

**Site Characterization  
Former Williams Express Site No. 5009  
1209 Gambell Street  
Anchorage, Alaska**

February 2010

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## TABLE OF CONTENTS

|     |   |   |
|-----|---|---|
| 1.0 | INTRODUCTION .....  | 1 |
| 2.0 | SITE DESCRIPTION .....                                    | 1 |
| 3.0 | PROJECT DESCRIPTION.....                                  | 1 |
| 4.0 | FIELD ACTIVITIES .....                                    | 1 |
|     | 4.1 Soil Borings.....                                     | 2 |
|     | 4.2 Soil Sample Collection, Screening, and Analyses ..... | 2 |
|     | 4.3 Monitoring Well Installation.....                     | 3 |
|     | 4.4 Monitoring Well Development and Sampling .....        | 3 |
|     | 4.5 Monitoring Well Decommissioning.....                  | 3 |
|     | 4.6 Investigation-Derived Waste.....                      | 4 |
| 5.0 | LABORATORY ANALYSES .....                                 | 4 |
| 6.0 | SUBSURFACE CONDITIONS .....                               | 4 |
| 7.0 | DISCUSSION OF RESULTS.....                                | 5 |
|     | 7.1 Soil Samples .....                                    | 5 |
|     | 7.2 Groundwater Samples .....                             | 5 |
|     | 7.3 Quality Control.....                                  | 5 |
| 8.0 | CONCLUSIONS.....  | 6 |
| 9.0 | CLOSURE/LIMITATIONS .....                                 | 6 |

## LIST OF TABLES

|         |   |
|---------|---|
| Table 1 | Sample Locations and Descriptions         |
| Table 2 | Well Development and Sampling Log         |
| Table 3 | Summary of Soil Analytical Results        |
| Table 4 | Summary of Groundwater Analytical Results |

## LIST OF FIGURES

|          |  |
|----------|--|
| Figure 1 | Vicinity Map                           |
| Figure 2 | Site Plan                              |
| Figure 3 | Monitoring Well MW-5 Historical Trends |

## LIST OF APPENDICES

|            |   |
|------------|---|
| Appendix A | Site Photos   |
| Appendix B | Boring Log and Monitoring Well Construction Details   |
| Appendix C | Results of Analytical Testing By SGS Environmental Services of Anchorage, Alaska and ADEC's Laboratory Data Review Checklists |
| Appendix D | Emerald Alaska, Inc. Certificate of Disposal  |
| Appendix E | Important Information About Your Geotechnical/ Environmental Report   |

**ACRONYMS AND ABBREVIATIONS**

|           |   |
|-----------|---|
| AAC       | Alaska Administrative Code                                    |
| ADEC      | Alaska Department of Environmental Conservation               |
| AK        | Alaska Method   |
| bgs       | Below the Ground Surface                                      |
| BTEX      | Benzene, Toluene, Ethylbenzene, and Xylenes                   |
| Discovery | Discovery Drilling  |
| DQO       | Data Quality Objective  |
| DRO       | Diesel Range Organics   |
| EPA       | Environmental Protection Agency                               |
| GRO       | Gasoline Range Organics                                       |
| I.D.      | Inside Diameter   |
| LCS/LCSD  | Laboratory Control Sample/Laboratory Control Sample Duplicate |
| ml        | Milliliter  |
| MS/MSD    | Matrix Spike/Matrix Spike Duplicate                           |
| O.D.      | Outside Diameter  |
| OVM       | Organic Vapor Meter   |
| PID       | Photoionization Detector                                      |
| ppm       | Parts Per Million   |
| PVC       | Polyvinyl Chloride  |
| SGS       | SGS Environmental Services, Inc.                              |

**SITE CHARACTERIZATION  
FORMER WILLIAMS EXPRESS SITE No. 5009  
1209 GAMBELL STREET  
ANCHORAGE, ALASKA**

*ADEC File No. 2100.26.024  
Fac ID No. 0756*

## **1.0 INTRODUCTION**

This report presents the results of Shannon & Wilson's December 2009 site characterization activities at former Williams Express Site No. 5009 (WES 5009), 1209 Gambell Street in Anchorage, Alaska. The work was conducted in material accordance with our December 11, 2009 work plan, which was approved by Ms. Keather McLoone of the Alaska Department of Environmental Conservation (ADEC) on December 16, 2009.

## **2.0 SITE DESCRIPTION & BACKGROUND**

WES 5009 is located on the southeast corner of 12<sup>th</sup> Avenue and Gambell Street in Anchorage, Alaska. The site location is shown on the vicinity map included as Figure 1. A detailed site plan is provided as Figure 2. Additional information about the site is contained in Shannon & Wilson's December 2003 *WES No. 5009 Site Summary*.

## **3.0 PROJECT DESCRIPTION**

The project purpose is to progress towards Cleanup Complete with Institutional Controls status with the ADEC. The objective of the site activities was to install a downgradient monitoring well to delineate the extent of contamination to the southwest (the historical groundwater flow direction).

## **4.0 FIELD ACTIVITIES**

The field efforts included advancing one soil boring and installing one groundwater monitoring well, well development, collecting soil and water samples, and decommissioning three monitoring wells and two vapor extraction wells. The well drilling, installation, and decommissioning activities were conducted by Discovery Drilling (Discovery) of Anchorage, Alaska under subcontract to Shannon & Wilson. Analytical testing was provided by SGS Environmental Services (SGS) of Anchorage, Alaska. Photographs of field activities are included in Appendix A.

#### 4.1 Soil Borings

Soil Boring B7 was advanced on December 18, 2009 on the north side of 13<sup>th</sup> Avenue, west of Gambell Street (as shown on Figure 2). Soil Boring B7 was positioned southwest of the site, and downgradient of Monitoring Well MW4, as shown in Photo 1, included in Appendix A. Discovery provided a truck-mounted CME-55 drill rig equipped with a 4-inch inside diameter (I.D.) hollow stem auger. Drilling equipment was steam-cleaned off site prior to use, and clean augers were used to drill the boring. The boring was advanced to a depth of approximately 29 feet below ground surface (bgs). Drill cuttings from Borings B7 were containerized in 55-gallon drums (See Section 4.6 for waste disposal details).

#### 4.2 Soil Sample Collection, Screening, and Analyses

Soil samples were obtained by driving a 3-inch outside diameter (O.D.) split-spoon sampler 24 inches ahead of the auger flights using a 340-pound hammer free falling 30 inches onto the drilling rods. Soil screening samples were collected at 5-foot intervals from the ground surface to approximately 20 feet bgs, and from the base of the boring. Sample descriptions and field screening results are listed in Table 1. Additional drilling information, including soil stratigraphy and blow counts, is presented on the boring log provided in Appendix B.

The soil samples recovered from the subsurface were visually classified for soil type, and screened for volatile organic compounds using an OVM 580B photoionization detector (PID), calibrated to 100 parts per million (ppm) isobutylene gas. The PID was used to sample organic vapors in the soil gas using an ADEC-approved headspace screening technique. Based on the results of the headspace screening and field observations, one soil sample from the smear zone was selected for laboratory analysis. The analytical soil sample was placed in the laboratory-supplied containers using a clean, stainless-steel spoon. The soil sample analyzed for diesel range organics (DRO) was collected in a 4-ounce jar with teflon-lined lids. The soil sample analyzed for gasoline range organics (GRO) and aromatic volatile organics (BTEX) by Environmental Protection Agency (EPA) Method 8021B was collected using the ADEC sampling procedure for Alaska Method 101 (AK 101) and a field methanol extraction using EPA Method 5035. In accordance with the method, approximately 25 to 50 grams of soil were placed in a pre-weighed, 4-ounce jar with septa lid. Afterward, 25 milliliters of reagent grade methanol were added to submerge the soil. The methanol extracted the volatile petroleum hydrocarbons from the soil at the time of sampling, thereby reducing the possible loss of volatile constituents prior to sample analysis. The soil and water samples were transferred to the laboratory in coolers with ice packs using

### 4.3 Monitoring Well Installation

Boring B7 was completed as Monitoring Well MW7. The well was constructed of 2-inch nominal I.D. schedule 40 PVC pipe with threaded connections. The bottom 10 feet of the well consisted of polyvinyl chloride (PVC) pipe with 0.020-inch slotted well screen. Solid 2-inch diameter PVC risers were attached to the well screen and extended to the ground surface. The bottom of the well was placed at approximately 29 feet bgs. A 10-20 silica sand filter pack was manually poured into the annular space between the well casing and the borehole to an elevation approximately 1 foot above the top of the well screen. Bentonite chips were placed above the filter pack to approximately 1 foot bgs. Silica sand was placed above the near-surface bentonite seal, and a flush mount cover was set in concrete to complete the well. The monitoring well construction log is provided in Appendix B.

### 4.4 Monitoring Well Development and Sampling

Monitoring Wells MW7 was developed on December 21, 2009. Well development was conducted to stabilize the filter pack, remove fine-grained soils or suspended sediment from the surrounding aquifer formation, and establish water inflow pathways into the well that are representative of the aquifer formation prior to drilling. Well development was considered complete when 55 gallons of water was removed from the well. During development and purging, water quality parameters including pH, temperature, and specific conductance were obtained using a Hanna water quality instrument. Turbidity was measured during development using a Hach turbidimeter. The development water generated during this process was containerized in a 55-gallon drum. Well development and sampling data are listed in Table 2.

Prior to sampling, groundwater in Monitoring Well MW7 was allowed to recover to at least 80 percent of the initial volume measured prior to development. Because the water sample was collected within 24 hours of well development, no additional purging of the well was conducted. In addition to sampling the newly installed well, a groundwater sample was also collected from Monitoring Well MW5. Well MW5 was sampled using a disposable bailer and no purge sampling. Water quality parameters were recorded at the time of sampling. One duplicate groundwater sample was also collected for quality control from Well MW-7, designated Sample MW-8.

### 4.5 Monitoring Well Decommissioning

Monitoring Wells MW1, MW2, and MW4, and Vapor Extraction Wells VE-1 and VE-2 were decommissioned on December 18, 2009. Decommissioning activities were conducted in general accordance with Shannon & Wilson's May 29, 2009 *Work Plan for Monitoring Well Decommissioning at Holiday and/or Williams Stores, Alaska*. Following decommissioning, the ground surfaces around the wells were repaired with cold patch asphalt, concrete, or gravel to

match surrounding conditions. Photos 2 and 3 show typical decommissioning activities conducted.

#### **4.6 Investigation-Derived Waste**

Waste material generated during the course of this investigation included two 55-gallon steel drums of soil cuttings, one 55-gallon steel drum of purge and decontamination water, and miscellaneous sampling supplies. Drums of soil cuttings and decontamination water and purge water were picked up by Emerald for treatment and disposal on December 24, 2009. Miscellaneous sampling supplies included disposable nitrile gloves, paper towels, empty glass vials, polyethylene bailers, polypropylene string, and vinyl tubing, and were disposed as solid waste in the Municipality of Anchorage landfill. The disposal certificate from Emerald is included in Appendix D.

### **5.0 LABORATORY ANALYSES**

One soil sample and three groundwater samples, including one duplicate water sample, were submitted to SGS for laboratory analyses. Quality control samples consisted of one soil trip blank, one water trip blank, and one field duplicate. The project and duplicate samples were analyzed for GRO by AK 101, DRO by AK 102 and BTEX by EPA Method 8021B. The trip blanks were analyzed for GRO and BTEX. The soil and groundwater sample results are summarized in Tables 3 and 4, respectively. Copies of the laboratory reports are provided in Appendix C.

