation. The original sample to be spiked was not associated with this project, and this QA anomaly does not affect our data. The DRO LCS and LCSD recoveries for our samples were within laboratory limits, indicating the DRO results are accurate.

The MSD results for the BTEX analysis were biased high, but there were no BTEX analytes detected in the samples, so the accuracy of our data was unaffected.

The laboratory report also noted that the GRO "closing CCV surrogate recovery is biased low (74%)," and that this surrogate may be biased low in associated samples. However, the surrogate recoveries for each of our project samples were within the laboratory's control limits, indicating our results were accurate.

Our review of the LCS/LCSD, MS/MSD, and surrogate recovery data indicates that the groundwater data for this project are accurate.

Precision

We collected field-duplicate samples for DRO/RRO and GRO/BTEX analysis at a frequency of 10 percent to evaluate the precision of analytical measurements, as well as the reproducibility of our sampling technique. One may evaluate the precision of data by calculating the relative percent difference (RPD; difference between the sample and its field duplicate

divided by the mean of the two); RPD can be calculated only if the results of the analyses for both the sample and its duplicate are above the method detection limits. The RPD could not be calculated for the duplicate groundwater samples *1327-082306-003* and *1320-082306-004*, as these samples did not contain analytes above the laboratory's PQL.

Laboratory analytical precision can also be evaluated by calculating RPDs for MS/MSD and LCS/LCSD pairs. Most of the laboratory-based RPDs were within the established control limits, but the RPDs for the BTEX MS/MSDs were above the laboratory's 20-percent RPD limits. This was due to the high recoveries for the BTEX MSD. The spiked MS/MSD sample was our groundwater sample (*1320-082306-001*) from monitoring well G-7, which did not contain detectable BTEX analytes. The failure of the laboratory to meet the MS/MSD RPD control limits suggests the BTEX data from well G-7 may be imprecise; however, the surrogate, MS/MSD, and LCS/LCSD analyte recoveries associated with these samples indicates the results are accurate, as noted above. No BTEX analyte was detected in these samples, so the possible imprecision suggested by the MS/MSD RPD result does not adversely affect our sample data.

With the exception of the MS/MSD RPD failure for the BTEX analysis, there was no evidence of precision failures in the analyses of our project samples.

QC Summary

By working in general accordance with our work plan, 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 quality control failures. However, our completeness goal of obtaining 85 percent useable data was not met because a sample could not be collected from monitoring well G-2 due to the presence of NAPL in that well.

Overall, our review of the laboratory QA/QC measures indicates the sample data are of good quality, and are valid for interpreting the groundwater quality at the ERA site.

CONCEPTUAL SITE MODEL

We completed a CSM to assess the potential sources of chemicals, release mechanisms, means of retention in or migration to exposure media, and exposure routes (Figure 3). The CSM is intended to provide a background description of contaminant fate and transport mechanisms. A complete pathway from the source of chemicals to the potential receptors is necessary for chemical exposure to occur. The CSM can be used to assess site characterization objectives, but does not quantify risk associated with a contaminated site.

The ground surface at the site is covered with pavement, and fuel releases are assumed to have occurred as the result of leaking USTs or associated piping, which directly contaminated subsurface soils and groundwater. Surface soils are therefore not considered to be affected media. The contaminated media at the site include subsurface soils and groundwater (Figure 3).

As the site is paved, direct contact with contaminated soils would be limited to construction workers who might encounter contamination during the course of excavation. In this case, both incidental soil ingestion and dermal absorption of soil contaminants through skin represent potentially complete exposure pathways for construction workers. There are no residents, commercial workers, site visitors, or other potential receptors who may encounter and be exposed to soil contamination (Figure 3).

Soil and groundwater contamination may volatilize, posing a potential inhalation-exposure risk. As contaminated soil and groundwater extends beneath the hangar, there is a possible indoor-air inhalation risk associated with the contamination. Potential receptors of this contamination include visitors and workers at the site, and construction workers who uncover contaminated soil and/or groundwater during excavation activities (Figure 3). There is also a potential outdoor-air exposure risk associated with the VES that vents volatile contaminants from contaminated soil and groundwater. The same set of potential receptors for the indoor-air pathway may also be exposed via the outdoor-air pathway (Figure 3).

Groundwater contamination may pose an exposure risk via incidental ingestion, dermal absorption, and inhalation of volatiles from tap water (Figure 3). We understand the businesses in the area do not rely on groundwater for drinking, and obtain their potable water from Golden

Heart Utilities. Incidental ingestion of, or dermal exposure to, groundwater would therefore be limited to construction workers engaged in excavation activities that expose contaminated groundwater. The dermal-exposure pathway could also be completed if someone were to wash equipment or skin with contaminated groundwater. In addition, volatilization of contamination from tap water represents a potentially complete pathway for workers at the site or their visitors, should on-site water be used for nonpotable purposes (Figure 3).

Our groundwater sampling results indicate that groundwater contamination associated with previous fuel releases at the site is limited in extent, and is not migrating from the property. It is our opinion that the contaminant-exposure risk is primarily focused on construction workers who may encounter contamination during excavation, and site workers or their visitors who may be exposed to contaminants via the inhalation pathway.

DISCUSSION

As noted above, the groundwater contamination associated with fuel releases at the facility is limited in extent. The samples from wells G-5, G-6, and G-7 did not contain detectable GRO, DRO, or BTEX analytes (Table 1), though wells G-2 and G-8 (Figure 1) are known to contain NAPL. Earlier groundwater gradient measurements at the site indicated that wells G-5, G-6, and G-7 are hydrologically downgradient from wells G-2 and G-7. The fact that the wells we sampled were free of contamination despite their long-term proximity to the wells containing NAPL indicates the potential for widespread contaminant migration is low.