### **6.0 SUBSURFACE CONDITIONS**

The description of subsurface conditions is based on our December 2009 field observations. Sandy gravel was encountered in Boring B7 from the ground surface to about 15 feet bgs. A sand layer with variable gravel content was encountered from approximately 15 feet bgs to the bottom of the boring at approximately 29 feet bgs. Soil conditions documented during drilling are recorded in Table 1 and on the boring log included in Appendix B.

Groundwater contact was encountered during drilling at a depth of approximately 24 feet bgs in Boring B7. The static groundwater levels of Monitoring Wells MW5 and MW7 were measured on December 21, 2009 at 23.84 and 23.52 feet below the tops of casing, respectively. These groundwater levels are consistent with the typical flow direction to the southwest, as determined from historical data from WES 5009 monitoring.

## 7.0 DISCUSSION OF RESULTS

Contaminant concentrations in the soil and groundwater samples were compared to the cleanup levels listed in the Oil and Other Hazardous Substances Pollution Control Regulations (18 Alaska Administrative Code (AAC) 75, Sections 341 and 345, October 2008). The soil cleanup criteria are based on the most stringent Method 2 levels listed in Tables B1 and B2 for the “under 40-inch (precipitation) zone”. Groundwater cleanup levels are listed in Table C, 18 AAC 75.345.

### 7.1 Soil Samples

One analytical soil sample was submitted for analytical testing. Sample B7S6, collected from between 24 and 26 feet bgs from Boring B7, did not contain detectable concentrations of target analytes.

### 7.2 Groundwater Samples

The December 2009 groundwater sample from Monitoring Well MW5 contained 3.92 mg/L DRO, which is greater than the applicable cleanup level of 1.5 mg/L. Other target analytes were not detected in the groundwater sample. These analytical results are comparable to historical groundwater data collected from Monitoring Well MW5, as shown in Figure 3. This suggests that groundwater samples collected during this December 2009 event are generally representative of the conditions at the site. The groundwater sample collected from Monitoring Well MW7 did not contain detectable concentrations of target analytes.

### 7.3 Quality Control

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQO). Internal laboratory controls to assess data quality for this project include method blanks, and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to assess precision and accuracy. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the Case Narrative section of their Laboratory Analysis Report (See Appendix C). Shannon & Wilson reviewed the laboratory data deliverables and completed the ADEC’s Laboratory Data Review Checklist, which is included in Appendix C. Based on our review of SGS’s data reports, the project data meet the ADEC DQOs.

The sample temperature was documented as 0.4 degrees C, which below the recommended range. However, since the lab noted that no ice was present within the samples, the sample storage temperature should not impact the data usability.



The lab also noted that a VOA sample container from the groundwater sample collected from Monitoring Well MW5 contained a 6 millimeter air bubble. However, the remaining VOA containers did not contain air bubbles, and were used for analysis of Sample MW5.

External quality controls include field records and trip blanks. Data validation was performed to assess the field records and analytical test results. Field logs and records were checked for completeness, accuracy, and adherence to field procedures established in ADEC's guidance documents. No discrepancies were identified in the field records that would impact the validity of the data.

One soil trip blank and one water trip blank accompanied the sample jars from the laboratory to the site during sampling activities and back again to the laboratory. The trip blanks did not contain detectable concentrations of target analytes, indicating that the samples were not contaminated during the sample handling and storage process.

## **8.0 CONCLUSIONS**

This site characterization effort included advancing one soil boring and installing one groundwater monitoring well, collecting soil and water samples, and well development. Three monitoring wells and two vapor extraction wells were also decommissioned at the site. The soil and groundwater sample collected from Boring B7/Monitoring Well MW7 did not contain detectable concentrations of target analytes. Based on the results of this sampling event, a Cleanup Complete with Institutional Controls designation will be petitioned for this site under a separate cover.

## **9.0 CLOSURE/LIMITATIONS**

This report was prepared for the exclusive use of our client and their representatives in the study of this site. The findings we have presented within this report are based on the limited research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the site's soil and groundwater quality. It is possible that our subsurface tests missed higher levels of petroleum hydrocarbon constituents, although our intention was to sample areas likely to be impacted. As a result, the analyses and sampling performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised.

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

Shannon & Wilson has prepared the document in Appendix D, "Important Information About Your Geotechnical/Environmental Report", to assist you and others in understanding the use and limitations of our reports.

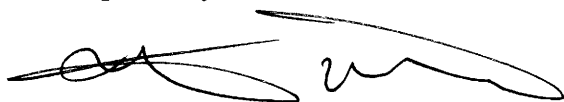
Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion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

We appreciate the opportunity to be of service and your continued confidence in our firm. Please call Matt Hemry, P.E. or the undersigned at (907) 561-2120 if you have questions regarding the contents of this report.

Sincerely,

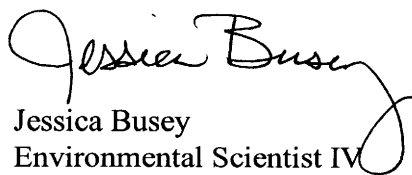
**SHANNON & WILSON, INC.**

Prepared By:



Jessica A. Morris  
Environmental Engineer II

Reviewed By:



Jessica Busey  
Environmental Scientist IV

srb: MSH

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

| Sample Number                         | Date       | Sample Location<br>(See Figure 2) | Depth<br>(feet)~ | Headspace<br>(ppm) ^ | Sample Classification** (see boring log in Appendix B)                             |
|---------------------------------------|------------|-----------------------------------|------------------|----------------------|--|
| <b>Soil Boring Samples</b>            |            |                                   |                  |                      |  |
| <b><u>Boring B7</u></b>               |            |                                   |                  |                      |  |
| B7S1                                  | 12/18/2009 | Boring B7, Sample 1               | 5 - 7            | 1.4                  | Medium dense, dark brown, sandy GRAVEL; moist                                      |
| B7S2                                  | 12/18/2009 | Boring B7, Sample 2               | 10 - 12          | 3.4                  | Medium dense, dark brown, sandy GRAVEL; moist                                      |
| B7S3                                  | 12/18/2009 | Boring B7, Sample 3               | 15 - 17          | 1.3                  | Medium dense, light brown, gravely SAND; moist                                     |
| B7S4                                  | 12/18/2009 | Boring B7, Sample 4               | 20 - 22          | 1.4                  | Medium dense, brown SAND; moist  |
| B7S5                                  | 12/18/2009 | Boring B7, Sample 5               | 22 - 24          | 2.0                  | Medium dense, brown SAND; moist  |
| * B7S6                                | 12/18/2009 | Boring B7, Sample 6               | 24 - 26          | 3.1                  | Medium dense, brown SAND; wet  |
| B7S7                                  | 12/18/2009 | Boring B7, Sample 7               | 27.5 - 29        | -                    | Medium dense, brown SAND; wet; Stiff, gray SILT in last few inches of split spoon. |
| <b><u>Groundwater Samples</u></b>     |            |                                   |                  |                      |  |
| * MW5                                 | 12/21/2009 | Monitoring Well MW5               | 23.84            | -                    | Groundwater  |
| * MW7                                 | 12/21/2009 | Monitoring Well MW7               | 23.52            | -                    | Groundwater  |
| * MW8                                 | 12/21/2009 | Field Duplicate of MW7            | 23.52            | -                    | Groundwater  |
| <b><u>Quality Control Samples</u></b> |            |                                   |                  |                      |  |
| * Soil Trip Blank                     | -          | Soil Trip Blank                   | -                | -                    | Ottawa sand with methanol added in the laboratory                                  |
| * Water Trip                          | -          | Water Trip Blank                  | -                | -                    | Organic-free water blank prepared in the laboratory                                |

**KEY DESCRIPTION**

- \* Sample analyzed by the project laboratory (See Tables 3 & 4)
- \*\* Sample classification applies to the portion of the specified sample interval from which the sample was collected
- ^ Field screening instrument was a ThermoInstruments 580B photoionization detector (PID)
- Measurement not recorded or not applicable
- ppm parts per million
- ~ Depths for soil samples were measured below ground surface. Depths for groundwater samples were measured below the top of casing.

**TABLE 2 - WELL DEVELOPMENT AND SAMPLING LOG****WATER LEVEL MEASUREMENT DATA**

| Well Number                           | MW5        | MW7        |
|---------------------------------------|------------|------------|
| Date Water Level Measured             | 12/21/2009 | 12/21/2009 |
| Time Water Level Measured             | 10:45      | 10:50      |
| Measured Depth to Water (ft below MP) | 23.84      | 23.52      |

**DEVELOPMENT/PURGING DATA**

| Well Number                                  | MW5        | MW7                               |
|--|------------|-----------------------------------|
| Date Sampled                                 | 12/21/2009 | 12/21/2009                        |
| Time Sampled                                 | 13:45      | 12:55                             |
| Measured Static Depth to Water (ft below MP) | 23.84      | 23.52                             |
| Total Depth of Well (ft below MP)            | 27.18      | 29.04                             |
| Water Column in Well (ft)                    | 3.34       | 5.52                              |
| Gallons per Foot                             | 0.16       | 0.16                              |
| Water Column Volume (gallons)                | 0.53       | 0.88                              |
| Total Volume Pumped/Bailed (gallons)         | 0          | 55                                |
| Development Method                           | -          | Submersible Pump/<br>Surge Block  |
| Purging/Sampling Method                      | bailer     | Submersible Pump                  |
| Diameter of Well Casing                      | 2-inch     | 2-inch                            |
| Remarks                                      |            | Duplicate Sample<br>MW8 collected |

**WATER QUALITY DATA**

| WELL NUMBER                  | MW5  | MW7  |
|------------------------------|------|------|
| Temperature (°C)             | 4.9  | 4.5  |
| Specific Conductance (µS/cm) | 513  | 371  |
| pH (Standard Units)          | 5.61 | 6.00 |
| Turbidity (NTU)              | 178  | 609  |

Note: Water quality parameters were measured with a Hanna water quality meter and a Hach turbidimeter.

| <b>KEY</b> | <b>DESCRIPTION</b>                  |
|------------|-------------------------------------|
| °C         | Degrees Celsius                     |
| ft         | Feet                                |
| µS/cm      | MicroSiemens per Centimeter         |
| MP         | Measuring Point - Top of PVC Casing |
| NTU        | Nephelometric Turbidity Units       |
| Mg/L       | Milligrams per Liter                |
| ppm        | Parts per Million                   |
| -          | Not applicable                      |

TABLE 3 - SUMMARY OF SOIL ANALYTICAL RESULTS

| Parameter Tested                      | Method*   | Cleanup Level<br>(mg/kg)** | Sample Number ^ and Depth in feet<br>(See Table 1, Figure 2, and Appendices B & C) |                 |
|---------------------------------------|-----------|----------------------------|--|-----------------|
|                                       |           |                            | Soil Boring  | Quality Control |
|                                       |           |                            | B7S6<br>24-26  | Soil Trip Blank |
| PID Headspace Reading - ppm           | 580B PID  | -                          | 3.1  | -               |
| Diesel Range Organics (DRO) - mg/kg   | AK 102    | 250                        | < 24.1   | -               |
| Gasoline Range Organics (GRO) - mg/kg | AK 101    | 300                        | < 2.99   | < 2.50          |
| Aromatic Volatile Organics (BTEX)     |           |                            |  |                 |
| Benzene - mg/kg                       | EPA 8021B | 0.025                      | < 0.0149   | < 0.0125        |
| Toluene - mg/kg                       | EPA 8021B | 6.5                        | < 0.0598   | < 0.050         |
| Ethylbenzene - mg/kg                  | EPA 8021B | 6.9                        | < 0.0598   | < 0.050         |
| Xylenes - mg/kg                       | EPA 8021B | 63                         | < 0.0598   | < 0.050         |

| KEY | DESCRIPTION |
|-----|-------------|
|-----|-------------|

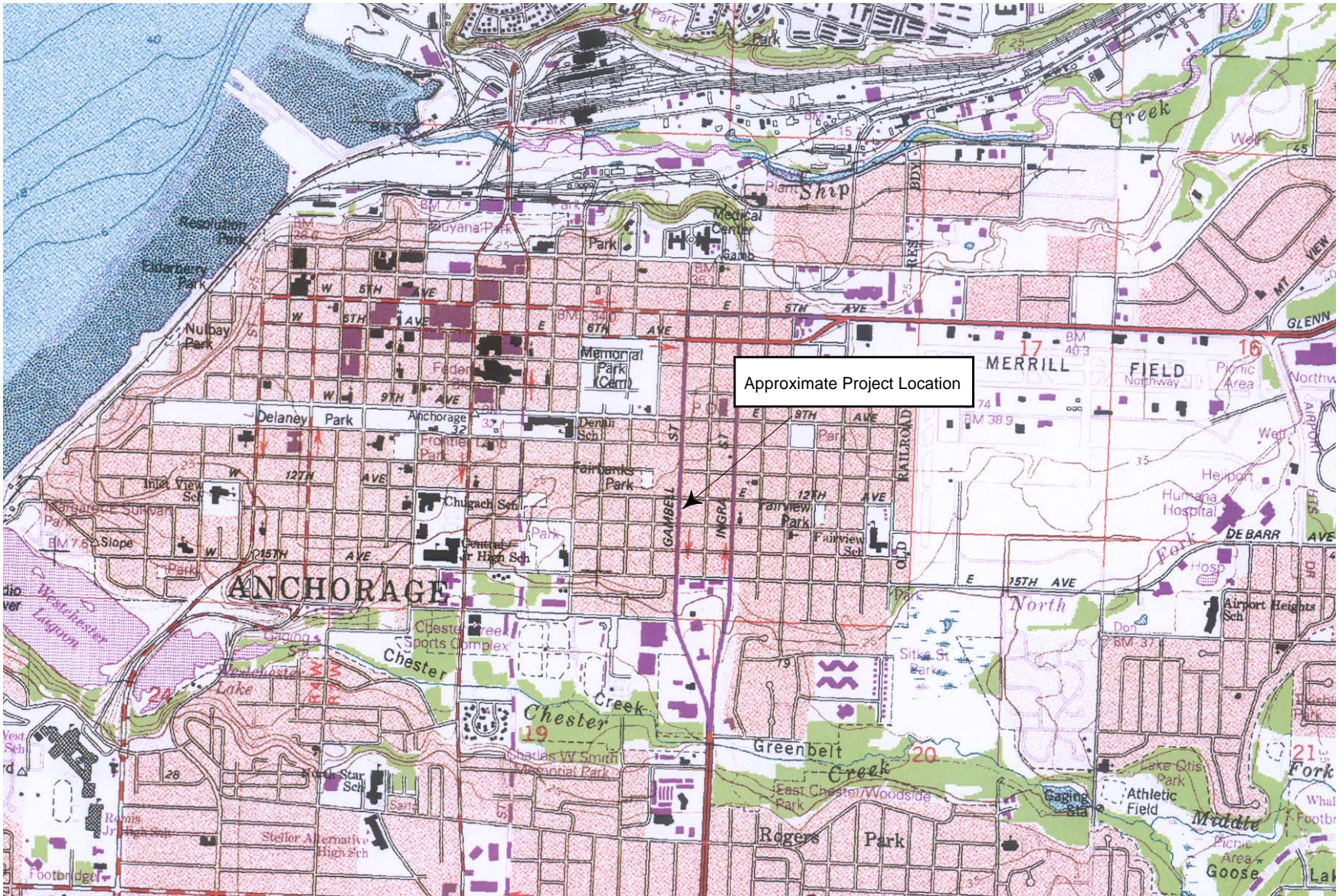
|       |  |
|-------|--|
| *     | See Appendix C for compounds tested, methods, and laboratory reporting limits  |
| **    | Soil cleanup level is the most stringent standard listed in Table B1 or B2, 18 AAC 75, for the "under 40 inches (precipitation) zone" [October 2008] |
| ^     | Sample ID No. preceded by "17309-094-" on the chain of custody form  |
| <2.99 | Analyte not detected; laboratory reporting limit of 2.99 mg/kg   |
| -     | Not applicable or sample not tested for this analyte   |
| mg/kg | milligrams per kilogram  |

**TABLE 4 - SUMMARY OF GROUNDWATER ANALYTICAL RESULTS**

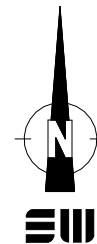
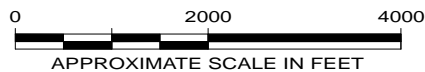
| Parameter Tested                     | Method*   | Cleanup Level<br>(mg/L)** | Sample Number ^ and Water Depth<br>(See Tables 1 & 2, Figure 2, and Appendix C) |            |            |                  |
|--------------------------------------|-----------|---------------------------|---|------------|------------|------------------|
|                                      |           |                           | Monitoring Wells  |            |            | Quality Control  |
|                                      |           |                           | MW5   | MW7        | MW8~       | Water Trip Blank |
|                                      |           |                           | 23.84   | 23.52      | 23.52      | -                |
| Diesel Range Organics (DRO) - mg/L   | AK 102    | 1.5                       | <b>3.92</b>   | < 0.821    | < 0.837    | -                |
| Gasoline Range Organics (GRO) - mg/L | AK 101    | 1.1                       | < 0.100   | < 0.100    | < 0.100    | < 0.100          |
| Aromatic Volatile Organics (BTEX)    |           |                           |   |            |            |                  |
| Benzene - mg/L                       | EPA 8021B | 0.005                     | < 0.000500  | < 0.000500 | < 0.000500 | < 0.000500       |
| Toluene - mg/L                       | EPA 8021B | 1.0                       | < 0.00200   | < 0.00200  | < 0.00200  | < 0.00200        |
| Ethylbenzene -mg/L                   | EPA 8021B | 0.7                       | < 0.00200   | < 0.00200  | < 0.00200  | < 0.00200        |
| Xylenes - mg/L                       | EPA 8021B | 10                        | < 0.00200   | < 0.00200  | < 0.00200  | < 0.00200        |


**KEY DESCRIPTION**

|             |  |
|-------------|--|
| *           | See Appendix C for compounds tested, methods, and laboratory reporting limits  |
| **          | Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 [October 2008] |
| ^           | Sample ID No. preceded by "17309-094-" on the chain of custody form            |
| <0.00200    | Analyte not detected; laboratory reporting limit of 0.00200 mg/L               |
| mg/L        | Milligrams per Liter   |
| -           | Not applicable or sample not tested for this analyte                           |
| ~           | Duplicate of preceeding sample   |
| <b>3.92</b> | Concentration exceeds applicable target level                                  |



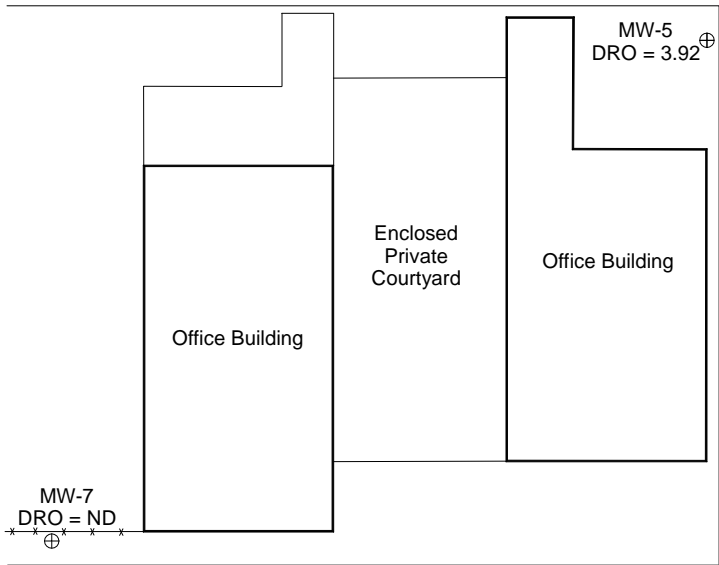
Elevation in Meters  
 Contour Interval 5 Meters  
 Taken from Anchorage A-8 NW  
 U.S. Geological Survey Quadrangle



|  |                |
|--|----------------|
| WES 5009, 1209 Gambell Street<br>Anchorage, Alaska   |                |
| <b>VICINITY MAP</b>  |                |
| February 2010  | 32-1-17310-098 |
|  SHANNON & WILSON, INC.<br>Geotechnical & Environmental Consultants | <b>Fig. 1</b>  |



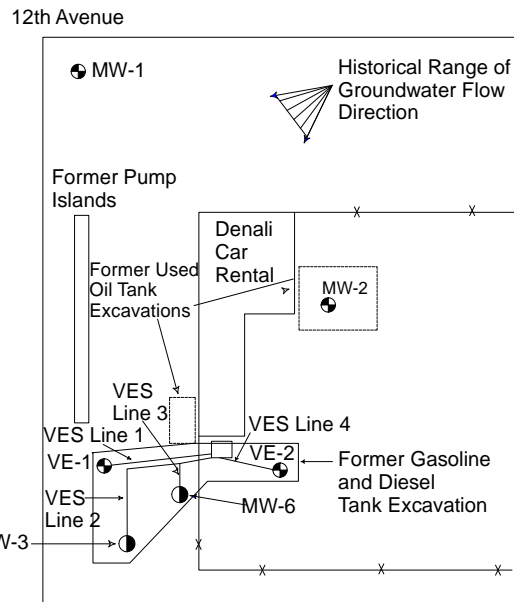
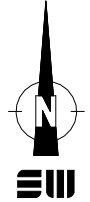
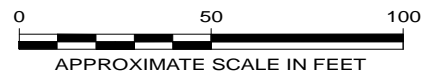
ALLEY