The NAPL recovery data collected since 1996 show a pronounced decline in the amount of product recovered, despite continued efforts to collect it (Figure 2). The NAPL-recovery records indicate that recovery efforts were pursued on an almost daily basis in 1996 and 1997, and then reverted to weekly recovery after 1997. We estimated about 372 liters of NAPL were recovered through June 2006. Amounts of recovered NAPL were initially typically in the range of 2 or 3 liters for each recovery effort; later volumes have been substantially lower (Figure 2). The diminishing return per unit effort to collect the free-phase NAPL suggests that the ongoing 10-year effort to recover the fuel has had a beneficial affect on the magnitude of subsurface contamination.

CONCLUSIONS

Following our review of corrective actions at the site, historical site assessment data, and our own limited groundwater-sampling effort, we present the following conclusions:

- Soils data collected at the time of UST closures have not been sufficiently documented to allow a determination that cleanup levels have been met.
- NAPL is present in monitoring wells G-8 and G-2, but soil and groundwater contamination appears to remain limited to the area east of wells G-5, G-6, and G-7 (Figure 1).
- On-site NAPL recovery efforts have resulted in ever-diminishing volumes of product recovered. NAPL recovery, coupled with ongoing soil-vapor extraction, appears to have limited the extent of subsurface contamination at the site.
- Groundwater samples we collected indicate that the subsurface contamination is not migrating off the site.
- Groundwater is not used for consumption at this site or on adjacent properties.
- The primary exposure risks to site workers or visitors to the site are related to indoor- and outdoor-air inhalation, and possibly dermal absorption of contaminants in tap water.
- Other potentially complete contaminant-exposure pathways include incidental ingestion of soil and groundwater, and dermal absorption of soil and groundwater contaminants. These exposure pathways would be limited to construction workers engaged in subsurface excavation activities.

RECOMMENDATIONS

Based on our conclusions presented above, we offer the following recommendations:

- Due to the limited area of contamination, and evidence that contamination is not migrating off the site, we recommend that the ADEC consider this site for conditional-closure status.
- The VES system and periodic hand-bailing of NAPL from well G-8 have had a beneficial effect on site conditions. We therefore suggest these activities continue.

  - We recommend that you periodically check for NAPL in wells G-2 and G-8 and remove it when it is found.
  - We also suggest that the VES exhaust be checked periodically to document a decrease in volatile compounds extracted from the subsurface.
  - When only trace amounts of NAPL and volatile gases are recovered from the wells and VES exhaust, additional monitoring of these media should no longer be needed.

- If continued groundwater monitoring is required as a condition of the site's conditional-closure status, monitoring wells G-5, G-6, and G-7 should be repaired. If no additional groundwater monitoring is foreseen, these wells should be abandoned in accordance with ADEC regulations.
- We did not inspect monitoring wells G-1, G-3, and G-4. If these wells are still present and will not be used, they should be abandoned in accordance with ADEC regulations.

LIMITATIONS

This report presents conclusions based on limited sampling and analysis that we performed at the former ERA hangar at the Fairbanks International Airport in Fairbanks, Alaska. The data presented in this report should be considered representative of the time our site observations and sample collection. Changes in the observed site conditions can occur with the passage of time. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions regarding this site may need to be revised. In addition, there can be no assurance that a regulatory agency or its staff will reach the same conclusions as Shannon & Wilson.

In preparing this assessment we have reviewed and interpreted reports prepared by others. We have not conducted an independent evaluation of the accuracy or completeness of such information, and will not be responsible for any errors or omissions contained in these reports.

This report was prepared for the exclusive use of Bob Bursiel. If it is made available to others, it should be for information on factual data only and not as a warranty of conditions described in this report. The interpretations and recommendations are based solely upon information available to Shannon & Wilson at the time of this report.

We trust this information is sufficient for your needs at this time. If you have any questions, please do not hesitate to call.

Sincerely,

SHANNON & WILSON, INC.

Jon Lindstrom, Ph.D.
Principal Chemist

Reviewed by:

David M. McDowell
Vice President

Enclosures:

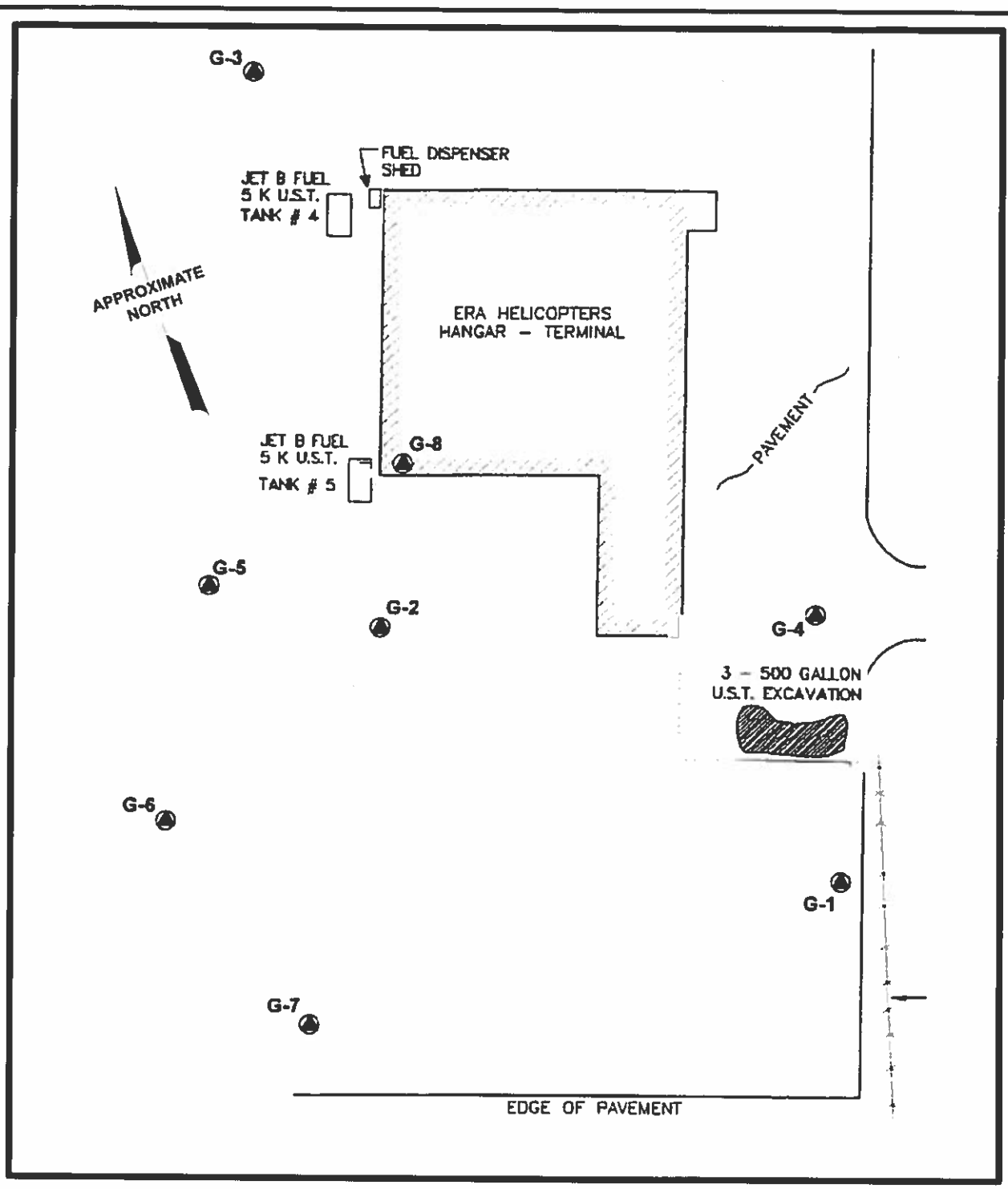
Table 1	Analytical Groundwater Sample Results
Figure 1	Site Plan
Figure 2	NAPL Recovered From Well G-8
Figure 3	Conceptual Site Model
Laboratory Data Review Checklist	
SGS Laboratory Data Report	

c: Jim Frechione, ADEC
Kristen DuBois, ADOT&PF

TABLE 1
ANALYTICAL GROUNDWATER SAMPLE RESULTS
ERA HANGAR, FAIRBANKS, ALASKA

Sample Number	Sample Location	AK101	AK102	EPA 8021B				
		GRO (mg/L)	DRO (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	p&m Xylene (µg/L)	o-Xylene (µg/L)
ADEC Groundwater Cleanup Levels -->		1.3	1.5	5	1,000	700	Total 10,000	
1320-082306-001	Monitoring Well G7	<0.100	<0.300	<0.500	<2.00	<2.00	<2.00	<2.00
1320-082306-002	Monitoring Well G6	<0.100	<0.319	<0.500	<2.00	<2.00	<2.00	<2.00
1320-082306-003	Monitoring Well G5	<0.100	<0.300	<0.500	<2.00	<2.00	<2.00	<2.00
1320-082306-004[1]	Monitoring Well G5	<0.100	<0.300	<0.500	<2.00	<2.00	<2.00	<2.00

Notes:
< = analyte not detected above laboratory practical quantitation limit, shown
[1] duplicate of 1320-082306-003



Legend:

G-3 Monitoring well

APPROXIMATE SCALE: 1 inch = 50 feet

0 25 50 100 150

(feet)

Note: Drawing adapted from Gilfilian reports. Site features have not been verified or surveyed.