13th Avenue

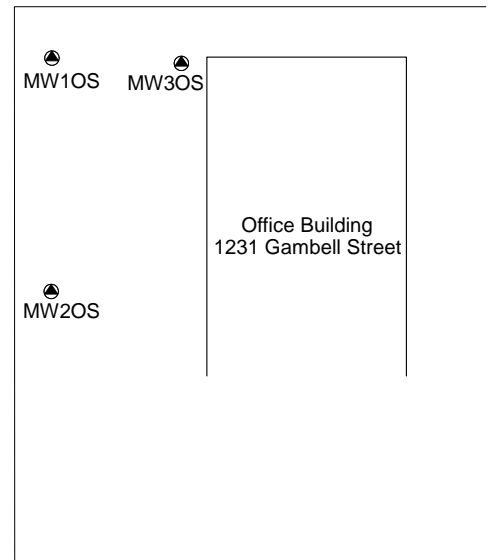
**LEGEND**

- Monitoring Well or Vapor Extraction Well decommissioned on December 18, 2009.
- MW-7 Approximate location and number of Monitoring Well MW-7 installed by Shannon & Wilson on December 18, 2009.
- MW-6 Approximate location and number of Monitoring Well MW-6
- DRO = 3.92 DRO concentrations (mg/L) in December 2009 sample
- ND Not detected; see Table 4 and Appendix C for reporting limits
- Monitoring well installed by Shannon and Wilson in February 2007, under contract to third party



Gambell Street

ALLEY



Gambell Street

WES 5009, 1209 Gambell Street  
Anchorage, Alaska

**SITE PLAN**

February 2010

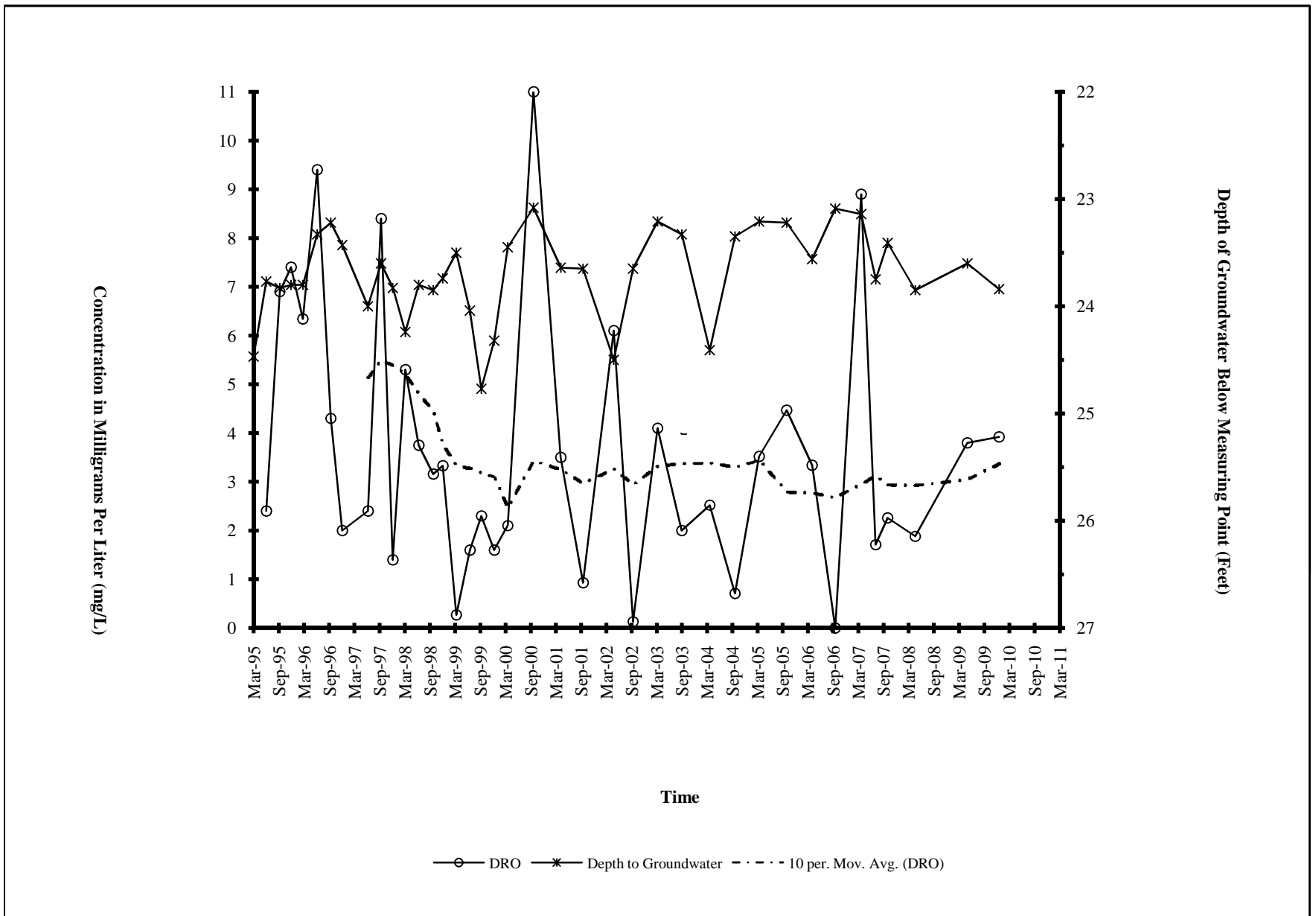
32-1-17310-098

**SHANNON & WILSON, INC.**  
Geotechnical & Environmental Consultants

**Fig. 2**



FIGURE 3 - MONITORING WELL MW-5 HISTORICAL TRENDS



**APPENDIX A**  
**SITE PHOTOS**



Photograph 1: Looking east, Monitoring Well MW7 was installed on the north side of 13<sup>th</sup> Avenue, southwest of the WES 5009 site (December, 18, 2009).



Photograph 2: Looking east, Vapor Extraction Well VE-2 was decommissioned by overdrilling, and filling the borehole with bentonite chips. (December 18, 2009)



Photograph 3: Following the decommissioning of Monitoring Well MW4, the top 2 feet of the space created by removal of the monument was filled with gravel. The ground was resurfaced with cold patch asphalt to match surrounding conditions (December 18, 2009).

WES 5009, 1209 Gambell Street  
Anchorage, Alaska

**PHOTOGRAPH 3**

February 2010

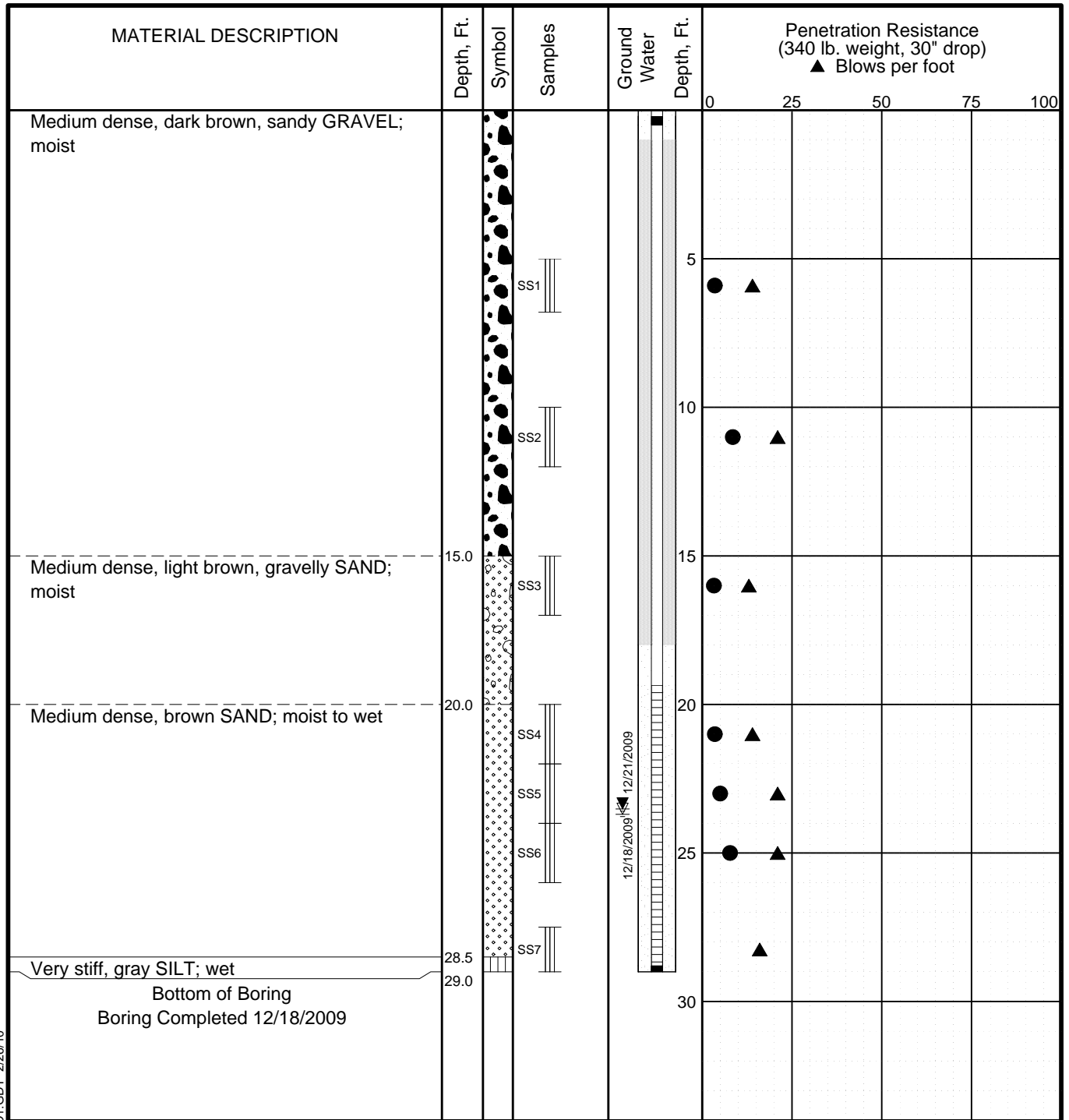
32-1-17310-098



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A-2

**APPENDIX B**  
**BORING LOG AND**  
**MONITORING WELL CONSTRUCTION DETAILS**



**LEGEND**

- \* Sample Not Recovered
- III 3" O.D. Split Spoon Sample
- [Symbol: Surface Seal] Surface Seal
- [Symbol: Solid Casing and Annular Seal] Solid Casing and Annular Seal
- [Symbol: Well Casing and Filter Sand] Well Casing and Filter Sand
- [Symbol: Cuttings Backfill] Cuttings Backfill
- [Symbol: Ground Water Level At Time Of Drilling] Ground Water Level At Time Of Drilling
- [Symbol: Static Water Level] Static Water Level

● PID Reading (ppm)

**NOTES**

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.
- USC letter symbol based on visual classification.