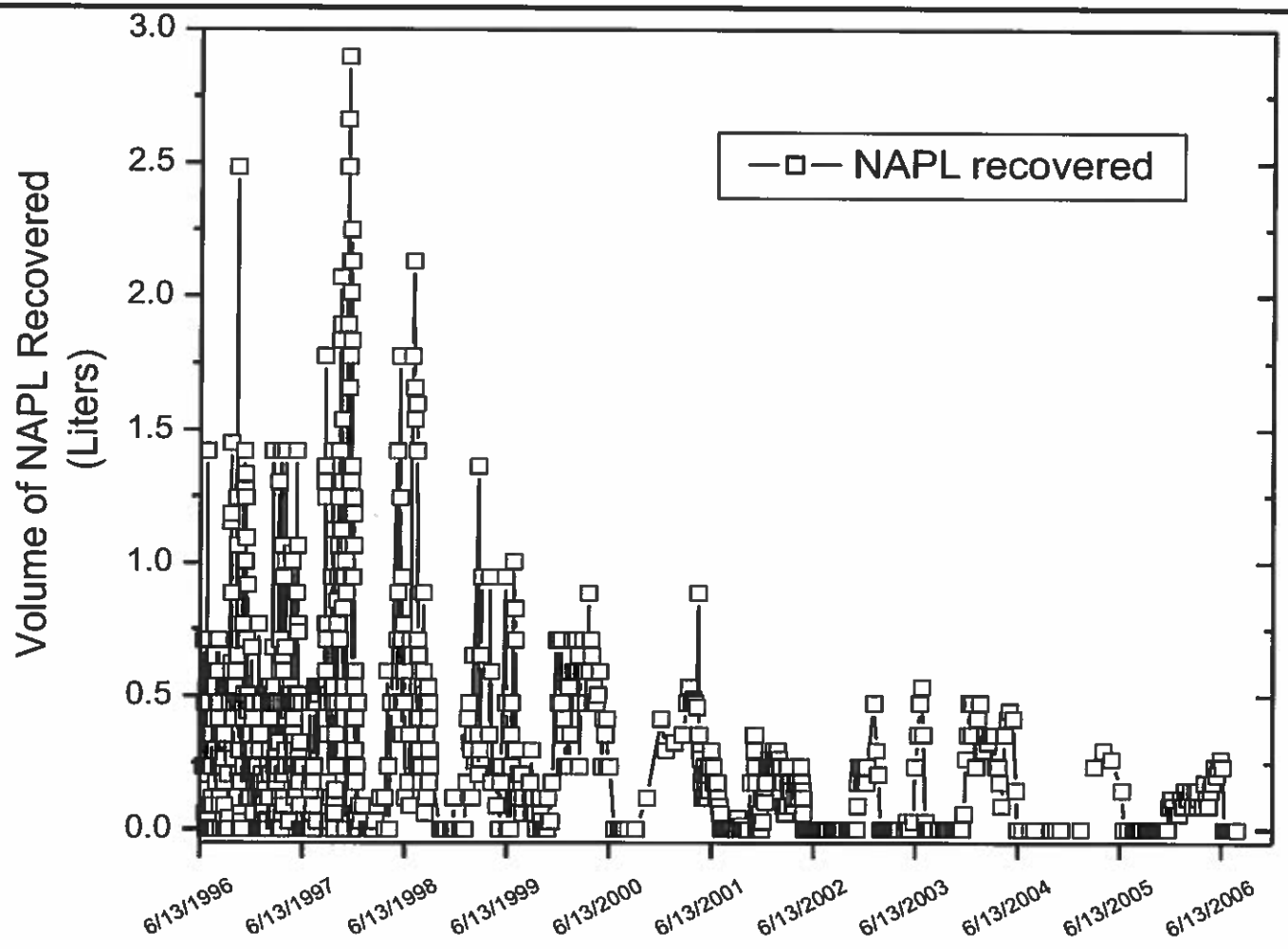
ERA Hangar
Fairbanks, Alaska

SITE PLAN

July 2007 31-1-11320-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



ERA Hangar
Fairbanks, Alaska

NAPL RECOVERY HISTORY
MONITORING WELL G-8

July 2007 31-1-11320-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

Figure 2

DRAFT HUMAN HEALTH CONCEPTUAL SITE MODEL

Site Name: ERA Hangar, Fairbanks International Airport
Completed By: Shannon & Wilson, Inc.
Describe source of contamination:
Releases from underground fuel storage tanks and associated piping.

Directions: Follow the italicized directions below in numbered order. At least one transport mechanism, exposure media, and receptor should be identified for each complete pathway identified in column (4). Do not consider engineering or land use controls when describing exposure pathways.

(1) Media	(2) Transport Mechanisms	(3) Exposure Media	(4) Pathway/ Exposure Route	(5) Current & Future Receptors DR: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
Surface Soil (0-2 ft bgs) ☐	Direct release to surface soil — check soil ☐ Migration or leaching to subsurface — check soil ☐ Migration or leaching to groundwater — check groundwater ☐ Volatilization — check air ☐ Runoff or erosion ☐ Uptake by plants or animals — check biota ☐ Other:	☑ soil	☑ Incidental Soil Ingestion				✓			
			☑ Dermal Absorption of Contaminants from Soil				✓			
Subsurface Soil (2-15 ft bgs) ☑	Direct release to subsurface soil — check soil ☑ Migration to groundwater — check groundwater ☑ Volatilization — check air ☐ Other:	☑ air	☑ Inhalation of Outdoor Air		✓	✓	✓			
			☑ Inhalation of Indoor Air		✓	✓	✓			
			☐ Inhalation of Fugitive Dust							
Ground-water ☑	Direct release to groundwater — check groundwater ☑ Volatilization — check air ☐ Flow to sediment — check sediment ☐ Flow to surface water body ☐ Uptake by plants or animals — check biota ☐ Other:	☑ groundwater	☐ Ingestion of Groundwater (as drinking water)							
			☑ Ingestion of Groundwater (incidental only)				✓			
			☑ Dermal Absorption of Contaminants in Groundwater		✓	✓	✓			
			☑ Inhalation of Volatile Compounds in Tap Water		✓	✓				
Surface Water ☐	☐ Volatilization — check air ☐ Sedimentation — check sediment ☐ Uptake by plants or animals — check biota ☐ Other:	☐ surface water	☐ Ingestion of Surface Water (as drinking water)							
			☐ Ingestion of Surface Water (incidental only)							
			☐ Dermal Absorption of Contaminants in Surface Water							
			☐ Inhalation of Volatile Compounds in Tap Water							
Sediment ☐	Direct release to sediment — check sediment ☐ Resuspension, runoff, or erosion ☐ Uptake by plants or animals — check biota ☐ Other:	☐ sediment	☐ Direct Contact with Sediment							
		☐ biota	☐ Ingestion of Wild Foods							

ERA Hangar
Fairbanks, Alaska

CONCEPTUAL SITE MODEL

July 2007 31-1-11320-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3

Figure 3

SGS Laboratory Report Number: 1064669 – Groundwater sample data

LABORATORY DATA REVIEW CHECKLIST

(**NOTE: NA** = not applicable)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? (Yes) / No

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)

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)? (Yes) / No

b. Were the correct analyses requested? (Yes) / No

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)? (Yes) / No

b. Sample preservation acceptable - acidified waters, MeOH-preserved VOC soil (GRO, BTEX, VOCs, etc.)? (Yes) / No

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

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

e. Data quality or usability affected? **Yes (explain)** (No)

4. Case Narrative

a. Present and understandable? (Yes) / No (explain)

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

c. Were all corrective actions documented? (NA) / Yes / No (explain)

SGS Laboratory Report Number: 1064669 – Groundwater sample data

d. Is there an effect on data quality/usability, according to the case narrative? (No) / Yes (explain)

5. Sample Results

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

b. All applicable holding times met? (Yes) / No

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

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project? (Yes) / No (explain only for non-detects with elevated PQLs)

e. Data quality or usability affected? (No) / Yes (explain)

6. QC Samples

a. Method Blank

i. Is at least one method blank (MB) reported per matrix, analysis, and 20 samples? (Yes) / No
ii. Are all method blank results less than PQL? (Yes) / No
iii. If MB above PQL, what samples are affected?

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

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

v. Are data quality or usability affected? (No) (i.e., MB data are acceptable) / Yes (Explain)

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

i. Organics - Is at least one LCS/LCSD reported per matrix, analysis, and 20 samples?
NA /Yes / (No; only LCS reported for GRO/BTEX.)

ii. Metals/Inorganics - Is at least one LCS and one sample duplicate reported per matrix, analysis and 20 samples? (NA) /Yes / No

iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits or project-specified DQOs? [*AK petroleum methods %R < 20%; other analyses, refer to lab QC pages*] (Yes) / No (explain)

iv. Precision – Are all relative percent differences (RPDs) reported and less than method or laboratory limits, or project-specified DQOs? Yes (No) (explain) **No LCSD for GRO/BTEX; RPD not calculated for LCS/LCSD.**

v. If %R or RPD is outside of acceptable limits, what samples are affected? (NA) or **list**

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

If so, are the data flags clearly defined?

vii. Is the data quality or usability affected? (NA) or **explain**.

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, including field, QC and laboratory samples? (Yes)/ **No**

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits or project-specified DQOs? (Yes)/ **No See text**

iii. Do the sample results with failed surrogate recoveries have data flags? (NA)/**Yes / No (explain)**

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

iv. Is the data quality or usability affected? (No) or **explain**.

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

i. Is at least one trip blank (TB) reported per matrix, analysis and cooler? **NA /** (Yes)/ **No**

ii. Are all results less than the PQL? (Yes)/ **No**

iii. If TB is above the PQL, what samples are affected? (NA) or **list samples**

iv. Is the data quality or usability affected? (No) or **explain**.

e. Field Duplicate

i. Was at least one field duplicate submitted per matrix, analysis and 10 project samples? (Yes)/ **No**

ii. Was the field duplicate submitted blind to the lab? (Yes)/ **No**

SGS Laboratory Report Number: 1064669 – Groundwater sample data

iii. Precision – Are all relative percent differences (RPDs) less than specified DQOs (recommended: 30% for water, 50% for soil) ? (Yes) / No

iv. Is the data quality or usability affected? (No) / Yes (explain)

f. Decontamination or Equipment Blank (if applicable)

(Not Applicable) or…

i. Are all results less than the PQL? **Yes / No**

ii. If results are above PQL, what samples are affected? **NA** or **list**

iii. Is the data quality or usability affected? Explain.

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

(Not applicable) or …

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

Completed by: Jon Lindstrom, Ph.D.

Title: Principal Chemist **Date:** July 24, 2007

CS Report Name: Environmental Site Conditions and Conceptual Site Model, Former ERA Hangar, Fairbanks International Airport, Fairbanks, Alaska

Report Date: July 2007

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS Environmental Services, Inc.

Laboratory Report Numbers: 1064669

ADEC File Number: 102.26.030 **ADEC Rec**
Key Number: 19931310021801

SGS Environmental Services
Alaska Division
Level II Laboratory Data Report

Project:	31-1-11320-001 ERA
Client:	Shannon & Wilson-Fairbanks
SGS Work Order:	1064669

Released by: Stephen C. Ede

Alaska Division Technical Director

Stephen C. Ede
2006.09.07
14:43:24 -08'00'

Contents:

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

SGS

Case Narrative

Client	SHANFBK	Shannon & Wilson-Fairbanks	**Printed Date/Time**	9/7/2006	14:16
Workorder	1064669	31-1-11320-001 ERA			

Sample ID	Client Sample ID

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

1064669002 **PS** **1320-082306-002**

DRO - Unknown hydrocarbon with several peaks is present.

1064852050 **BMS** **ADPSW01 MS**

DRO/RRO - BMS/BMSD were not spiked. See LCS/LCSD for precision and accuracy.

1064852051 **BMSD** **ADPSW01 MSD**

DRO/RRO - BMS/BMSD were not spiked. See LCS/LCSD for precision and accuracy.

724101 **MSD** **1320-082306-001(1064669001MSD**

GRO/BTEX - MSD recovery and RPD for several compounds does not meet QC criteria. See LCS for control.

724122 **CCV** **CCV for HBN 176723 [VFC/8005]**

GRO - Closing CCV surrogate recovery is biased low (74%). This surrogate may be biased low in associated samples

SGS

Laboratory Analysis Report

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

Angela Miller
Shannon & Wilson-Fairbanks
2355 Hill Road
Fairbanks, AK 99709

Work Order:	1064669
	31-1-11320-001 ERA
Client:	Shannon & Wilson-Fairbanks
Report Date:	September 07, 2006

Released by:

Stephen C. Ede
Alaska Division Technical Director

Stephen C. Ede
2006.09.07 14:43:42
-08'00'

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 Assurance Plan (QAP), which outlines this program, is available at your request.

The laboratory certification numbers are AK971-05 (DW), UST-005 (CS) and AK00971 (Micro) for ADEC and 001543 for NELAP.

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP, the National Environmental Laboratory Accreditation Program and, when applicable, other regulatory authorities.

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.

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 value that is greater than or equal to the MDL.
J	The quantitation is an estimation.
ND	Indicates the analyte is not detected.
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 above the calibrated range.