WES 5009, 1209 Gambell Street  
Anchorage, Alaska

**LOG OF BORING B7**

February 2010

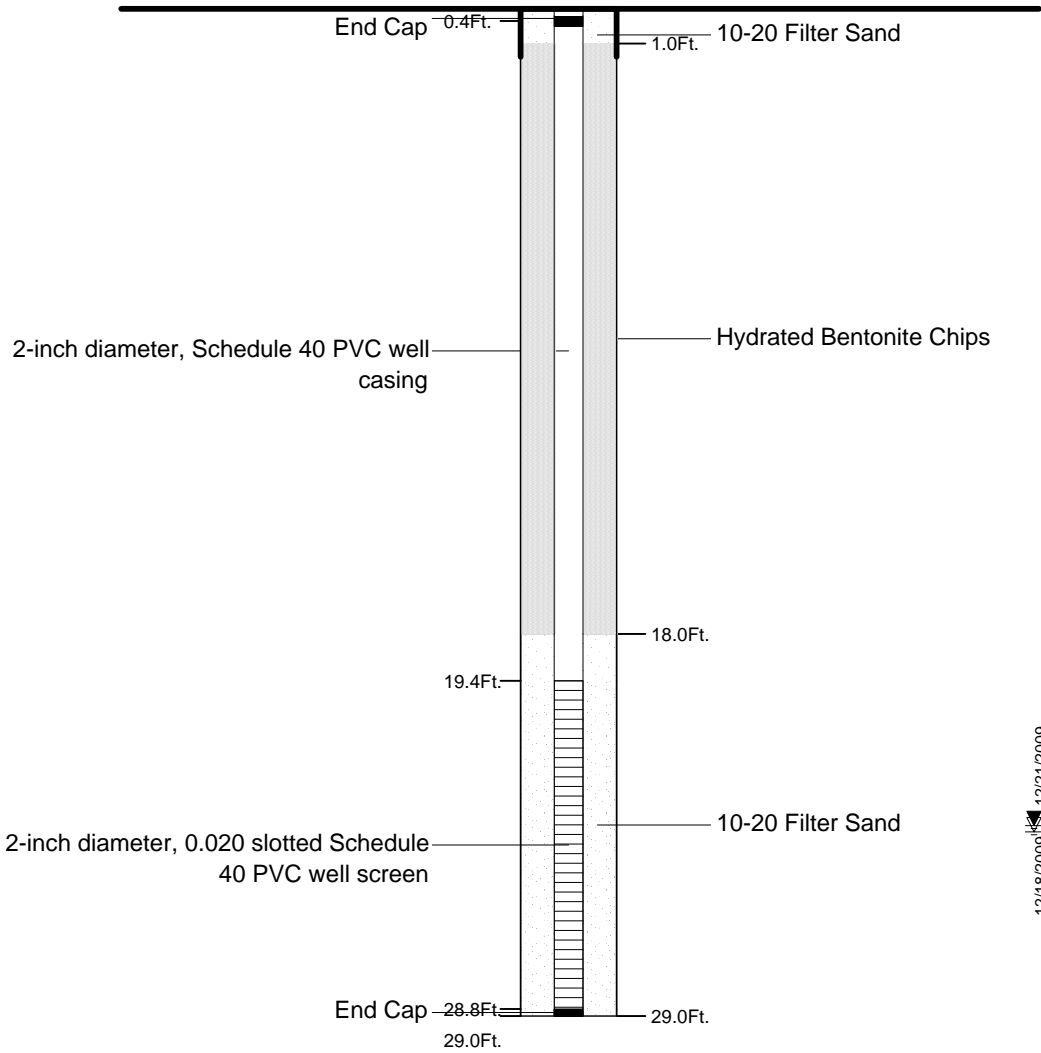
32-1-17310-098

**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

**B-1**

**Casing Description**

**Backfill Description**



**LEGEND**

- ▽ Ground Water Level ATD
- ▼ Static Ground Water Level

NOTE: All joints use welded connections.

WES 5009, 1209 Gambell Street  
Anchorage, Alaska

**MONITORING WELL MW7  
CONSTRUCTION DETAIL**

February 2010

32-1-17310-098

**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

**B-2**

**APPENDIX C**

**RESULTS OF ANALYTICAL TESTING BY**

**SGS ENVIRONMENTAL SERVICES**

**OF ANCHORAGE, ALASKA**

**AND**

**ADEC LABORATORY DATA REVIEW CHECKLIST**





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

Project: 17309-094 WES 5009  
Client: Shannon & Wilson, Inc.  
SGS Work Order: 1096678

Released by:

**Contents:**

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

**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.



Case Narrative

Client SHANNOT Shannon & Wilson, Inc.  
Workorder 1096678 17309-094 WES 5009

Printed Date/Time 1/11/2010 9:40

**Sample ID** **Client Sample ID**

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

---

**1096678006 PS**

**17309-094-MW5**

AK102 - The pattern is consistent with a weathered middle distillate.

Jessica Busey  
Shannon & Wilson Inc.  
5430 Fairbanks Street, Suite 3  
Anchorage, AK 99518

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|                     |                        |                     |
|---------------------|------------------------|---------------------|
| <b>Work Order:</b>  | 1096678                |                     |
|                     | 17309-094 WES 5009     | <b>Released by:</b> |
| <b>Client:</b>      | Shannon & Wilson, Inc. |                     |
| <b>Report Date:</b> | January 11, 2010       |                     |

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Enclosed are the analytical results associated with the above work order. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions ([http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)), unless other written agreements have been accepted by both parties.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and AK100001 for NELAP (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6010B, 6020, 7470A, 7471B, 8021B, 8081B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, the National Environmental Laboratory Accreditation Program and other regulatory authorities. The following descriptors or qualifiers may be found in your report:

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

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.  
All DRO/RRO analyses are integrated per SOP.



**Detectable Results Summary**

Print Date: 1/11/2010 9:40 am

Client Sample ID: **17309-094-MW5**

SGS Ref. #: 1096678006

**Semivolatile Organic Fuels Department**

| <u>Parameter</u>      | <u>Result</u> | <u>Units</u> |
|-----------------------|---------------|--------------|
| Diesel Range Organics | 3.92          | mg/L         |



**SGS Ref.#** 1096678002  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Client Sample ID** 17309-094-B7S6  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 01/11/2010 9:40  
**Collected Date/Time** 12/18/2009 10:50  
**Received Date/Time** 12/21/2009 14:52  
**Technical Director** Stephen C. Ede

Sample Remarks:

| Parameter   | Results | LOQ  | Units | Method     | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|------|-------|------------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b>             |         |      |       |            |              |                  |           |               |      |
| Gasoline Range Organics                             | 2.99 U  | 2.99 | mg/Kg | AK101      | A            |                  |           | 12/22/09      | KPW  |
| Benzene   | 14.9 U  | 14.9 | ug/Kg | SW8021B    | A            |                  |           | 12/22/09      | KPW  |
| Toluene   | 59.8 U  | 59.8 | ug/Kg | SW8021B    | A            |                  |           | 12/22/09      | KPW  |
| Ethylbenzene  | 59.8 U  | 59.8 | ug/Kg | SW8021B    | A            |                  |           | 12/22/09      | KPW  |
| o-Xylene  | 59.8 U  | 59.8 | ug/Kg | SW8021B    | A            |                  |           | 12/22/09      | KPW  |
| P & M -Xylene                                       | 59.8 U  | 59.8 | ug/Kg | SW8021B    | A            |                  |           | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                            |         |      |       |            |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>                         | 103     |      | %     | AK101      | A            | 50-150           |           | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>                          | 88      |      | %     | SW8021B    | A            | 80-120           |           | 12/22/09      | KPW  |
| <b><u>Semivolatile Organic Fuels Department</u></b> |         |      |       |            |              |                  |           |               |      |
| Diesel Range Organics                               | 24.1 U  | 24.1 | mg/Kg | AK102      | B            |                  | 12/28/09  | 01/05/10      | KDC  |
| <b><u>Surrogates</u></b>                            |         |      |       |            |              |                  |           |               |      |
| 5a Androstane <surr>                                | 77.4    |      | %     | AK102      | B            | 50-150           | 12/28/09  | 01/05/10      | KDC  |
| <b><u>Solids</u></b>                                |         |      |       |            |              |                  |           |               |      |
| Total Solids  | 81.0    |      | %     | SM20 2540G | B            |                  |           | 12/22/09      | SMH  |



**SGS Ref.#** 1096678003  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Client Sample ID** Soil Trip Blank  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 01/11/2010 9:40  
**Collected Date/Time** 12/18/2009 8:00  
**Received Date/Time** 12/21/2009 14:52  
**Technical Director** Stephen C. Ede

Sample Remarks:

| Parameter                               | Results | LOQ  | Units | Method  | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|------|-------|---------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b> |         |      |       |         |              |                  |           |               |      |
| Gasoline Range Organics                 | 2.50 U  | 2.50 | mg/Kg | AK101   | A            |                  |           | 12/22/09      | KPW  |
| Benzene                                 | 12.5 U  | 12.5 | ug/Kg | SW8021B | A            |                  |           | 12/22/09      | KPW  |
| Toluene                                 | 50.0 U  | 50.0 | ug/Kg | SW8021B | A            |                  |           | 12/22/09      | KPW  |
| Ethylbenzene                            | 50.0 U  | 50.0 | ug/Kg | SW8021B | A            |                  |           | 12/22/09      | KPW  |
| o-Xylene                                | 50.0 U  | 50.0 | ug/Kg | SW8021B | A            |                  |           | 12/22/09      | KPW  |
| P & M -Xylene                           | 50.0 U  | 50.0 | ug/Kg | SW8021B | A            |                  |           | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                |         |      |       |         |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>             | 88.1    |      | %     | AK101   | A            | 50-150           |           | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>              | 87.8    |      | %     | SW8021B | A            | 80-120           |           | 12/22/09      | KPW  |



SGS Ref.# 1096678004  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Client Sample ID 17309-094-MW7  
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/11/2010 9:40  
Collected Date/Time 12/21/2009 12:55  
Received Date/Time 12/21/2009 14:52  
Technical Director Stephen C. Ede

Sample Remarks:

| Parameter   | Results | LOQ   | Units | Method  | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|-------|-------|---------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b>             |         |       |       |         |              |                  |           |               |      |
| Gasoline Range Organics                             | 0.100 U | 0.100 | mg/L  | AK101   | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Benzene   | 0.500 U | 0.500 | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Toluene   | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Ethylbenzene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| o-Xylene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| P & M -Xylene                                       | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>                         | 99.7    |       | %     | AK101   | A            | 50-150           | 12/22/09  | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>                          | 89.2    |       | %     | SW8021B | A            | 80-120           | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Semivolatile Organic Fuels Department</u></b> |         |       |       |         |              |                  |           |               |      |
| Diesel Range Organics                               | 0.821 U | 0.821 | mg/L  | AK102   | D            |                  | 12/22/09  | 12/23/09      | HM   |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 5a Androstane <surr>                                | 80.4    |       | %     | AK102   | D            | 50-150           | 12/22/09  | 12/23/09      | HM   |



**SGS Ref.#** 1096678005  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Client Sample ID** 17309-094-MW8  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Collected Date/Time** 12/21/2009 12:00  
**Received Date/Time** 12/21/2009 14:52  
**Technical Director** Stephen C. Ede

Sample Remarks:

| Parameter   | Results | LOQ   | Units | Method  | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|-------|-------|---------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b>             |         |       |       |         |              |                  |           |               |      |
| Gasoline Range Organics                             | 0.100 U | 0.100 | mg/L  | AK101   | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Benzene   | 0.500 U | 0.500 | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Toluene   | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Ethylbenzene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| o-Xylene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| P & M -Xylene                                       | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>                         | 98.3    |       | %     | AK101   | A            | 50-150           | 12/22/09  | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>                          | 89.2    |       | %     | SW8021B | A            | 80-120           | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Semivolatile Organic Fuels Department</u></b> |         |       |       |         |              |                  |           |               |      |
| Diesel Range Organics                               | 0.837 U | 0.837 | mg/L  | AK102   | D            |                  | 12/22/09  | 12/23/09      | HM   |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 5a Androstane <surr>                                | 87      |       | %     | AK102   | D            | 50-150           | 12/22/09  | 12/23/09      | HM   |