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

SGS

SGS Ref.#	1064669001	**All Dates/Times are Alaska Standard Time**	
Client Name	Shannon & Wilson-Fairbanks	**Printed Date/Time**	09/07/2006 14:16
Project Name/#	31-1-11320-001 ERA	**Collected Date/Time**	08/23/2006 11:12
Client Sample ID	1320-082306-001	**Received Date/Time**	08/24/2006 8:55
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	ND	100	ug/L	AK101	A		08/30/06	08/30/06	HM
Benzene	ND	0.500	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Toluene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Ethylbenzene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
o-Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Surrogates									
1,4-Difluorobenzene <surr>	91		%	SW8021B	A	74-120	08/30/06	08/30/06	HM
4-Bromofluorobenzene <surr>	70		%	AK101	A	50-150	08/30/06	08/30/06	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	300	ug/L	AK102	D		08/28/06	08/29/06	JE
Surrogates									
5a Androstane <surr>	92		%	AK102	D	50-150	08/28/06	08/29/06	JE

SGS

SGS Ref.#	1064669002
Client Name	Shannon & Wilson-Fairbanks
Project Name/#	31-1-11320-001 ERA
Client Sample ID	1320-082306-002
Matrix	Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time	09/07/2006 14:16
Collected Date/Time	08/23/2006 12:10
Received Date/Time	08/25/2006 8:55
Technical Director	**Stephen C. Ede**

Sample Remarks:

DRO - Unknown hydrocarbon with several peaks is present.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	ND	100	ug/L	AK101	A		08/30/06	08/30/06	HM
Benzene	ND	0.500	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Toluene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Ethylbenzene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
o-Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Surrogates									
1,4-Difluorobenzene <surr>	92.7		%	SW8021B	A	74-120	08/30/06	08/30/06	HM
4-Bromofluorobenzene <surr>	69.1		%	AK101	A	50-150	08/30/06	08/30/06	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	319	ug/L	AK102	D		08/28/06	08/29/06	JE
Surrogates									
5a Androstane <surr>	80.2		%	AK102	D	50-150	08/28/06	08/29/06	JE

SGS

SGS Ref.#	1064669003	**All Dates/Times are Alaska Standard Time**	
Client Name	Shannon & Wilson-Fairbanks	**Printed Date/Time**	09/07/2006 14:16
Project Name/#	31-1-11320-001 ERA	**Collected Date/Time**	08/23/2006 13:10
Client Sample ID	1320-082306-003	**Received Date/Time**	08/25/2006 8:55
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	ND	100	ug/L	AK101	A		08/30/06	08/30/06	HM
Benzene	ND	0.500	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Toluene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Ethylbenzene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
o-Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Surrogates									
1,4-Difluorobenzene <surr>	101		%	SW8021B	A	74-120	08/30/06	08/30/06	HM
4-Bromofluorobenzene <surr>	75.2		%	AK101	A	50-150	08/30/06	08/30/06	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	300	ug/L	AK102	D		08/28/06	08/29/06	JE
Surrogates									
5a Androstane <surr>	85.8		%	AK102	D	50-150	08/28/06	08/29/06	JE

SGS

SGS Ref.#	1064669004
Client Name	Shannon & Wilson-Fairbanks
Project Name/#	31-1-11320-001 ERA
Client Sample ID	1320-082306-004
Matrix	Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time	09/07/2006 14:16
Collected Date/Time	08/23/2006 14:10
Received Date/Time	08/25/2006 8:55
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	ND	100	ug/L	AK101	A		08/30/06	08/30/06	HM
Benzene	ND	0.500	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Toluene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Ethylbenzene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
o-Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Surrogates									
1,4-Difluorobenzene <surr>	97.8		%	SW8021B	A	74-120	08/30/06	08/30/06	HM
4-Bromofluorobenzene <surr>	69.9		%	AK101	A	50-150	08/30/06	08/30/06	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	300	ug/L	AK102	D		08/28/06	08/29/06	JE
Surrogates									
5a Androstane <surr>	75.6		%	AK102	D	50-150	08/28/06	08/29/06	JE

SGS

SGS Ref.#	1064669005
Client Name	Shannon & Wilson-Fairbanks
Project Name/#	31-1-11320-001 ERA
Client Sample ID	Trip Blank
Matrix	Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time	09/07/2006 14:16
Collected Date/Time	08/23/2006 11:12
Received Date/Time	08/25/2006 8:55
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	ND	100	ug/L	AK101	A		08/30/06	08/30/06	HM
Benzene	ND	0.500	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Toluene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Ethylbenzene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
o-Xylene	ND	2.00	ug/L	SW8021B	A		08/30/06	08/30/06	HM
Surrogates									
1,4-Difluorobenzene <surr>	98.5		%	SW8021B	A	74-120	08/30/06	08/30/06	HM
4-Bromofluorobenzene <surr>	69.5		%	AK101	A	50-150	08/30/06	08/30/06	HM

SGS

SGS Ref.#	723026 Method Blank		**Printed Date/Time**		09/07/2006 14:16
Client Name	Shannon & Wilson-Fairbanks		**Prep**	**Batch**	XXX17192
Project Name/#	31-1-11320-001 ERA			**Method**	SW3520C
Matrix	Water (Surface, Eff., Ground)			**Date**	08/28/2006

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Semivolatile Organic Fuels Department					
Diesel Range Organics	78.9J	300	60.0	ug/L	08/29/06
Surrogates					
5a Androstane <surr>	86.1	60-120		%	08/29/06
Batch	XFC7129				
Method	AK102				
Instrument	HP 5890 Series II FID SV A F				

SGS

SGS Ref.#	724097	Method Blank	**Printed Date/Time**		09/07/2006 14:16
Client Name	Shannon & Wilson-Fairbanks		**Prep**	**Batch**	VXX15877
Project Name/#	31-1-11320-001 ERA			**Method**	SW5030B
Matrix	Water (Surface, Eff., Ground)			**Date**	08/30/2006

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Volatile Fuels Department					
Gasoline Range Organics	ND	100	10.0	ug/L	08/30/06
Surrogates					
4-Bromofluorobenzene <surr>	72.2	50-150		%	08/30/06
Batch VFC8005					
Method AK101					
Instrument HP 5890 Series II PID+FID VCA					
Benzene	ND	0.500	0.150	ug/L	08/30/06
Toluene	ND	2.00	0.620	ug/L	08/30/06
Ethylbenzene	ND	2.00	0.620	ug/L	08/30/06
P & M -Xylene	ND	2.00	0.620	ug/L	08/30/06
o-Xylene	ND	2.00	0.620	ug/L	08/30/06
Surrogates					
1,4-Difluorobenzene <surr>	96.9	74-120		%	08/30/06
Batch VFC8005					
Method SW8021B					
Instrument HP 5890 Series II PID+FID VCA					