**SGS Ref.#** 1096678006  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Client Sample ID** 17309-094-MW5  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Collected Date/Time** 12/21/2009 13:45  
**Received Date/Time** 12/21/2009 14:52  
**Technical Director** Stephen C. Ede

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

| Parameter   | Results | LOQ   | Units | Method  | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|-------|-------|---------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b>             |         |       |       |         |              |                  |           |               |      |
| Gasoline Range Organics                             | 0.100 U | 0.100 | mg/L  | AK101   | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Benzene   | 0.500 U | 0.500 | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Toluene   | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Ethylbenzene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| o-Xylene  | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| P & M -Xylene                                       | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>                         | 95.6    |       | %     | AK101   | A            | 50-150           | 12/22/09  | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>                          | 90.3    |       | %     | SW8021B | A            | 80-120           | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Semivolatile Organic Fuels Department</u></b> |         |       |       |         |              |                  |           |               |      |
| Diesel Range Organics                               | 3.92    | 0.847 | mg/L  | AK102   | D            |                  | 12/22/09  | 12/23/09      | HM   |
| <b><u>Surrogates</u></b>                            |         |       |       |         |              |                  |           |               |      |
| 5a Androstane <surr>                                | 79.7    |       | %     | AK102   | D            | 50-150           | 12/22/09  | 12/23/09      | HM   |



**SGS Ref.#** 1096678007  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Client Sample ID** Water Trip Blank  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Collected Date/Time** 12/21/2009 8:00  
**Received Date/Time** 12/21/2009 14:52  
**Technical Director** Stephen C. Ede

Sample Remarks:

| Parameter                               | Results | LOQ   | Units | Method  | Container ID | Allowable Limits | Prep Date | Analysis Date | Init |
|---|---------|-------|-------|---------|--------------|------------------|-----------|---------------|------|
| <b><u>Volatile Fuels Department</u></b> |         |       |       |         |              |                  |           |               |      |
| Gasoline Range Organics                 | 0.100 U | 0.100 | mg/L  | AK101   | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Benzene                                 | 0.500 U | 0.500 | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Toluene                                 | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| Ethylbenzene                            | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| o-Xylene                                | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| P & M -Xylene                           | 2.00 U  | 2.00  | ug/L  | SW8021B | A            |                  | 12/22/09  | 12/22/09      | KPW  |
| <b><u>Surrogates</u></b>                |         |       |       |         |              |                  |           |               |      |
| 4-Bromofluorobenzene <surr>             | 99.6    |       | %     | AK101   | A            | 50-150           | 12/22/09  | 12/22/09      | KPW  |
| 1,4-Difluorobenzene <surr>              | 89.3    |       | %     | SW8021B | A            | 80-120           | 12/22/09  | 12/22/09      | KPW  |



SGS Ref.# 943938 Method Blank  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/11/2010 9:40  
Prep Batch XXX22144  
Method SW3520C  
Date 12/22/2009

QC results affect the following production samples:  
1096678004, 1096678005, 1096678006

| Parameter   | Results  | LOQ/CL     | DL    | Units | Analysis Date |
|---|----------|------------|-------|-------|---------------|
| <b><u>Semivolatile Organic Fuels Department</u></b> |          |            |       |       |               |
| Diesel Range Organics                               | 0.500 U  | 0.800      | 0.250 | mg/L  | 12/23/09      |
| <b>Surrogates</b>                                   |          |            |       |       |               |
| 5a Androstane <surr>                                | 80.1     | 60-120     |       | %     | 12/23/09      |
| Batch   | XFC9073  |            |       |       |               |
| Method  | AK102    |            |       |       |               |
| Instrument  | HP 7890A | FID SV E F |       |       |               |



SGS Ref.# 944108 Method Blank  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Soil/Solid (dry weight)

Printed Date/Time 01/11/2010 9:40  
Prep Batch  
Method  
Date

QC results affect the following production samples:  
1096678002

| Parameter | Results | LOQ/CL | DL | Units | Analysis Date |
|-----------|---------|--------|----|-------|---------------|
|-----------|---------|--------|----|-------|---------------|

| <u>Solids</u> |            |  |  |   |          |
|---------------|------------|--|--|---|----------|
| Total Solids  | 99.9       |  |  | % | 12/22/09 |
| Batch         | SPT8075    |  |  |   |          |
| Method        | SM20 2540G |  |  |   |          |
| Instrument    |            |  |  |   |          |



**SGS Ref.#** 944198 Method Blank  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Prep Batch** VXX20370  
**Method** SW5030B  
**Date** 12/22/2009

QC results affect the following production samples:  
 1096678004, 1096678005, 1096678006, 1096678007

| Parameter | Results | LOQ/CL | DL | Units | Analysis Date |
|-----------|---------|--------|----|-------|---------------|
|-----------|---------|--------|----|-------|---------------|

**Volatile Fuels Department**

|                         |          |       |        |      |          |
|-------------------------|----------|-------|--------|------|----------|
| Gasoline Range Organics | 0.0620 U | 0.100 | 0.0310 | mg/L | 12/22/09 |
|-------------------------|----------|-------|--------|------|----------|

**Surrogates**

|                             |     |        |  |   |          |
|-----------------------------|-----|--------|--|---|----------|
| 4-Bromofluorobenzene <surr> | 101 | 50-150 |  | % | 12/22/09 |
|-----------------------------|-----|--------|--|---|----------|

**Batch** VFC9816  
**Method** AK101  
**Instrument** HP 5890 Series II PID+FID VCA

|               |         |       |       |      |          |
|---------------|---------|-------|-------|------|----------|
| Benzene       | 0.300 U | 0.500 | 0.150 | ug/L | 12/22/09 |
| Toluene       | 1.24 U  | 2.00  | 0.620 | ug/L | 12/22/09 |
| Ethylbenzene  | 1.24 U  | 2.00  | 0.620 | ug/L | 12/22/09 |
| o-Xylene      | 1.24 U  | 2.00  | 0.620 | ug/L | 12/22/09 |
| P & M -Xylene | 1.24 U  | 2.00  | 0.620 | ug/L | 12/22/09 |

**Surrogates**

|                            |      |        |  |   |          |
|----------------------------|------|--------|--|---|----------|
| 1,4-Difluorobenzene <surr> | 91.4 | 80-120 |  | % | 12/22/09 |
|----------------------------|------|--------|--|---|----------|

**Batch** VFC9816  
**Method** SW8021B  
**Instrument** HP 5890 Series II PID+FID VCA



**SGS Ref.#** 944208 Method Blank  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 01/11/2010 9:40  
**Prep Batch** VXX20371  
**Method** SW5035A  
**Date** 12/22/2009

QC results affect the following production samples:  
 1096678002, 1096678003

| Parameter | Results | LOQ/CL | DL | Units | Analysis Date |
|-----------|---------|--------|----|-------|---------------|
|-----------|---------|--------|----|-------|---------------|

**Volatile Fuels Department**

|                         |        |      |       |       |          |
|-------------------------|--------|------|-------|-------|----------|
| Gasoline Range Organics | 1.50 U | 2.50 | 0.750 | mg/Kg | 12/22/09 |
|-------------------------|--------|------|-------|-------|----------|

**Surrogates**

|                             |     |        |  |   |          |
|-----------------------------|-----|--------|--|---|----------|
| 4-Bromofluorobenzene <surr> | 103 | 50-150 |  | % | 12/22/09 |
|-----------------------------|-----|--------|--|---|----------|

**Batch** VFC9817  
**Method** AK101  
**Instrument** HP 5890 Series II PID+FID VCA

|               |        |      |      |       |          |
|---------------|--------|------|------|-------|----------|
| Benzene       | 8.00 U | 12.5 | 4.00 | ug/Kg | 12/22/09 |
| Toluene       | 30.0 U | 50.0 | 15.0 | ug/Kg | 12/22/09 |
| Ethylbenzene  | 30.0 U | 50.0 | 15.0 | ug/Kg | 12/22/09 |
| o-Xylene      | 30.0 U | 50.0 | 15.0 | ug/Kg | 12/22/09 |
| P & M -Xylene | 16.0 J | 50.0 | 15.0 | ug/Kg | 12/22/09 |

**Surrogates**

|                            |      |        |  |   |          |
|----------------------------|------|--------|--|---|----------|
| 1,4-Difluorobenzene <surr> | 88.1 | 80-120 |  | % | 12/22/09 |
|----------------------------|------|--------|--|---|----------|

**Batch** VFC9817  
**Method** SW8021B  
**Instrument** HP 5890 Series II PID+FID VCA



SGS Ref.# 944349 Method Blank  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Soil/Solid (dry weight)

Printed Date/Time 01/11/2010 9:40  
Prep Batch XXX22155  
Method SW3550C  
Date 12/28/2009

QC results affect the following production samples:  
1096678002

| Parameter | Results | LOQ/CL | DL | Units | Analysis Date |
|-----------|---------|--------|----|-------|---------------|
|-----------|---------|--------|----|-------|---------------|

**Semivolatile Organic Fuels Department**

|                       |        |      |      |       |          |
|-----------------------|--------|------|------|-------|----------|
| Diesel Range Organics | 12.4 U | 20.0 | 6.20 | mg/Kg | 01/05/10 |
|-----------------------|--------|------|------|-------|----------|

**Surrogates**

|                      |      |        |  |   |          |
|----------------------|------|--------|--|---|----------|
| 5a Androstane <surr> | 80.9 | 60-120 |  | % | 01/05/10 |
|----------------------|------|--------|--|---|----------|

Batch XFC9080  
Method AK102  
Instrument HP 7890A FID SV E F



SGS Ref.# 944109 Duplicate  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Original 1096678002  
Matrix Soil/Solid (dry weight)

Printed Date/Time 01/11/2010 9:40  
Prep Batch  
Method  
Date

QC results affect the following production samples:

1096678002

| Parameter | Original Result | QC Result | Units | RPD | RPD Limits | Analysis Date |
|-----------|-----------------|-----------|-------|-----|------------|---------------|
|-----------|-----------------|-----------|-------|-----|------------|---------------|

**Solids**

|              |      |      |   |   |        |            |
|--------------|------|------|---|---|--------|------------|
| Total Solids | 81.0 | 81.7 | % | 1 | (< 15) | 12/22/2009 |
|--------------|------|------|---|---|--------|------------|

Batch SPT8075  
Method SM20 2540G  
Instrument





**SGS Ref.#** 943939 Lab Control Sample  
 943940 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Prep Batch** XXX22144  
**Method** SW3520C  
**Date** 12/22/2009

QC results affect the following production samples:  
 1096678004, 1096678005, 1096678006

| Parameter                                    |                     | QC Results | Pct Recov | LCS/LCSD Limits | RPD | RPD Limits | Spiked Amount | Analysis Date |
|--|---------------------|------------|-----------|-----------------|-----|------------|---------------|---------------|
| <b>Semivolatile Organic Fuels Department</b> |                     |            |           |                 |     |            |               |               |
| Diesel Range Organics                        | LCS                 | 4.25       | 85        | ( 75-125 )      |     |            | 5 mg/L        | 12/23/2009    |
|  | LCSD                | 3.84       | 77        |                 | 10  | (< 20 )    | 5 mg/L        | 12/23/2009    |
| <b>Surrogates</b>                            |                     |            |           |                 |     |            |               |               |
| 5a Androstane <surr>                         | LCS                 |            | 85        | ( 60-120 )      |     |            |               | 12/23/2009    |
|  | LCSD                |            | 76        |                 | 12  |            |               | 12/23/2009    |
| <b>Batch</b>                                 | XFC9073             |            |           |                 |     |            |               |               |
| <b>Method</b>                                | AK102               |            |           |                 |     |            |               |               |
| <b>Instrument</b>                            | HP 7890A FID SV E F |            |           |                 |     |            |               |               |



**SGS Ref.#** 944199 Lab Control Sample  
 944200 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Matrix** Water (Surface, Eff., Ground)

**Printed Date/Time** 01/11/2010 9:40  
**Prep Batch** VXX20370  
**Method** SW5030B  
**Date** 12/22/2009

QC results affect the following production samples:  
 1096678004, 1096678005, 1096678006, 1096678007

| Parameter                               | QC Results | Pct Recov | LCS/LCSD Limits | RPD        | RPD Limits | Spiked Amount | Analysis Date       |
|---|------------|-----------|-----------------|------------|------------|---------------|---------------------|
| <b><u>Volatile Fuels Department</u></b> |            |           |                 |            |            |               |                     |
| Benzene                                 | LCS        | 106       | 106             | ( 80-120 ) |            | 100 ug/L      | 12/22/2009          |
|   | LCSD       | 108       | 108             |            | 2          | (< 20 )       | 100 ug/L 12/22/2009 |
| Toluene                                 | LCS        | 103       | 103             | ( 80-120 ) |            | 100 ug/L      | 12/22/2009          |
|   | LCSD       | 105       | 105             |            | 2          | (< 20 )       | 100 ug/L 12/22/2009 |
| Ethylbenzene                            | LCS        | 105       | 105             | ( 87-125 ) |            | 100 ug/L      | 12/22/2009          |
|   | LCSD       | 107       | 107             |            | 2          | (< 20 )       | 100 ug/L 12/22/2009 |
| o-Xylene                                | LCS        | 95.1      | 95              | ( 85-120 ) |            | 100 ug/L      | 12/22/2009          |
|   | LCSD       | 97.3      | 97              |            | 2          | (< 20 )       | 100 ug/L 12/22/2009 |
| P & M -Xylene                           | LCS        | 201       | 101             | ( 87-125 ) |            | 200 ug/L      | 12/22/2009          |
|   | LCSD       | 207       | 104             |            | 3          | (< 20 )       | 200 ug/L 12/22/2009 |
| <b><u>Surrogates</u></b>                |            |           |                 |            |            |               |                     |
| 1,4-Difluorobenzene <surr>              | LCS        |           | 98              | ( 80-120 ) |            |               | 12/22/2009          |
|   | LCSD       |           | 98              |            | 0          |               | 12/22/2009          |

**Batch** VFC9816  
**Method** SW8021B  
**Instrument** HP 5890 Series II PID+FID VCA



SGS Ref.# 944201 Lab Control Sample  
944202 Lab Control Sample Duplicate  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 01/11/2010 9:40  
Prep Batch VXX20370  
Method SW5030B  
Date 12/22/2009

QC results affect the following production samples:

1096678004, 1096678005, 1096678006, 1096678007

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

**Volatile Fuels Department**

|                         |      |       |     |            |   |            |                       |
|-------------------------|------|-------|-----|------------|---|------------|-----------------------|
| Gasoline Range Organics | LCS  | 0.216 | 108 | ( 60-120 ) |   | 0.200 mg/L | 12/22/2009            |
|                         | LCSD | 0.213 | 106 |            | 2 | (< 20 )    | 0.200 mg/L 12/22/2009 |

**Surrogates**

|                             |      |  |     |            |   |  |            |
|-----------------------------|------|--|-----|------------|---|--|------------|
| 4-Bromofluorobenzene <surr> | LCS  |  | 106 | ( 50-150 ) |   |  | 12/22/2009 |
|                             | LCSD |  | 105 |            | 1 |  | 12/22/2009 |

Batch VFC9816  
Method AK101  
Instrument HP 5890 Series II PID+FID VCA



**SGS Ref.#** 944209 Lab Control Sample  
 944210 Lab Control Sample Duplicate  
**Client Name** Shannon & Wilson, Inc.  
**Project Name/#** 17309-094 WES 5009  
**Matrix** Soil/Solid (dry weight)

**Printed Date/Time** 01/11/2010 9:40  
**Prep Batch** VXX20371  
**Method** SW5035A  
**Date** 12/22/2009

QC results affect the following production samples:  
 1096678002, 1096678003

| Parameter                               | QC Results | Pct Recov | LCS/LCSD Limits | RPD        | RPD Limits | Spiked Amount | Analysis Date         |
|---|------------|-----------|-----------------|------------|------------|---------------|-----------------------|
| <b><u>Volatile Fuels Department</u></b> |            |           |                 |            |            |               |                       |
| Benzene                                 | LCS        | 1380      | 110             | ( 80-125 ) |            | 1250 ug/Kg    | 12/22/2009            |
|   | LCSD       | 1330      | 106             |            | 3          | (< 20 )       | 1250 ug/Kg 12/22/2009 |
| Toluene                                 | LCS        | 1360      | 109             | ( 85-120 ) |            | 1250 ug/Kg    | 12/22/2009            |
|   | LCSD       | 1330      | 106             |            | 3          | (< 20 )       | 1250 ug/Kg 12/22/2009 |
| Ethylbenzene                            | LCS        | 1420      | 113             | ( 85-125 ) |            | 1250 ug/Kg    | 12/22/2009            |
|   | LCSD       | 1380      | 111             |            | 2          | (< 20 )       | 1250 ug/Kg 12/22/2009 |
| o-Xylene                                | LCS        | 1310      | 105             | ( 85-125 ) |            | 1250 ug/Kg    | 12/22/2009            |
|   | LCSD       | 1280      | 103             |            | 2          | (< 20 )       | 1250 ug/Kg 12/22/2009 |
| P & M -Xylene                           | LCS        | 2770      | 111             | ( 85-125 ) |            | 2500 ug/Kg    | 12/22/2009            |
|   | LCSD       | 2710      | 109             |            | 2          | (< 20 )       | 2500 ug/Kg 12/22/2009 |
| <b>Surrogates</b>                       |            |           |                 |            |            |               |                       |
| 1,4-Difluorobenzene <surr>              | LCS        |           | 95              | ( 80-120 ) |            |               | 12/22/2009            |
|   | LCSD       |           | 94              |            | 0          |               | 12/22/2009            |

**Batch** VFC9817  
**Method** SW8021B  
**Instrument** HP 5890 Series II PID+FID VCA



SGS Ref.# 944211 Lab Control Sample  
944212 Lab Control Sample Duplicate  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Soil/Solid (dry weight)

Printed Date/Time 01/11/2010 9:40  
Prep Batch VXX20371  
Method SW5035A  
Date 12/22/2009

QC results affect the following production samples:

1096678002, 1096678003

| Parameter                               | QC Results | Pct Recov | LCS/LCSD Limits | RPD        | RPD Limits | Spiked Amount | Analysis Date         |
|---|------------|-----------|-----------------|------------|------------|---------------|-----------------------|
| <b><u>Volatile Fuels Department</u></b> |            |           |                 |            |            |               |                       |
| Gasoline Range Organics                 | LCS        | 12.1      | 108             | ( 60-120 ) |            | 11.3 mg/Kg    | 12/22/2009            |
|   | LCSD       | 12.1      | 107             |            | 0          | (< 20 )       | 11.3 mg/Kg 12/22/2009 |
| <b>Surrogates</b>                       |            |           |                 |            |            |               |                       |
| 4-Bromofluorobenzene <surr>             | LCS        |           | 107             | ( 50-150 ) |            |               | 12/22/2009            |
|   | LCSD       |           | 111             |            | 4          |               | 12/22/2009            |

Batch VFC9817  
Method AK101  
Instrument HP 5890 Series II PID+FID VCA



SGS Ref.# 944350 Lab Control Sample  
944351 Lab Control Sample Duplicate  
Client Name Shannon & Wilson, Inc.  
Project Name/# 17309-094 WES 5009  
Matrix Soil/Solid (dry weight)

Printed Date/Time 01/11/2010 9:40  
Prep Batch XXX22155  
Method SW3550C  
Date 12/28/2009

QC results affect the following production samples:

1096678002

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

**Semivolatile Organic Fuels Department**

|                       |      |     |    |            |   |           |                      |
|-----------------------|------|-----|----|------------|---|-----------|----------------------|
| Diesel Range Organics | LCS  | 151 | 91 | ( 75-125 ) |   | 167 mg/Kg | 01/05/2010           |
|                       | LCSD | 151 | 91 |            | 0 | (< 20 )   | 167 mg/Kg 01/05/2010 |

**Surrogates**

|                      |      |  |    |            |   |  |            |
|----------------------|------|--|----|------------|---|--|------------|
| 5a Androstane <surr> | LCS  |  | 84 | ( 60-120 ) |   |  | 01/05/2010 |
|                      | LCSD |  | 83 |            | 0 |  | 01/05/2010 |

Batch XFC9080  
Method AK102  
Instrument HP 7890A FID SV E F

1096678



**CHAIN-OF-CUSTODY RECORD**

**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

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

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

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

| Sample Identity  | Lab No. | Time  | Date Sampled | Comp. | Grab | Total Number of Containers | Remarks/Matrix       |
|------------------|---------|-------|--------------|-------|------|----------------------------|----------------------|
| 17309-094-B752   | ① AB    | 10:30 | 12/10/09     | X     | Hold | 2                          | Soil / Place on Hold |
| 17309-094-B75b   | ② AB    | 10:50 | 12/10/09     | X     | X    | 2                          | Soil                 |
| Soil Trip Blank  | ③ A     | 0800  | 12/10/09     | X     | X    | 5                          | Soil                 |
| 17309-094-MW7    | ④ A-E   | 1255  | 12/11/09     | X     | X    | 5                          | water                |
| 17309-094-MW8    | ⑤ ↓     | 1200  | 12/21/09     | X     | X    | 5                          | water                |
| 17309-094-MW5    | ⑥ ↓     | 1345  | 12/21/09     | X     | X    | 5                          | water                |
| Water Trip Blank | ⑦ A-C   | 0800  | 12/10/09     | X     | X    | 5                          | water                |

| Project Information   | Sample Receipt                  | Relinquished By: 1.                  | Relinquished By: 2. | Relinquished By: 3.                    |
|---|---------------------------------|--------------------------------------|---------------------|--|
| Project Number: <u>17309-094</u>  | Total Number of Containers      | Signature: _____                     | Signature: _____    | Signature: _____                       |
| Project Name: <u>WFS 5009</u>   | COC Seals/Intact? <u>Y/N/NA</u> | Printed Name: _____                  | Printed Name: _____ | Printed Name: _____                    |
| Contact: <u>Jessica Buser</u>   | Received Good Cond./Cold        | Date: <u>12/10/09</u>                | Date: _____         | Date: _____                            |
| Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>  | Delivery Method:                | Company: <u>Shannon &amp; Wilson</u> | Company: _____      | Company: _____                         |
| Sampler: <u>Jessica Morris</u>  | (attach shipping bill, if any)  | Received By: 1.                      | Received By: 2.     | Received By: 3.                        |
| Requested Turnaround Time: _____  |                                 | Signature: _____                     | Signature: _____    | Signature: _____                       |
| Special Instructions: _____   |                                 | Printed Name: _____                  | Printed Name: _____ | Printed Name: <u>Joe Bud. 12/11/09</u> |
| Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report<br>Yellow - w/shipment - for consignee files<br>Pink - Shannon & Wilson - Job File |                                 | Company: _____                       | Company: _____      | Company: <u>S65</u>                    |



SAMPLE RECEIPT FORM

SGS WO#:

Yes No NA

- Are samples RUSH, priority or w/in 72 hrs of hold time?
If yes, have you done e-mail ALERT notification?
Are samples within 24 hrs. of hold time or due date?
If yes, have you also spoken with supervisor?
Archiving bottles: Are lids marked w/ red "X" ?
Were samples collected with proper preservative?
Any problems (ID, cond'n , HT, etc)? Explain:

TAT (circle one): Standard -or- Rush

Received Date: 12/21/09

Received Time: 1452

Table with 3 columns: Cooler ID, Temperature, Measured w/ (Therm #). Row 1: 1, 0.4 °C, 70D

Note: Temperature readings include thermometer correction factors

Delivery method (circle all that apply):

- Client / Alert Courier / Lynden / SGS
UPS / FedEx / USPS / DHL / Carlile
AkAir Goldstreak / NAC / ERA / PenAir
Other:

Additional Sample Remarks: (√ if applicable)

- Extra Sample Volume?
Limited Sample Volume?
Multi-Incremental Samples?
Lab-filtered for dissolved
Ref Lab required for
Foreign Soil?