SGS

SGS Ref.#	723027	Lab Control Sample	**Printed Date/Time**	09/07/2006	14:16
	723028	Lab Control Sample Duplicate	**Prep Batch**	XXX17192	
Client Name	Shannon & Wilson-Fairbanks		**Method**	SW3520C	
Project Name/#	31-1-11320-001 ERA		**Date**	08/28/2006	
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS	819	82	(75-125)			1000 ug/L	08/29/2006
	LCSD	846	85		3	(< 20)	1000 ug/L	08/29/2006
Surrogates								
5a Androstane <surr>	LCS		73	(60-120)				08/29/2006
	LCSD		73		0			08/29/2006

Batch	XFC7129
Method	AK102
Instrument	HP 5890 Series II FID SV A F

SGS

SGS Ref.#	724098 Lab Control Sample	**Printed Date/Time**		09/07/2006	14:16
		Prep	**Batch**	VXX15877	
Client Name	Shannon & Wilson-Fairbanks		**Method**	SW5030B	
Project Name/#	31-1-11320-001 ERA		**Date**	08/30/2006	
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department								
Benzene	LCS	44.8	90	(79-115)			50 ug/L	08/30/2006
Toluene	LCS	51.5	103	(85-117)			50 ug/L	08/30/2006
Ethylbenzene	LCS	44.5	89	(81-120)			50 ug/L	08/30/2006
P & M -Xylene	LCS	93.8	94	(87-119)			100 ug/L	08/30/2006
o-Xylene	LCS	44.2	89	(85-114)			50 ug/L	08/30/2006
Surrogates								
1,4-Difluorobenzene <surr>	LCS		105	(74-120)				08/30/2006

Batch	VFC8005
Method	SW8021B
Instrument	HP 5890 Series II PID+FID VCA

SGS

SGS Ref.#	724099	Lab Control Sample	**Printed Date/Time**	09/07/2006	14:16
			Prep Batch	VXX15877	
Client Name	Shannon & Wilson-Fairbanks		**Method**	SW5030B	
Project Name/#	31-1-11320-001 ERA		**Date**	08/30/2006	
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department								
Gasoline Range Organics	LCS	400	89	(60-120)			450 ug/L	08/30/2006
Surrogates								
4-Bromofluorobenzene <surr>	LCS		77	(50-150)				08/30/2006

Batch VFC8005
Method AK101
Instrument HP 5890 Series II PID+FID VCA

SGS

SGS Ref.#	724100	Matrix Spike	**Printed Date/Time**		09/07/2006 14:16
	724101	Matrix Spike Duplicate	**Prep**	**Batch**	VXX15877
				Method	Volatile Fuels Extraction (W)
				Date	08/30/2006
Original	1064669001				
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department										
Benzene		MS	ND	51	102	(79-115)			50	ug/L 08/30/2006
		MSD		68.6	137*		29 *	(< 20)	50	ug/L 08/30/2006
Toluene		MS	ND	53.4	107	(85-117)			50	ug/L 08/30/2006
		MSD		68.8	138*		25 *	(< 20)	50	ug/L 08/30/2006
Ethylbenzene		MS	ND	54.7	109	(81-120)			50	ug/L 08/30/2006
		MSD		71.7	143*		27 *	(< 20)	50	ug/L 08/30/2006
P & M -Xylene		MS	ND	111	111	(87-119)			100	ug/L 08/30/2006
		MSD		146	146*		27 *	(< 20)	100	ug/L 08/30/2006
o-Xylene		MS	ND	53.3	107	(85-114)			50	ug/L 08/30/2006
		MSD		70.2	140*		27 *	(< 20)	50	ug/L 08/30/2006
Surrogates										
1,4-Difluorobenzene <surr>		MS		44.4	89	(74-120)				08/30/2006
		MSD		51	102		14			08/30/2006

Batch VFC8005
Method SW8021B
Instrument HP 5890 Series II PID+FID VCA

SGS

SGS Ref.#	724102	Matrix Spike	**Printed Date/Time**		09/07/2006 14:16
	724103	Matrix Spike Duplicate	**Prep**	**Batch**	VXX15877
				Method	Volatile Fuels Extraction (W)
				Date	08/30/2006
Original	1064669001				
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department										
Gasoline Range Organics		MS	ND	376	84	(60-120)			450 ug/L	08/30/2006
		MSD		402	89		7	(< 20)	450 ug/L	08/30/2006
Surrogates										
4-Bromofluorobenzene <surr>		MS		38	76	(50-150)				08/30/2006
		MSD		43.9	88		14			08/30/2006

Batch VFC8005
Method AK101
Instrument HP 5890 Series II PID+FID VCA

SGS

SGS Ref.#	1064852050	Billable Matrix Spike	**Printed Date/Time**	09/07/2006 14:16
	1064852051	Billable Matrix Spike Dup.	**Prep Batch**	VXX15877
			Method	Volatile Fuels Extraction (W)
			Date	08/30/2006
Original	1064852049			
Matrix	Water (Surface, Eff., Ground)			

QC results affect the following production samples:

1064669001, 1064669002, 1064669003, 1064669004, 1064669005

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department									
Gasoline Range Organics	BMS	ND	350	78	(60-120)			450 ug/L	08/30/2006
	BMSD		354	79		1	(< 20)	450 ug/L	08/30/2006
Surrogates									
4-Bromofluorobenzene <surr>	BMS		36.9	74	(50-150)				08/30/2006
	BMSD		36.1	72		2			08/30/2006

Batch VFC8005
Method AK101
Instrument HP 5890 Series II PID+FID VCA

Shannon & Wilson, Inc.

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

1150 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2355 Hill Road
Fairbanks, AK 99707
(907) 479-0600

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

Chain of Custody Record

1064669

Laboratory SGS

Attn:

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO/BTEX	DRO					Total Number of Containers	Remarks/Matrix
1320-082306-001	1A-E	1112	8-23-6		X	X	X					5	GW
1320-082306-002	2	1210	"		"	X	X					"	"
1320-082306-003	3	1310	"		"	X	X					"	"
1320-082306-004	4	1410	"		"	X	X					"	"
Trip Blank	5A-C	—	—		—	X						3	—

Project Information		Sample Receipt	
Project Number:	31-1-11320-001	Total Number of Containers	
Project Name:	ERA	COC Seals/Intact? Y/N/NA	NA
Contact:	Angela Miller	Received Good Cond./Cold	Y
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	hand
Sampler:	Nathan Brennan	(attach shipping bill, if any)	

Instructions
Requested Turn Around Time: Std
Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature:	Time: 815	Signature:	Time: 4:40PM	Signature:	Time:
Printed Name: Nathan Brennan	Date: 8-24-06	Printed Name: Ethan Nelson	Date: 8-24-06	Printed Name:	Date:
Company: SOW		Company: SGS		Company:	

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Time: 8:15AM	Signature:	Time:	Signature:	Time: 0855
Printed Name: Ethan Nelson	Date: 8-24-06	Printed Name:	Date:	Printed Name: Erin Lee	Date: 8/25/06
Company: SGS		Company:		Company: SGS	

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

F-19-91/UR

SGS

SAMPLE RECEIPT FORM

SGS WO#: 1064669

Yes	No	NA		
	X		Are samples **RUSH**, priority, or *w/n 72 hrs.* of **hold time**?	**Due Date:** 9-8-06 ~~9/7/06~~
		X	If yes have you done *e-mail notification*?	**Received Date:** 8-24-06
	X		Are samples *within 24 hrs.* of **hold time** or due date?	**Received Time:** 8:15 AM
		X	If yes, have you *spoken with* Supervisor?	**Is date/time conversion** necessary? ___
		X	Archiving bottles – if req., are they properly marked?	# of hours to AK Local Time: ___
		X	Are there any **problems**? PM Notified? ___	**Thermometer ID:** Longsten B
X			Were samples preserved correctly ~~and pH verified?~~ ~~MeOH~~ ~~EJL 8/25/06~~ samples pres. correctly and pH verified EJL 8/25/06	
		X	If this is for PWS, provide **PWSID.** ___	
		X	Will courier charges apply?	
		X	Method of payment? ___	
X			Data package required? (Level: 1 / (2) / 3 / 4)	
			Notes: ___	
	X		Is this a DoD project? (USACE, Navy, AFCEE)	

Cooler ID	Temp Blank	Cooler Temp
1	2.1 °C	2.2 °C
	°C	°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 / Carlile Lynden / SGS / Other: ___

Airbill # ___

Additional Sample Remarks: *(√ if applicable)*

- ___ Extra Sample Volume?
- ___ Limited Sample Volume?
- X Field preserved for volatiles?
- EJL Field-filtered for dissolved? ___
- 8/25/06 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? # / where: ___	
		Were seal(s) intact upon arrival?	
		Was there a COC with cooler?	
		Was COC sealed in plastic bag & taped inside lid of cooler?	
		Was the COC filled out properly?	
		Did the COC indicate COE / AFCEE / Navy project?	
		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 VOCs free of headspace and/or MeOH preserved?	
		Were correct container / sample sizes submitted?	
		Is sample condition good?	
		Was copy of CoC, SRF, and custody seals given to PM to fax?	

This section must be filled if problems are found.

Yes No ___ ___ Was client notified of problems?

Individual contacted: ___

Via: Phone / Fax / Email *(circle one)*

Date/Time: ___

Reason for contact: ___

Change Order Required? ___

SGS Contact: ___

Notes: ___

Completed by (sign): [signature] **(print):** Ethan Nelson

Login proof (check one): waived ___ required X performed by: [signature]

SGS

SAMPLE RECEIPT FORM (page 2)

SGS WO# 1064669

#	Container ID	Matrix	Test	QC	TB	Container Volume: 1 L	500 mL	250 mL	125 mL	60 mL	40 mL	8oz (250 mL)	4oz (125 mL)	Other	Container Type: AG	CG	HDPE	Nalgene	Cubie	Coli	Septa	Other	Preservative: None	HCl	HNO_3	H_2SO_4	MeOH	$Na_2S_2O_3$	NaOH	Other
1-4	A-C	1	GRO/BTEX								12				X						X			X						
	D-E		DRO			8									X									X						
5	A-C	1	GRO/BTEX		X						3				X						X			X						
Bottle Totals						8					15																			

Completed by: H N Date: 8-24-06

SGS

SGS WO#: 1064669

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: 8/25/06

Is Sample Date/Time Conversion Necessary? Yes _____ No ✓

Number of Hours From Alaska Local Time: —

Foreign Soil? Yes _____ No ✓

Delivery method to Anchorage (*circle all that apply*):

Alert Courier / UPS / FedEx / USPS / AA Goldstreak / NAC / ERA / PenAir / Carlile / (Lynden) / SGS

Other: _____

Airbill # _____

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank (°C)	Cooler (°C)	Cooler ID	Temp Blank (°C)	Cooler (°C)
2	5.8	4.2			

CUSTODY SEALS INTACT: (YES) / NO

~~# / WHERE:~~ 2 / one front, one back

COMPLETED BY: Lucy Lee

**Temperature readings include thermometer correction factors.*

1064669

SGS Environmental

CUSTODY SEAL WO# 4669-4671

Signature: [signature]

Date/Time: 8-24-06 9:40Pm

SGS Environmental

CUSTODY SEAL 4669-4671

Signature: [signature]

Date/Time: 8-24-06 9:40Pm