- If this is for PWS, provide PWSID:
Payment received: \$ by Check or Credit Card
Will courier charges apply?
Data package required? (Level: 1 / 2 / 3 / 4 )
Notes:
Is this a DoD project? (USACE, Navy, AFCEE)

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

Table with 4 columns: Yes, No, Yes, N/A. Rows include questions about temperature, pH, ice-free containers, airbill, custody seals, COC, and packaging.

This section must be completed if problems are noted.

Was client notified of problems? Yes / No

By (SGS PM):

Individual contacted:

Via: Phone / Fax / E-mail (circle one)

Date/Time:

Reason for contact:

Change Order Required? Yes / No

Notes: See C.O.C. - No Ice Present.

sample (6) c has a bubble 6 mm.

Completed by (sign): [Signature]

(print): Joe Paul

Login proof: Self-check completed JIR Peer-reviewer's Initials JPA



1096678



SAMPLE RECEIPT FORM - Bottle Tracking

SGS WO#

| #   | Container ID | Matrix | Test            | QC | TB | IL | Container Volume |              |              |      |      | Container Type |    |    |      |         |      |       | Preservative |      |     |      |       |      | *Notes |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----|--------------|--------|-----------------|----|----|----|------------------|--------------|--------------|------|------|----------------|----|----|------|---------|------|-------|--------------|------|-----|------|-------|------|--------|---------------|-------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|     |              |        |                 |    |    |    | 500ml            | 250ml or 8oz | 125ml or 4oz | 60ml | 40ml | Other:         | AG | CG | HDPE | Nalgene | Coll | Septa | Other:       | None | HCl | HNO3 | H2SO4 | NaOH |        | Ascorbic Acid | NH4Cl | Other: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1   | A            | 2      | Gro/Btex (Hold) |    |    |    | 1                |              |              |      |      |                |    |    |      |         | ✓    |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | B            | 2      | Dro (Hold)      |    |    |    | 1                |              |              |      |      |                |    |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2   | A            | 2      | Gro/Btex        |    |    |    | 1                |              |              |      |      |                |    |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | B            | 2      | Dro             |    |    |    | 1                |              |              |      |      |                |    |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3   | A            | 2      | Gro/Btex        |    | ✓  |    | 1                |              |              |      |      |                |    |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4-6 | A-C          | 1/2    | Gro/Btex        |    |    |    |                  |              |              |      |      |                | 9  |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | D-E          | 1/2    | Dro             |    |    | 6  |                  |              |              |      |      |                |    |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7   | A-C          | 1/2    | Gro/Btex        |    | ✓  |    |                  |              |              |      |      |                | 3  |    |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |              |        |                 |    |    |    | Bottle Totals    |              |              |      |      | 6              | 5  | 12 |      |         |      |       |              |      |     |      |       |      |        |               |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\* Note: Containers which require (additional) chemical preservation upon receipt must be documented per SOP#106

Completed by: Joe Randi Date: 12/21/09

## LABORATORY DATA REVIEW CHECKLIST

**CS Report Name:** Site Characterization WES 5009      **Date:** February 2010  
1209 Gambell Street  
Anchorage, Alaska

**Laboratory Report Date:** January 11, 2010

**Consultant Firm:** Shannon & Wilson, Inc.

**Completed by:** Jessica Morris  
**Title:** Environmental Engineer II

**Laboratory Name:** SGS Environmental Services, Inc.  
**Work Order Number:** 1096678

**ADEC File Number:** *2100.26.024*  
**Fac ID Number:** *0756*

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

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes**/ No  
Comments:
- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?  
**NA**/ Yes / No  
Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
**Yes**/ No  
Comments:
- b. Correct analyses requested? **Yes**/ No  
Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} C$ )?  
**Yes** **No**  
Comments: *Temperature blank was 0.4° C*

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

Comments:

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

Comments:

*Sample MW5 had an air bubble 6mm in diameter.*

- 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

Comments:

*Sample temperature was below range. However no ice was present in the samples.*

*Sample MW5 had an air bubble 6mm in diameter.*

- e. Data quality or usability affected? Explain.

Comments: *Because the samples did not contain ice, the storage temperature should not impact the data usability. For the purposes of this effort, the air bubble in Sample MW5 should not impact the data usability, as two other VOA vials were available for analysis.*

#### 4. Case Narrative

- a. Present and understandable? **Yes** / No

Comments:

- b. Discrepancies, errors or QC failures noted by the lab? ~~None Noted~~ / Yes

Comments:

- c. Were corrective actions documented? ~~None Noted~~ / Yes

Comments:

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

Comments:

*No comments on data quality/usability in case narrative.*

#### 5. Sample Results

- a. Correct analyses performed/reported as requested on COC? **Yes** / No

Comments:

- b. All applicable holding times met? **Yes** / No

Comments:

- c. All soils reported on a dry-weight basis? ~~NA~~ / **Yes** / No

Comments:

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project? **Yes**/ No

Comments:

- e. Data quality or usability affected? Explain. **NA**

Comments:

## 6. QC Samples

### a. Method Blank

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

**Yes**/ No

Comments:

- ii. All method blank results less than PQL? **Yes**/ No

Comments:

- iii. If above PQL, what samples are affected? **NA**

Comments:

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

Comments:

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

Comments:

- v. Data quality or usability affected? Explain. **NA**

Comments:

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

- i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples?

(LCS/LCSD required per AK methods, LCS required per SW846) N/A / **Yes**/ No

Comments:

- ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **N/A**/ Yes / No

Comments:

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

Comments:

- iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages) **Yes** / No

Comments:

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

Comments:

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

Comments:

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

Comments:

- vii. Data quality or usability affected? Explain. **NA**

Comments:

**c. Surrogates - Organics Only**

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

Comments:

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

Comments:

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

Comments:

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

Comments:

- iv. Data quality or usability affected? Explain. **NA**

Comments:

**d. Trip Blank - Volatile analyses only (GRO, BTEX, VOCs, etc.) [soil and water]**

- i. One trip blank reported per matrix, analysis and cooler? **NA** / **Yes** / No

Comments:

- ii. Is the cooler used to transport the trip blank and volatile samples clearly indicated on the CoC? **NA** / Yes / No (if no explain)

*Only one cooler was submitted.*

iii. All results less than PQL? NA / **Yes** / No

Comments:

iv. If above PQL, what samples are affected? **NA**

Comments:

v. Data quality or usability affected? Explain. **NA**

Comments:

**e. Field Duplicate**

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

**Yes / No**

Comments: *In accordance with our ADEC approved work plan, a soil field duplicate was not collected for this event. Water Sample MW8 was a duplicate of Sample MW7.*

ii. Were the field duplicates submitted blind to the lab? NA / **Yes** / No

Comments:

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

Comments: *RPDs could not be calculated for the duplicate sample set due to non-detect concentrations for one or both samples.*

iv. Data quality or usability affected? Explain. NA

*Duplicate results are considered usable.*

**f. Decontamination or Equipment Blank** (if not applicable, a comment stating why must be entered below) **NA** / Yes / No

*A decontamination or equipment blank was not included in this sampling program due to the scope of the project (limited site characterization).*

i. All results less than PQL? **NA** / Yes / No

Comments:

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

Comments:

iii. Data quality or usability affected? Explain. **NA**

Comments:

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

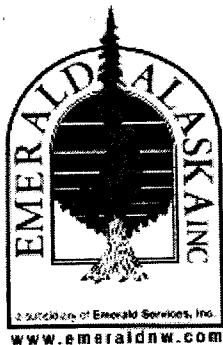
a. Are they defined and appropriate? NA / **Yes** / No

Comments:

Lab specific flags defined on page following case narrative.

**APPENDIX D**

**EMERALD ALASKA, INC.  
CERTIFICATE OF DISPOSAL**



# CERTIFICATE OF DISPOSAL/RECYCLE

**GENERATOR:** HOLIDAY ALASKA  
1209 GAMBELL STREET  
ANCHORAGE AK 99501

**DISPOSAL FACILITY:** EMERALD ALASKA, INC.  
2020 VIKING DRIVE  
ANCHORAGE AK 99501

**EPA ID NUMBER:** CESQG  
**MANIFEST/DOCUMENT #:** 11071  
**DATE OF DISPOSAL/RECYCLE:** 01/05/2010

| <u>LINE</u> | <u>WASTE DESCRIPTION</u>                    | <u>CONTAINERS</u> | <u>TYPE</u> | <u>QUANTITY</u> | <u>UOM</u> |
|-------------|---|-------------------|-------------|-----------------|------------|
| 1A          | GROUNDWATER / IDW WATER                     | 1                 | DM55        | 55              | G          |
| 1B          | PETROLEUM CONTAMINATED SOIL,SAND AND GRAVEL | 2                 | DM55        | 1,372           | P          |

**PREPARED BY:** MOISES ARAGONA

**SIGNATURE:** \_\_\_\_\_

**DATE:** 1/7/2010

*Your Local Partner for Recycling Environmental Services*

425 Outer Springer Loop Road - Palmer, AK 99645 - (907) 258-1558 - Fax (907) 746-3651 - Toll Free (877) 375-504



**APPENDIX E**

**“IMPORTANT INFORMATION ABOUT YOUR  
GEOTECHNICAL/ENVIRONMENTAL REPORT”**



Date: February 2010  
To: Holiday Alaska, Inc.  
Re: WES 5009  
1209 Gambell Street  
Anchorage, AK

## **Important Information About Your Geotechnical/Environmental Report**

### **CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.**

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

### **THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.**

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

### **SUBSURFACE CONDITIONS CAN CHANGE.**

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

### **MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.**

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

## **A REPORT'S CONCLUSIONS ARE PRELIMINARY.**

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

## **THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.**

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

## **BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.**

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

## **READ RESPONSIBILITY CLAUSES CLOSELY.**

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the  
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland