2009 Report

Soil Assessment and Groundwater Monitoring of Non-Tank Farm Sites

Former Quonset Hut Area
Former Landfill Area
Former Operations Building Facility Area
Former Trench Area Burn Pit
Maintenance Building 55

Former Wildwood Air Force Station
Formerly Used Defense Site
Kenai, Alaska
Property #: F10AK025104

Alaska District

Contract No. W911KB-08-D-0003
Task Order 4

April 2010

FES
FAIRBANKS ENVIRONMENTAL SERVICES INC.

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Prepared for

U.S. Army Corps of Engineers, Alaska District
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Task Order 4

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FES Project No. 5004-09

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LIST OF ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AFS	Air Force Station
AST	aboveground storage tank
bgs	below ground surface
°C	degree Celsius
CAS	Columbia Analytical Services, Inc.
CD	compact disk
CDQR	Chemical Data Quality Report
COC	contaminant of concern
COELT	Corps of Engineers Loading Tool Program
CSM	conceptual site model
DO	dissolved oxygen
DoD QSM	Department of Defense Quality Systems Manual for Environmental Laboratories
DQO	data quality objective
DRO	diesel range organics
EDF	electronic data format
E&E	Ecology and Environmental, Inc.
EPA	United States Environmental Protection Agency
°F	degrees Fahrenheit
FES	Fairbanks Environmental Services
FUDS	Formerly Used Defense Site
GAC	granulated activated carbon
GPS	Global Positioning System
GRO	gasoline range organics
HTRW	Hazardous, Toxic, and Radioactive Waste
IDW	investigation-derived waste
KNA	Kenai Natives Association
LCS	laboratory control sample
LIF	laser-induced fluorescence
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
µg/l	micrograms per liter
MS(D)	matrix spike (duplicate)
ng/kg	nanograms per kilogram
ORP	oxidation reduction potential
NTU	Nephelometric turbidity units
PCB	polychlorinated biphenyls
PDF	portable document format
POL	petroleum, oil, and lubricants
PQL	practical quantitation limit
PVC	polyvinyl chloride
QAPP	Quality Assurance Program Plan

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

QA	quality assurance
QC	quality control
RI	remedial investigation
ROST	rapid optical screening tool
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RRO	residual range organics
SAP	Sampling and Analysis Plan
SEDD	Staged Electronic Data Deliverable
SOW	Statement of Work
SVOC	semivolatile organic compound
TEF	toxicity equivalence factor
TEQ	toxic equivalence
TRPH	total recoverable petroleum hydrocarbons
USACE	United States Army Corps of Engineers
USAF	United States Air Force
UST	underground storage tank
VOC	volatile organic compound

EXECUTIVE SUMMARY

Sixteen temporary monitoring wells were installed at locations of former monitoring wells, and groundwater samples were collected, at non-Tank Farm sites at former Wildwood Air Force Station (AFS) Formerly Used Defense Site (FUDS), Kenai, Alaska. In addition, twenty soil samples were collected at a former burn pit and a site inspection at a maintenance building was conducted. Investigations were conducted at sites where previous soil and groundwater sampling had identified contaminant concentrations exceeding Alaska Department of Environmental Conservation (ADEC) cleanup levels. Subsequent remedial actions have occurred to remove contaminated soil from each of the sites.

Groundwater samples were collected from three non-Tank Farm sites: former Quonset Hut area, former Landfill area, and former Operations Building Facility area. Groundwater samples were submitted for one or more of the following analyses: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), gasoline range organics (GRO), diesel range organics (DRO), and natural attenuation parameters. DRO was above the ADEC groundwater cleanup level in one well at the Operations Building Facility downgradient of the former aboveground storage tank (AST) area. All other analytes at all sites were below respective ADEC cleanup levels.

Following collection of the groundwater samples, the temporary monitoring wells were removed and the boreholes were sealed with bentonite and decommissioned in accordance with *Monitoring Well Design and Construction for Investigation of Contaminated Sites* (ADEC, 2009a).

Soil samples were collected from five borings drilled at the former Trench Area Burn Pit. Each soil boring was sub-sampled at the specified depth intervals of 2, 4, 6, and 8 feet below ground surface (bgs). Soil samples were submitted for analysis of lead, polychlorinated biphenyls (PCBs), and dioxins/furans. All analytes were below respective ADEC soil cleanup levels.

Reconnaissance was conducted inside and around Maintenance Building 55 in effort to locate a potential former leach field associated with a floor drain inside the building. Four floor drains were identified inside the building, which are reportedly connected to the City of Kenai Municipal sewer. Evidence of a leach field around the perimeter of the building was not found, so soil samples were not collected. Since a three to six inch snow cover was present during the inspection, another outside site inspection will be conducted in spring 2010 during the groundwater sampling event at the Tank Farm site.

Overall, it appears that past remedial actions and natural attenuation processes have resulted in reducing contaminant concentrations at all of the sites. The remaining groundwater contamination that was identified at one Operations Building Facility area should naturally attenuate and achieve cleanup goals. A conceptual site model was prepared for this site, which indicates that risks are acceptable for the remaining contamination. Cleanup complete status is recommended for each of the sites.

1.0 INTRODUCTION

This report describes groundwater and soil sampling events at the former Wildwood Air Force Station (AFS) Formerly Used Defense Site (FUDS), non-Tank Farm sites, located in Kenai, Alaska. Fairbanks Environmental Services (FES) is providing this service under contract to the U.S. Army Corps of Engineers (USACE) Contract Number W911KB-08-D-0003 (Task Order 4), Modification 1.

1.1 Project Overview

The primary project objective was to conduct groundwater monitoring at three different locations at the former Wildwood AFS to support closure of the sites. In addition, soil samples were collected at a fourth location to assess remaining site contaminants.

Sixteen temporary monitoring wells were installed at locations of former monitoring wells and groundwater samples were collected; two at the former Landfill area; four at the former Quonset Hut area; and, ten at three distinct areas within the former Operations Building Facility site. The samples collected at the former Operations Building Facility site consists of four from the former Transformer area, three from the former Drum Storage area, and three from the former aboveground storage tank (AST)/underground storage tank (UST) area. The samples were submitted for one or more of the following analyses: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), gasoline range organics (GRO), diesel range organics (DRO), and natural attenuation parameters. Natural attenuation parameters included field-filtered iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, total Kjeldahl nitrogen, and methane. All temporary wells were decommissioned after the completion of groundwater sampling. Site descriptions, previous investigations, and groundwater analytical results are discussed in Sections 3 through 5.

Twenty soil samples were collected from five soil borings at the former Trench Area Burn Pit; four sub-samples from each boring at depth intervals of 2, 4, 6, and 8 feet bgs. All samples were submitted for the analysis of lead, polychlorinated biphenyls (PCBs), and dioxins/furans. Site descriptions, previous investigations, and soil analytical results are discussed in Section 6.

A site inspection was conducted at Maintenance Building 55 in effort to identify a potential former leach field associated with a floor drain inside the building. There were no obvious signs of a leach field that may have diverted petroleum, oil, and lubricant (POL) contaminants away from the building prior to being hooked up to Municipal sewer, so soil sampling was not warranted. Findings of the site investigation are discussed in more detail in Section 7.

1.2 Site Background and Physical Settings

1.2.1 Site Location

The former Wildwood AFS is located 3.5 miles northwest of Kenai, Alaska, accessed via Wildwood Drive East of the Kenai Spur Highway (Figure 1-1). The site is located at 60°35'N latitude and 151°17.8'W longitude, in Sections 24 and 25, Township 6N, Range 12W, of the Seward Meridian.

1.2.2 Site History

Wildwood AFS, originally named Seward Station, was constructed as a communications station and activated in 1953 by the United States Army. The total area of the station was approximately 5,300 acres; however, military construction was confined to a 125-acre tract. In May 1954, the station was renamed Wildwood Station, and in 1966 the property was transferred to the U.S. Air Force (USAF). Wildwood AFS was closed by the USAF in July 1972.

During military use, several ASTs and USTs containing petroleum products were present. The site also included a network of underground piping that supplied the petroleum products to a power plant, pump house, maintenance buildings, and fuel dispensing stations.

Following closure, the entire 5,300 acres was transferred to the U.S. Department of the Interior. The Bureau of Land Management transferred 4,300 acres to the Kenai Natives Association Inc. (KNA) during 1974. KNA sold the 125-acre tract of land that the former Wildwood AFS was located on to the Alaska Department of Natural Resources in 1994 (USACE, 2009). The Alaska Department of Corrections currently operates the Wildwood Correctional Center on a portion of this tract, immediately north of the former Wildwood AFS Tank Farm site (Figure 1-2).

1.2.3 Previous Investigations

Between 1989 and 1995, site investigations were conducted (E & E, 1995). Several soil borings were drilled, and monitoring wells and microwells were installed. In addition, surface soil, subsurface soil, surface water, and groundwater samples were collected and submitted to a laboratory for analysis. The sample results indicated that contamination by hazardous, toxic, and radioactive wastes (HTRW) and POL materials existed at the areas of the Main Complex, Quonset Hut, Operations Building Facility, Landfill, and the Trench Area. Between 1995 and 1998, infrastructures and contaminated surface soil were removed, and remedial investigations were initiated at several Wildwood AFS sites. The sites that were investigated under this Work Plan are described in Sections 3 through 7.

1.3 Site Environmental Setting

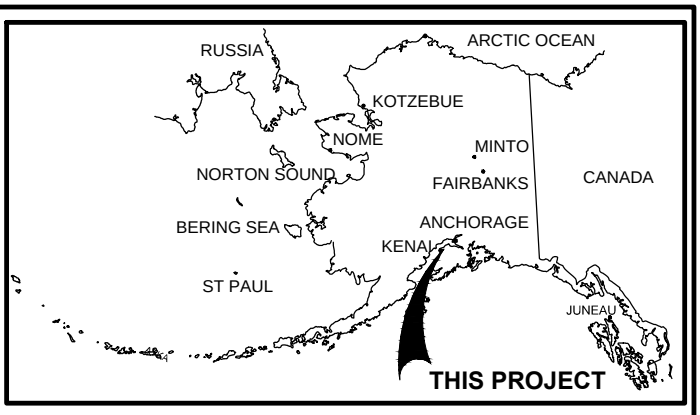
Geology and Land Surface

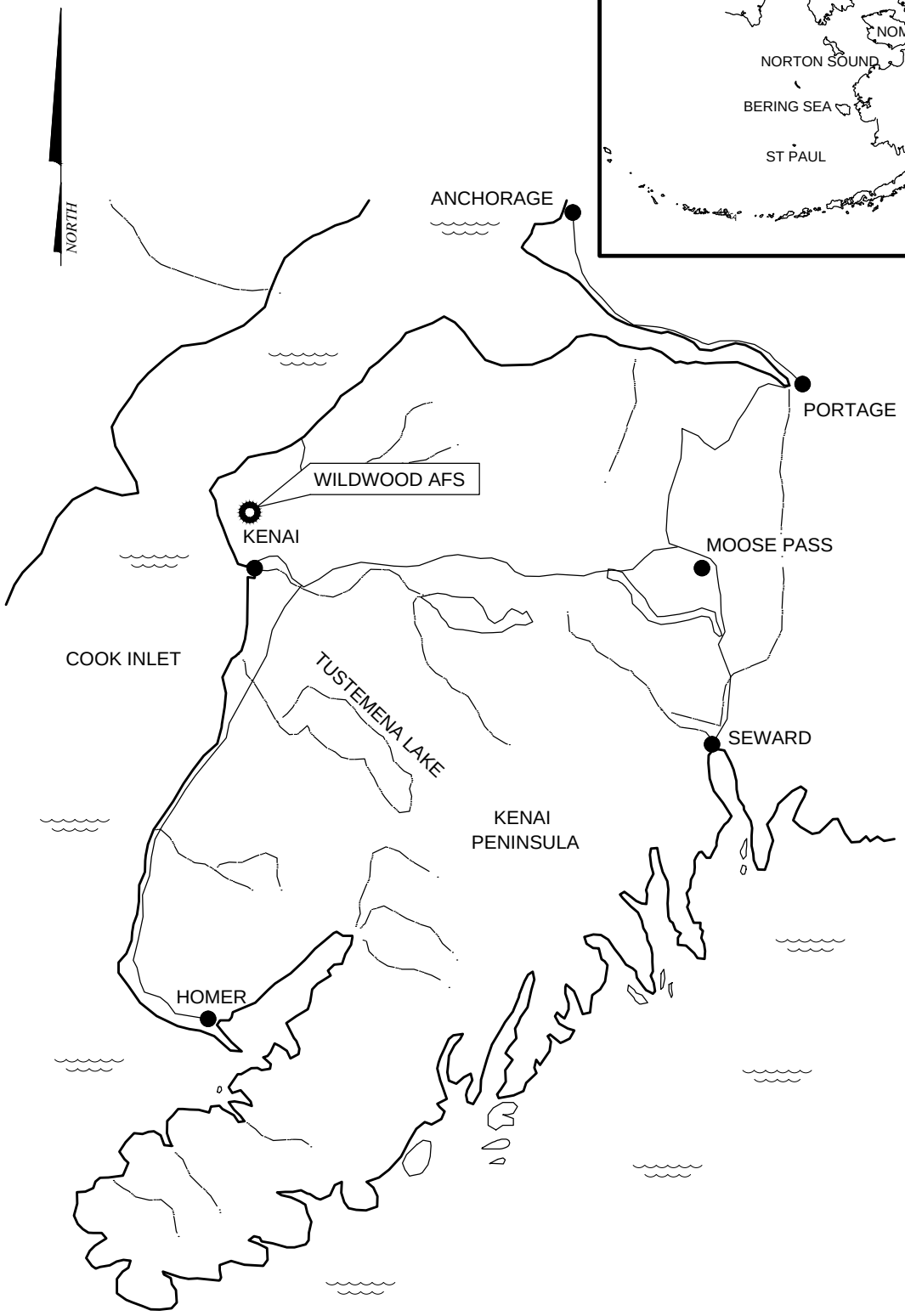
The former Wildwood AFS is located within the northwest region of the Kenai Peninsula, which extends approximately 150 miles into the Gulf of Alaska. The region is characterized by flat to undulating terrain with abundant wetlands, lakes, and streams. The western portion of Wildwood AFS, which includes the areas impacted by military construction, is generally well-drained, forested, and characterized by flat to gently sloping terrain.

Soils in the vicinity of Wildwood AFS are derived from glacial and fluvial deposits. On terraces and outwash plains, the well-drained soils consist of a surface mat of forest litter overlying silt loam. In depressions, the poorly drained soils consist of a surface layer of decomposed sphagnum moss overlying moss and sedge peat. These soils are approximately 2 to 10 feet thick. Sediments in the vicinity of Wildwood AFS consist of interbedded Quaternary-age glacial, fluvial, lacustrine, and marine deposits and underlie the soils described above. Bedrock beneath Wildwood AFS consists of the Tertiary-age Kenai Formation, which is composed of alternating strata of semiconsolidated silt, sand, and gravel, and is locally coal-bearing (E & E, 1995).

Climate

Wildwood AFS is located in the transition climate zone of Alaska and experiences cool summers and cold winters. January temperatures typically range from 10 and 30 degrees Fahrenheit (ºF) and July temperatures from 40 to 60 ºF. Average annual precipitation is approximately 20 inches; average snowfall is approximately 70 inches.





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Site Location and Vicinity Map

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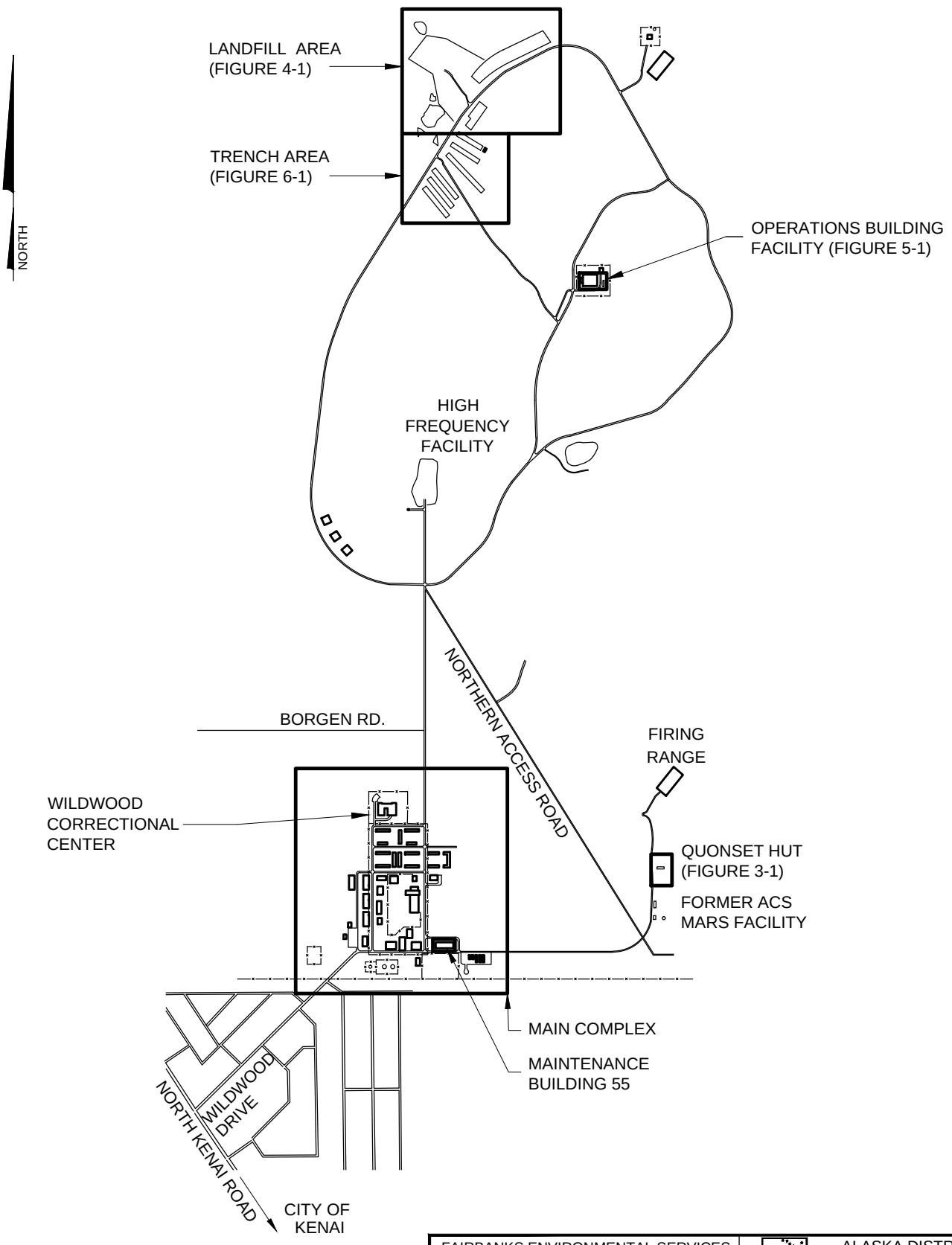

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Site Plan

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2.0 FIELD ACTIVITIES

Field activities include temporary installation of 16 monitoring wells and subsequent groundwater sampling. All temporary monitoring wells were decommissioned after sample collection was complete. In addition, 20 soil samples were collected from five soil borings. All sampling was conducted according to procedures identified in the Final 2009 Work Plan (FES, 2009).

2.1 Temporary Monitoring Well Installation

Temporary monitoring wells were installed at former monitoring well locations on November 18 and 19, 2009, by Hammer Environmental of Wasilla, Alaska, employing a 1.5-inch inside diameter Geoprobe 6610DT track-mounted direct push drill. One-inch diameter polyvinyl chloride (PVC) piping, with 10-foot sections of 0.010-inch slotted screens, were inserted into the boring holes and screened across the water table. The temporary well locations were determined in the field using a Global Positioning System (GPS) and coordinates provided by USACE. Swing ties were also provided by USACE for the former Operations Building Facility and Landfill sites, where accurate GPS coordinates were not available.

2.2 Groundwater Sampling

Groundwater samples were collected from 16 temporary monitoring wells between November 20 and 22, 2009. Groundwater samples were collected a minimum of 24 hours after well installation. The temporary monitoring wells were not developed, but were purged and sampled using low-flow sampling procedures (Puls and Barcelona, 1996). Samples were collected with peristaltic pumps, employing new, disposable tubing for sample collection, so the collection of equipment rinsate samples was not required.

Groundwater parameters were measured in a flow-through cell prior to sampling. Measured parameters included pH, temperature, specific conductivity, dissolved oxygen (DO) concentration, and oxidation/reduction potential. Turbidity was measured using a turbidity meter. Water levels were monitored during well purging/sampling and the pump flow rate was controlled to prevent excessive drawdown. All groundwater parameters stabilized prior to sample collection, except for turbidity for a few project samples. Although turbidity did not always stabilize, it did not prohibit sampling. Impact to data quality was minor as most wells were at or near stabilization prior to sampling, with turbidity measurements below 60 Neophelometric Turbidity Units (NTU); the majority ranging between 5-30 NTUs. Field parameters were recorded on standard groundwater sample forms for each well. Copies of groundwater sample forms are presented in Appendix C.

The samples were submitted for one or more of the following analyses: VOCs, SVOCs, GRO, DRO, and natural attenuation parameters. Natural attenuation parameters included field-filtered

iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, total Kjeldahl nitrogen, and methane. Groundwater samples were analyzed by Columbia Analytical Services (CAS) of Kelso, Washington with the exception of the methane samples, which were subcontracted to CAS of Simi Valley, California. The Chemical Data Quality Review (CDQR) and ADEC Laboratory Data Review Checklist are presented in Appendix A; a groundwater sample tracking (Table B1) and sample analytical results tables (Tables B3 through B7) are presented in Appendix B; groundwater sample forms are presented in Appendix C; GPS coordinates of the sample locations and USACE-provided GPS coordinates and swing ties of former sample locations are presented in Appendix F and Supplemental Data, respectively; and, the CAS laboratory report is presented in Supplemental Data (provided on CD). Groundwater sampling locations, analytical parameters, and results are discussed in Sections 3 through 5.

2.3 Temporary Monitoring Well Decommissioning

Following collection of the groundwater samples, the temporary monitoring wells were removed and the boreholes were sealed with bentonite and decommissioned in accordance with *Monitoring Well Design and Construction for Investigation of Contaminated Sites* (ADEC, 2009).

2.4 Soil Sampling

Soil samples were collected from five borings drilled at the former Trench Area Burn Pit on November 19, 2009, by Hammer Environmental of Wasilla, Alaska, employing a 1.5-inch inside diameter Geoprobe 6610DT track-mounted direct push drill unit and the MC5 Macrocore sampling system. New, disposable boring liners, and disposable spoons and nitrile gloves, were used to collect each sample, so the collection of an equipment rinsate sample was not required. Each soil boring was sub-sampled at the specified depth intervals of 2, 4, 6, and 8 feet bgs.

Burn Pit soil samples were submitted for analysis of dioxins, PCBs, and lead. Lead and PCB soil samples were analyzed by CAS of Kelso, Washington and the dioxin/furan samples were subcontracted to CAS of Houston, Texas. The CDQR and ADEC Laboratory Data Review Checklists are presented in Appendix A, a soil sample tracking table (Table B2) and analytical results tables (Tables B8 and B9) are present in Appendix B, soil boring logs are presented in Appendix E, GPS coordinates of soil boring locations are presented in Appendix F, and the CAS laboratory report is presented in Supplemental Data. Burn Pit soil sampling locations and analytical results are discussed in Section 6.

2.5 Maintenance Building 55 Site Inspection

Reconnaissance was conducted inside and around Maintenance Building 55 in effort to locate a potential former leach field associated with a floor drain inside the building. Four floor drains were identified inside the building, which are reportedly connected to the City of Kenai Municipal

sewer. In addition, a contained sub-floor POL sump system was identified in the vehicle maintenance bay of the building. Evidence of a leach field around the perimeter of the building was not found, so soil samples were not collected. Since a three to six inch snow cover was present during the inspection, another outside site inspection will be conducted in spring 2010 during the groundwater sampling event at the Tank Farm site.

2.6 Investigation-Derived Waste Handling and Disposal

All purge groundwater was filtered through a carbon filtration unit and then discharged to the ground in accordance with 18 AAC 75 (ADEC, 2008). Five-gallon vessels filled with 12 by 40 mesh acid-washed granulated activated carbon (GAC) filter were used to treat the water. No sheen or odor was noted on the effluent water. All soil not submitted for laboratory analysis was placed back into the boreholes and the borings were sealed with bentonite.

Solid non-hazardous investigation-derive waste (IDW) produced during sampling activities was comprised of sampling gloves, paper towels, peristaltic pump tubing, soil boring liners, and PVC tubing. At the end of the sampling event, this solid waste was disposed of at the Kenai-Peninsula Borough landfill.

3.0 FORMER QUONSET HUT AREA

3.1 Site Description and Previous Investigations

The former Quonset Hut area is located east of the Wildwood Correctional Center (Figure 1-2) and, at the time of the remedial investigation (RI), consisted of a burned-out Quonset Hut and a chain-link fence around the perimeter. Metal debris, including furniture and electrical equipment, was located inside the remains of the Quonset Hut. In addition, an AST was formerly located along the south side that used to supply fuel to the Quonset Hut. Stained soil was identified at the AST location, as well as at the southwest corner of the building (E & E, 1995).

Surface soil, subsurface soil, and groundwater at the source area were investigated during the RI. DRO was detected in the POL-stained surface soil (up to 15,000 milligrams per kilogram (mg/kg)), and the groundwater (up to 9.98 milligrams per liter (mg/L)) beneath the stained soil, above the ADEC cleanup levels.

Based upon contamination identified during the RI, removal actions were conducted in 1996. The Quonset Hut structure, ash, metal debris, and the chain-link fence were removed. Approximately 37 cubic yards of POL-contaminated soil was removed from two locations at the Quonset Hut source area. Stained soil was removed from the upper one foot near the southwest corner of the Quonset Hut and excavated to nine feet bgs at the former AST location; however, contaminated soil remained below the groundwater table at the AST location. POL-contaminated groundwater was identified extending approximately 50 feet downgradient from the former AST location (USACE, 2007).

In 2005, a Rapid Optical Screening Tool/Laser-Induced Fluorescence (ROST/LIF) investigation delineated the lateral and vertical extent of the remaining soil POL contamination. POL contamination was identified below the former AST location and extended laterally more than 20 feet and less than 35 feet downgradient. Contamination near the former AST location existed in a depth interval extending from 5 to 13 feet bgs. Soil samples collected from locations with the highest LIF responses contained DRO ranging from 1,390 mg/kg to 2,150 mg/kg (USACE, 2007).

3.2 Chemical Analyses and Data Quality

Groundwater samples were collected from four temporary monitoring wells (Figure 3-1) and analyzed for GRO, DRO, and natural attenuation parameters, which included dissolved iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, total Kjeldahl nitrogen, and methane. Project and QC samples were analyzed by CAS-Kelso, and the methane samples were sub-contracted to CAS-Simi Valley.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the Sampling and Analysis Plan (SAP; FES, 2009), the ADEC Technical

Memo 06-002 (ADEC, 2009b), and the Department of Defense Quality Systems Manual for Environmental Laboratories (DoD QSM), version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Laboratory Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several DRO results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to DRO data quality were minor as the affected sample results were two orders of magnitude below the ADEC cleanup level.

3.3 Contaminant Sample Results

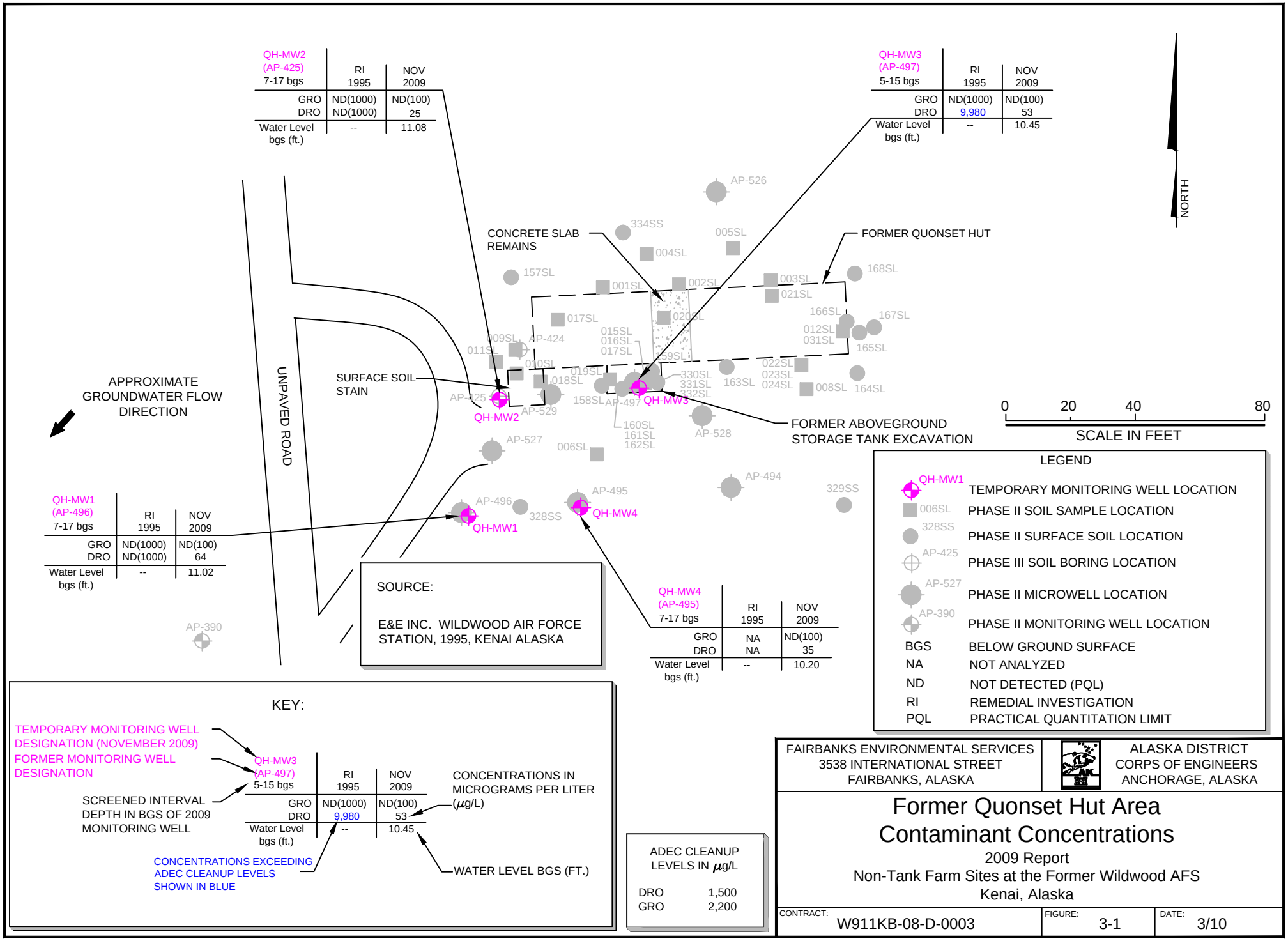
The results of the chemical analyses were compared to Table C of the ADEC Title 18, Alaska Administrative Code, Chapter 75.345 (18 AAC 75.345), Oil and Hazardous Substances Pollution Control. DRO and GRO results reported in the 1995 RI (field and off-site laboratory results) and the results from the 2009 sampling event are compared in Figure 3-1. In the 1995 RI, DRO was reported above cleanup level at the former AST location (AP-497; 9,980 µg/L). However, since the 1996 removal of 37 cubic yards of POL-contaminated soil from the AST area, the DRO concentration in groundwater has decreased significantly and is now detected well below cleanup level. Complete analytical results (Table B3) and a sample tracking table (Table B1) are presented in Appendix B. Groundwater sample results are summarized below.

- DRO was detected in all four wells at concentrations two orders of magnitude less than the ADEC cleanup level of 1,500 micrograms per liter (µg/L).
- GRO was not detected in wells at the Quonset Hut site.

3.4 Geochemical Parameter Evaluation

Geochemical sample results are summarized below and presented in the analytical results table (Table B3) in Appendix B. All groundwater samples at the Quonset Hut area contained low contaminants of concern (COC) concentrations, so the correlation of biodegradation and contamination is subtle. Limited geochemical data were collected in previous sampling events so an interpretation of the biodegradation process over time cannot be summarized. Background samples were not collected to verify background geochemical data at the former Quonset Hut area.

- Dissolved iron concentrations ranged between 0.86 and 5.35 mg/L and dissolved manganese between 0.12 and 0.21 mg/L. The well with the highest dissolved iron concentration corresponds with the highest DRO concentration (QH-MW1 (AP-496)).
- Sulfate concentrations ranged between 7.46 and 9.08 mg/L.
- Relatively low concentration ranges of methane (1.8 and 8.9 µg/L), total Kjeldahl Nitrogen, and nitrate/nitrite as nitrogen (0.020 and 0.93 mg/L) were detected at the former Quonset Hut.
- Chloride concentrations ranged between 2.36 and 2.88 mg/L.00.



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Former Quonset Hut Area Contaminant Concentrations

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4.0 FORMER LANDFILL AREA

4.1 Site Description and Previous Investigations

The former Landfill area is approximately two miles north of the Main Complex Area on the northwest side of Perimeter Road (Figure 1-2). The Landfill was used for solid waste disposal during the operation of Wildwood AFS. Debris, including wood, tires, metal, and general household waste, was present at the surface of the Landfill.

Sampling of surface soil, subsurface soil, surface water, sediment, and groundwater was conducted at the landfill during the RI. This included installation and sampling of nine monitoring wells and ten microwells. No subsurface sources of contaminated soil were identified in the Landfill area. Vinyl chloride and several Resource Conservation and Recovery Act (RCRA) metals were the only contaminants detected in groundwater above the ADEC cleanup levels. However, the elevated concentrations of metals are attributed to the acid digestion (from the sample preservative) of turbid groundwater samples. The vinyl chloride contamination is attributed to the burial practices at the Landfill since these contaminants were not detected in samples from upgradient locations (E & E, 1995).

4.2 Chemical Analyses and Data Quality

Groundwater samples were collected from two temporary monitoring wells (Figure 4-1) and analyzed for VOCs and natural attenuation parameters, which included dissolved iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, total Kjeldahl nitrogen, and methane. Project and QC samples were analyzed by CAS-Kelso, and the methane samples were sub-contracted to CAS-Simi Valley.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the SAP (FES, 2009), the ADEC Technical Memo 06-002 (ADEC, 2009b), and the DoD QSM, version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to data quality were minor and generally affected sample results that were orders of magnitude below respective cleanup levels.

4.3 Contaminant Sample Results

The results of the chemical analyses were compared to Table C of the ADEC 18 AAC 75.345, Oil and Hazardous Substances Pollution Control. In the 1995 RI, vinyl chloride was the only landfill COC reported above the regulatory guidance (ADEC, 1990), with the exception of RCRA metals

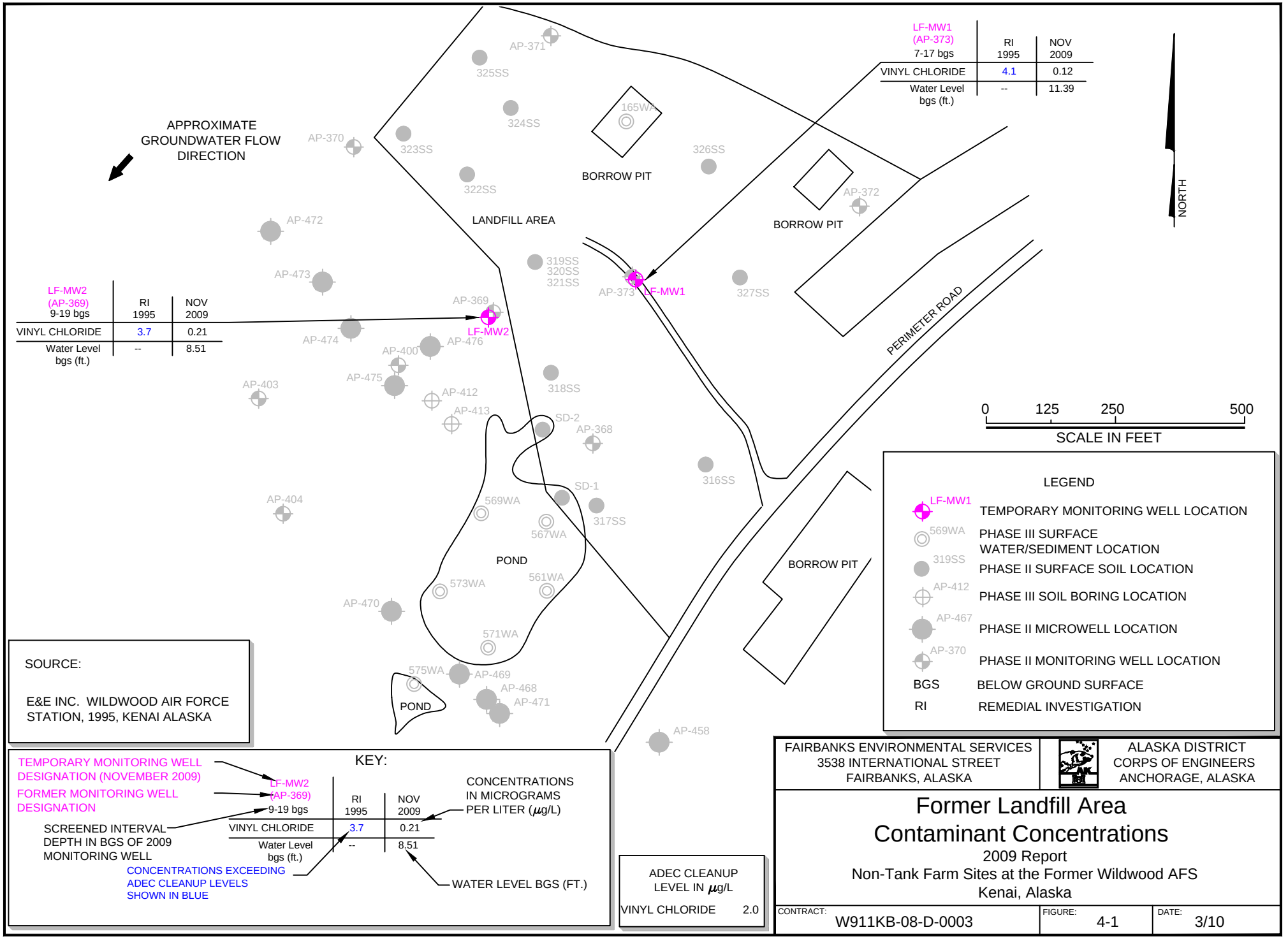
(see Section 4.1 above). Vinyl chloride results reported in the 1995 RI and the results from the 2009 sampling event are compared in Figure 4-1. Complete analytical results (Table B4) and a sample tracking table (Table B1) are presented in Appendix B. Groundwater sample results are summarized below.

- Vinyl chloride was detected in wells LF-MW1 (AP-373) and LF-MW2 (AP-369) at concentrations (0.21 µg/L and 0.12 µg/L, respectively) one order of magnitude below the ADEC cleanup level (2 µg/L).
- All other detected VOCs in both Landfill wells were one to four orders of magnitude below respective ADEC cleanup levels.

4.4 Geochemical Parameter Evaluation

Geochemical sample results are summarized below and presented in the analytical results table (Table B4) in Appendix B. Limited geochemical data were collected in previous sampling events so an interpretation of the biodegradation process over time cannot be summarized. Background samples were not collected to verify background geochemical data at the former Landfill area.

- Elevated dissolved iron (74 and 27 mg/L) and dissolved manganese (3.41 and 1.08 mg/L) concentrations were detected in wells LF-MW1 (AP-393) and LF-MW2 (AP-369), respectively.
- Relatively low sulfate concentrations (0.31 and 0.40 mg/L) were detected at the site.
- Total Kjeldahl Nitrogen and nitrate/nitrite as nitrogen concentrations ranged between 0.073 and 1.91 mg/L.
- Methane was detected at concentrations of 5,900 and 2,000 µg/L. These elevated methane concentrations (as compared to the other Wildwood AFS sites) are consistent with the degradation of Landfill wastes.
- Chloride was detected at concentrations of 2.95 and 4.12 mg/L.



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5.0 FORMER OPERATIONS BUILDING FACILITY

The former Operations Building Facility is approximately 0.5 mile southeast of the Landfill Area and approximately 1.5 miles north of the Main Complex Area (Figure 1-2). The facility, which occupies approximately 1 acre, consists of an operations building (Building 100), shop (Building 101), former transformer storage area, former drum storage location, former site of two ASTs and two USTs, and a septic system and a leaching pond (utilized for the disposal of cooling water).

5.1 Former Transformer Area

5.1.1 Site Description and Previous Investigations

The former Transformer Area is located on the west side of Building 101 (Figure 5-1). In 1990, the transformer was removed, as well as transformer oil-stained soil from a 3-foot by 5-foot by 3-foot-deep area adjacent to the transformer pad. Subsequently, POLs were spilled on the transformer pad and spread to the clean fill used to backfill the removal excavation. The exact source and cause of this spill is unknown; however, the release may be associated with an UST that was found in the area during remedial action.

Sampling of surface soil, subsurface soil, and groundwater was conducted at the former Transformer area during the RI. This included installation and sampling of two monitoring wells and nine microwells. PCBs and DRO were detected in the POL-stained surface soil above the ADEC cleanup levels. DRO was detected in the groundwater below the stained soil area, as well as 60 feet downgradient, at the cleanup level (1.5 mg/L; E & E, 1995).

Based upon contamination identified during the RI, removal actions were conducted in 1997. Approximately 123 cubic yards of POL and low-level PCB-contaminated soil was excavated from the former transformer location. A 500-gallon UST was also identified and removed during this work. Final excavation dimensions were 13 feet by 36 feet by 5 to 6 feet deep. Confirmation soil samples were collected from the excavation. DRO concentrations above the cleanup level remained in the soil at the base of the excavation, ranging from 6,500 mg/kg to 16,300 mg/kg. PCB concentrations in soil at the base of the excavation were below cleanup levels (USACE, 2007).

In 2005, a ROST/LIF investigation at this site delineated the lateral and vertical extent of the remaining soil POL contamination. POL contamination extended more than 30 feet and less than 60 feet downgradient. The contamination was located within a depth interval between 5.2 and 11 feet bgs. Soil samples collected from locations with highest LIF responses contained DRO up to 3,420 mg/kg and residual range organics (RRO) up to 1,540 mg/kg (USACE, 2007).

5.1.2 Chemical Analyses and Data Quality

Groundwater samples were collected from four temporary monitoring wells (Figure 5-1) and analyzed for GRO, DRO, and natural attenuation parameters, which included dissolved iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, total Kjeldahl nitrogen, and methane. Project and QC samples were analyzed by CAS-Kelso, and the methane samples were sub-contracted to CAS-Simi Valley.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the SAP (FES, 2009), the ADEC Technical Memo 06-002 (ADEC, 2009b), and the DoD QSM, version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to data quality were minor and generally affected sample results that were orders of magnitude below respective cleanup levels.

5.1.3 Contaminant Sample Results

The results of the chemical analyses were compared to Table C of the ADEC 18 AAC 75.345, Oil and Hazardous Substances Pollution Control. DRO and GRO results reported in the 1995 RI (field and off-site laboratory results) and the results from the 2009 sampling event are compared in Figure 5-1. In the 1995 RI, DRO was reported above the ADEC cleanup level downgradient of the former transformer pad. However, since the 1997 removal of 123 cubic yards of POL-contaminated soil, the DRO concentration in groundwater has decreased significantly and is now detected well below cleanup level. Complete analytical results (Table B5) and a sample tracking table (Table B1) are presented in Appendix B. Groundwater sample results are summarized below:

- DRO, which historically exceeded regulatory guidance (ADEC, 1990) in former wells AP-448 and AP-449, was detected at concentrations (190 µg/L and 370 µg/L, respectively) one order of magnitude below the ADEC cleanup level (1,500 µg/L).
- GRO was detected at concentrations between 18 and 81 µg/L; two orders of magnitude below the ADEC cleanup level (2,200 µg/L).

5.1.4 Geochemical Parameter Evaluation

Geochemical sample results are summarized below and presented in the analytical results table (Table B5) in Appendix B. Limited geochemical data were collected in previous sampling events so an interpretation of the biodegradation process over time cannot be summarized. Background

samples were not collected to verify background geochemical data at the former Transformer area.

- Dissolved iron concentrations ranged from 2.24 and 3.10 mg/L and dissolved manganese ranged from 0.075 and 0.086 mg/L.
- Sulfate was detected at concentrations between 2.37 and 6.16 mg/L.
- Total Kjeldahl Nitrogen and nitrate/nitrite as nitrogen concentrations ranged between non-detect and 0.93 mg/L.
- Methane was detected at concentrations ranging between 31 and 860 µg/L.
- Chloride was detected at concentrations ranging between 2.29 and 2.56 mg/L.

5.2 Former Drum Storage Area

5.2.1 Site Description and Previous Investigations

The former Drum Storage area is located north of Building 101 (Figure 5-1). In 1990, thirteen 55-gallon drums (that reportedly contained POLs) and fourteen cubic yards of POL-contaminated soil were removed from the north and east of Building 101 (E & E, 1995).

Sampling of surface soil, subsurface soil, and groundwater was conducted at the former Drum Storage area during the RI. This included installation and sampling of one monitoring well and two soil borings. DRO concentrations in surface and subsurface soil ranged up to 4,400 mg/kg and extended to the groundwater table. Elevated DRO (8.86 mg/L) was detected in the groundwater below the former Drum Storage area, as well as 40 feet downgradient, ranging from 1.8 to 20 mg/L. The groundwater plume extended downgradient from the former Drum Storage area and was believed to merge with the groundwater plume associated with the former Transformer area (E & E, 1995).

Based upon contamination identified during the RI, removal actions were conducted in 1997 and 1998. Approximately 162 cubic yards of POL-contaminated soil was excavated from the former Drum Storage Area. Final excavation dimensions were approximately 15 feet by 40 feet by 7 feet deep. DRO concentration (5,800 mg/kg) above the ADEC cleanup level remained in the soil at the base of the excavation near the groundwater table (USACE, 2007).

In 2005, a ROST/LIF investigation at this site delineated the lateral and vertical extent of the remaining soil POL contamination. POL contamination in the soil extends toward the south and west of the former Drum Storage Area, but not to the north or east. The contamination was located within a depth interval between approximately 3 to 9 feet bgs. Soil samples collected from locations with highest LIF responses contained DRO up to 2,360 mg/kg (USACE, 2007).

5.2.2 Chemical Analyses and Data Quality

Groundwater samples were collected from three temporary monitoring wells (Figure 5-1) and analyzed for VOC, SVOC, GRO, DRO, and natural attenuation parameters, which included dissolved iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, Kjeldahl nitrogen, and methane. Project and QC samples were analyzed by CAS-Kelso, and the methane samples were sub-contracted to CAS-Simi Valley.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the SAP (FES, 2009), the ADEC Technical Memo 06-002 (ADEC, 2009b), and the DoD QSM, version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to data quality were minor and generally affected sample results that were orders of magnitude below respective cleanup levels.

5.2.3 Contaminant Sample Results

The results of the chemical analyses were compared to Table C of the ADEC 18 AAC 75.345, Oil and Hazardous Substances Pollution Control. GRO, DRO and BTEX results reported in the 1995 RI and the results from the 2009 sampling event are compared in Figure 5-1. Complete analytical results (Table B6) and a sample tracking table (Table B1) are presented in Appendix B. Groundwater sample results are summarized below:

- DRO and VOCs were detected in all three wells at concentrations at least one order of magnitude less than the respective ADEC cleanup levels.
- GRO was detected in one well (DSA-MW5 (AP-504)) at the Drum Storage area at a concentration (17 µg/L) two orders of magnitude below the cleanup level (2,200 µg/L). GRO was non-detect in all other wells.
- SVOCs were not detected above respective cleanup levels in any well the former Drum Storage area.

5.2.4 Geochemical Parameter Evaluation

Geochemical sample results are summarized below and presented in the analytical results table (Table B6) in Appendix B. Limited geochemical data were collected in previous sampling events so an interpretation of the biodegradation process over time cannot be summarized. Background

samples were not collected to verify background geochemical data at the former Drum Storage area.

- Dissolved iron concentrations ranged from 1.50 and 1.68 mg/L and dissolved manganese ranged from 0.048 and 0.067 mg/L.
- Sulfate was detected at concentrations between 2.72 and 6.25 mg/L.
- Total Kjeldahl Nitrogen and nitrate/nitrite as nitrogen concentrations ranged between 0.062 and 1.13 mg/L.
- Methane was detected at concentrations ranging between 2.3 and 97 µg/L.
- Chloride was detected at concentrations ranging between 2.31 and 2.43 mg/L.

5.3 Former AST and UST Area

5.3.1 Site Description and Previous Investigations

Two 3,500-gallon ASTs and two 15,000-gallon USTs were formerly located southeast of Building 101 (Figure 5-1). The tanks were used to supply diesel fuel to the facility's generator, and were removed prior to the start of the RI.

Sampling of surface soil, subsurface soil, and groundwater was conducted at the former ASTs/USTs area during the RI. This included installation and sampling of two monitoring wells, nine microwells, and six soil borings. DRO concentrations in surface soil were as high as 26,000 mg/kg and up to 1,230 mg/kg in subsurface soil in the AST area. Groundwater beneath the former ASTs was identified at 4 to 5 feet bgs and contained elevated DRO concentrations (62 mg/L). Between 1994 and 1997, DRO ranged from 0.27 to 5.2 mg/L in a monitoring well 130 feet downgradient from the former AST/UST location (E & E, 1995).

Based upon contamination identified during the RI, removal actions were conducted in 1997. Approximately 345 cubic yards of POL-contaminated soil was removed from the former AST/UST area. Final excavation dimensions were approximately 45 feet by 26 feet by 8 feet deep. DRO (up to 3,770 mg/kg) remained in soil at the base of the excavation at 8 feet bgs (USACE, 2007).

In 2005, a ROST/LIF investigation at this site delineated the lateral and vertical extent of the remaining soil POL contamination. POL contamination in the soil extended toward the west, southwest, and northwest, but not to the east. POL contamination in soils existed at a depth interval extending from approximately 2 to 11 feet bgs. Soil samples collected from locations with highest LIF responses contained DRO up to 2,090 mg/kg (USACE, 2007).

5.3.2 Chemical Analyses and Data Quality

Groundwater samples were collected from three temporary monitoring wells (Figure 5-1) and analyzed for GRO, DRO, and natural attenuation parameters, which included dissolved iron and manganese, sulfate and chloride, nitrate/nitrite as nitrogen, Kjeldahl nitrogen, and methane. Project and QC samples were analyzed by CAS-Kelso, and the methane samples were sub-contracted to CAS-Simi Valley.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the SAP (FES, 2009), the ADEC Technical Memo 06-002 (ADEC, 2009b), and the DoD QSM, version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to data quality were minor and generally affected sample results that were orders of magnitude below respective cleanup levels.

5.3.3 Contaminant Sample Results

The results of the chemical analyses were compared to Table C of the ADEC 18 AAC 75.345, Oil and Hazardous Substances Pollution Control. DRO and GRO results reported in the 1995 RI (field-laboratory results) and the results from the 2009 sampling event are compared in Figure 5-1. Complete analytical results (Table B7) and a sample tracking table (Table B1) are presented in Appendix B. Groundwater sample results are summarized below.

- DRO was detected in one well, AST-MW10 (AP-503), at a concentration (3,800 µg/L) that exceeded the ADEC cleanup level (1,500 µg/L), located directly downgradient of the former ASTs. The two wells located further downgradiant had DRO concentrations detected below the cleanup level.
- GRO was detected in all wells one to two orders of magnitude less than the ADEC cleanup level (2,200 µg/L).

Although the DRO concentration in well AST-MW10 (3,800 µg/L) exceeds the groundwater cleanup level (1,500 µg/L), it has decreased significantly since the removal of 345 cubic yards of POL-contaminated soil from the AST area in 1997. The DRO concentration measured in 2009 was two orders of magnitude less than the concentration identified in the nearby RI sample location (AP-503). It is presumed that the concentration will continue to decrease over time through natural attenuation processes. Furthermore, the two downgradient wells, AST-MW8 (AP-446) and AST-MW9 (AP-507), were below the DRO cleanup level in the 2009 groundwater sampling event, which indicates limited contamination migration.

5.3.4 Geochemical Parameter Evaluation

Geochemical sample results are summarized below and presented in the analytical results table (Table B7) in Appendix B. Limited geochemical data were collected in previous sampling events so an interpretation of the biodegradation process over time cannot be summarized. Background samples were not collected to verify background geochemical data at the former AST/UST area.

- Dissolved iron concentrations ranged from 4.70 and 7.37 mg/L and dissolved manganese ranged from 0.0758 and 0.170 mg/L.
- Sulfate was detected at concentrations between 2.64 and 4.41 mg/L.
- Total Kjeldahl Nitrogen and nitrate/nitrite as nitrogen concentrations ranged between 0.019 and 0.74 mg/L.
- Methane was detected at concentrations ranging between 3.1 and 110 µg/L.
- Chloride was detected at concentrations ranging between 2.14 and 2.37 mg/L.

5.3.5 Conceptual Site Model

A site conceptual model (CSM) was developed for the former AST site since one well had a DRO concentration exceeding the ADEC cleanup level. The CSM was prepared according to the *Policy Guidance on Developing Conceptual Site Models* (ADEC, 2005) to describe the potential exposure pathways from the residual DRO contamination remaining at the site. The CSM graphic was developed using the ADEC Human Health Conceptual Site Model Scoping form; both are presented in Appendix D. The CSM is based on the assumption that a limited area of residual DRO contamination above the ADEC cleanup level remains in the subsurface soil and groundwater in the vicinity of AST-MW10 (former well AP-503). This assumption has been derived from findings reported in the 1995 RI (E & E, 1995), the 2007 ROST investigation (USACE, 2007), and the 2009 groundwater monitoring event. The ROST investigation showed the soil DRO contamination (1,240 mg/kg to 2,090 mg/kg) is limited to an approximate depth between 2 to 12 feet bgs, and is localized around the former AST area, extending downgradient approximately 100 feet. A description of each of the complete, or potentially complete, exposure pathways is presented in the following paragraphs.

Direct Contact with Soil

Direct contact with contaminated soil through incidental soil ingestion and dermal absorption was considered a completed exposure pathway based on residual DRO contamination above the ADEC cleanup level that exists at the site. The extent of contamination has been shown to be relatively small, and is present between 2 and 12 feet bgs. However, future potential exposure to construction workers, site visitors, trespassers, or recreational users may occur at this site if excavation occurs to a depth greater than 2 feet bgs. There are no known plans for construction

or excavation at this site, and information regarding the residual DRO contamination should be made available if development does occur.

Exposure to Contaminated Groundwater

Exposure to contaminated groundwater was considered a completed exposure pathway based on the 2009 groundwater sampling results showing exceedance of the ADEC cleanup level for DRO in AST-MW10 (AP-503). This pathway includes ingestion of groundwater, dermal absorption, and inhalation of volatile compounds in tap water. Although this pathway has the potential to be complete, there are currently no wells installed to access the groundwater in the former AST area. It is unlikely that the groundwater would be used as a potable water source since nearby areas (e.g., a residential area and the Wildwood Correctional Center) are provided with a public water supply. However, if site groundwater was used as a potable water source in the future, exposure to DRO contamination above the ADEC cleanup level may occur. Receptors for this exposure pathway may include future residents.

Ingestion of surface water was not considered as a completed pathway since there is no connection or anticipated connection between the contaminated groundwater and surface water.

Inhalation of Outdoor Air

The inhalation of contaminants in an outdoor air exposure pathway was also considered complete. This determination was based on the presence of DRO contaminated soil at the approximated depth of 2 to 12 feet bgs. Although outdoor inhalation exposure is possible, there is currently low risk since DRO was not detected in surface soils. However, the exposure pathway may be completed during excavation where contaminated soil is brought to the surface. Potential receptors for this scenario include construction workers, site visitors, trespassers, and recreational users. If construction is planned in this area, information related to the contamination should be made available.

The inhalation of volatile contaminants in indoor air was not considered a completed pathway since there are no occupied buildings within 100 feet of the site, nor are there known plans of the construction of a building.

NORTH

APPROXIMATE GROUNDWATER FLOW DIRECTION

TA-MW4 (AP-449) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(1,000)	81
DRO	92,200	370
Water Level bgs (ft.)	--	8.26

TA-MW3 (AP-448) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(1,000)	29
DRO	1,500	190
Water Level bgs (ft.)	--	8.66

TA-MW2 (AP-450) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(1,000)	18
DRO	ND(1,000)	160
Water Level bgs (ft.)	--	10.14

TA-MW1 (AP-515) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(1,000)	58
DRO	ND(1,000)	440
Water Level bgs (ft.)	--	9.34

DSA-MW5 (AP-504) 5-15 bgs	RI 1995	NOV 2009
GRO	ND(30,000)	17
DRO	ND(30,000)	190
BENZENE	ND(30)	ND(0.5)
TOLUENE	74	0.07
ETHYLBENZENE	ND(30)	ND(0.5)
XYLENES	182	ND(0.5)
Water Level bgs (ft.)	--	7.94

DSA-MW6 (AP-387/411) 7-17 bgs	RI 1995	NOV 2009
GRO	NA	ND(100)
DRO	NA	32
BENZENE	NA	ND(0.5)
TOLUENE	NA	0.06
ETHYLBENZENE	NA	ND(0.5)
XYLENES	NA	ND(0.5)
Water Level bgs (ft.)	--	7.62

DSA-MW7 (AP-317) 7-17 bgs	RI 1995	NOV 2009
GRO	NA	ND(100)
DRO	NA	43
BENZENE	NA	ND(0.5)
TOLUENE	NA	ND(0.5)
ETHYLBENZENE	NA	ND(0.5)
XYLENES	NA	ND(0.5)
Water Level bgs (ft.)	--	7.48

AST-MW9 (AP-507) 7-17 bgs	RI 1995	NOV 2009
GRO	NA	96
DRO	NA	1,000
Water Level bgs (ft.)	--	7.55

AST-MW8 (AP-446) 7-17 bgs	RI 1995	NOV 2009
GRO	NA	61
DRO	NA	720
Water Level bgs (ft.)	--	7.53

AST-MW10 (AP-503) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(30,000)	180
DRO	115,000	3,800
Water Level bgs (ft.)	--	7.46

FORMER DRUM STORAGE LOCATION

FORMER TRANSFORMER LOCATION

FORMER UNDERGROUND TANK LOCATIONS

FORMER ABOVEGROUND TANK LOCATIONS

DSA-MW5 DSA-MW6 DSA-MW7 TA-MW4 TA-MW3 TA-MW2 TA-MW1 AST-MW10 AST-MW9 AST-MW8

AP-411 AP-387 AP-410 AP-317 AP-504 AP-447 AP-449 AP-448 AP-450 AP-515 AP-356 AP-505 AP-508 AP-451 AP-318 AP-442 AP-541 AP-502 AP-540 AP-443 AP-537 AP-444 AP-538 AP-536 AP-503 AP-506 AP-445 AP-507 AP-446 AP-523 AP-386 AP-385

460SL 456SL 462SL 463SL 150TR 151SL 457SL 461SL 458SL 459SL 152SL 153DR 154DR 155DR 158SL 167GW 596SS 595SS 592SS 593SS 591SS 597SS

100 101 102

ADEC CLEANUP LEVELS in µg/L

1,500	DRO
2,200	GRO
5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES

LEGEND

- MW-9 TEMPORARY MONITORING WELL LOCATION AT THE FORMER AST/UST TANK AREA
- MW-1 TEMPORARY MONITORING WELL LOCATION AT THE FORMER TRANSFORMER AREA
- MW-5 TEMPORARY MONITORING WELL LOCATION AT THE FORMER DRUM STORAGE AREA
- 150TR PHASE II TRANSFORMER OIL SAMPLE LOCATION
- 153DR PHASE II DRUM CONTENT SAMPLE LOCATION
- 158SL PHASE II SOIL SAMPLE LOCATION
- 592SS PHASE II SURFACE SOIL LOCATION
- 167GW PHASE II GROUNDWATER LOCATION
- AP-536 PHASE III SOIL BORING LOCATION
- AP-523 PHASE II MICROWELL LOCATION
- AP-386 PHASE II MONITORING WELL LOCATION

BGS	BELOW GROUND SURFACE
NA	NOT ANALYZED
ND	NOT DETECTED (PQL)
RI	REMEDIAL INVESTIGATION
PQL	PRACTICAL QUANTITATION LIMIT

SOURCE:

E&E INC. WILDWOOD AIR FORCE STATION, 1995, KENAI ALASKA

KEY:

TEMPORARY MONITORING WELL DESIGNATION (NOVEMBER 2009)
FORMER MONITORING WELL DESIGNATION
SCREENED INTERVAL DEPTH IN BGS OF 2009 MONITORING WELL
CONCENTRATIONS EXCEEDING ADEC CLEANUP LEVELS SHOWN IN BLUE
CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L)
WATER LEVEL BGS (FT.)

AST-MW10 (AP-503) 7-17 bgs	RI 1995	NOV 2009
GRO	ND(30,000)	180
DRO	115,000	3,800
Water Level bgs (ft.)	--	7.46

0 30 60 120
SCALE IN FEET

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FAIRBANKS, ALASKA

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

Former Operations Building Facility Contaminant Concentrations

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

CONTRACT: W911KB-08-D-0003
FIGURE: 5-1
DATE: 3/10

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6.0 FORMER TRENCH AREA BURN PIT

6.1 Site Description and Previous Investigations

The Burial Trench area is located approximately 1.75 miles north of the Main Complex Area (Figure 1-2). The trench area was utilized by AFS as a solid waste disposal area. Debris, including tires, metal scraps, wood, and rusty 55-gallon drums, were found in one open trench and protruded from the surface of other buried trenches. In addition to the disposal trenches, a suspected Burn Pit is located northeast of the northernmost trench. The Burn Pit was approximately 50 feet by 40 feet (E & E, 1995).

Sampling of surface soil, subsurface soil, and groundwater was conducted at the former Burn Pit during the RI. This included installation and sampling of one monitoring well, and six microwells, as well as the sampling of one soil boring. Stained surface soil and elevated concentrations of DRO, RRO, and lead characterized the location of the suspected burn pit (18,000, 55,000, and 1040 mg/kg, respectively). Contaminant concentrations in the subsurface soil beneath (5 feet bgs) the Burn Pit decreased by an order of magnitude from the surface soil concentrations, with only DRO remaining above the cleanup level (2,900 mg/kg). However, DRO concentration in groundwater below the Burn Pit did not exceed the cleanup level.

Based upon contamination identified during the RI, removal actions were conducted in 1996. The upper 2 feet of POL and lead-contaminated soil was removed, which amounted to approximately 117 cubic yards of material. Confirmation soil samples were collected from the excavation and analyzed for DRO and lead. Remaining DRO concentrations ranged from 1,200 mg/kg to 18,000 mg/kg. Remaining lead concentrations ranged from 34 mg/kg to 420 mg/kg.

In 2005, a ROST/LIF investigation at this site delineated the lateral and vertical extent of the remaining soil POL contamination. POL contamination in the soil remained in a discrete area less than 25 feet in diameter and at a depth interval extending from approximately 1.5 to 9.8 feet bgs. Soil samples collected from locations with highest LIF responses contained DRO up to 1,200 mg/kg (USACE, 2007).

6.2 Sample Collection, Chemical Analyses, and Data Quality

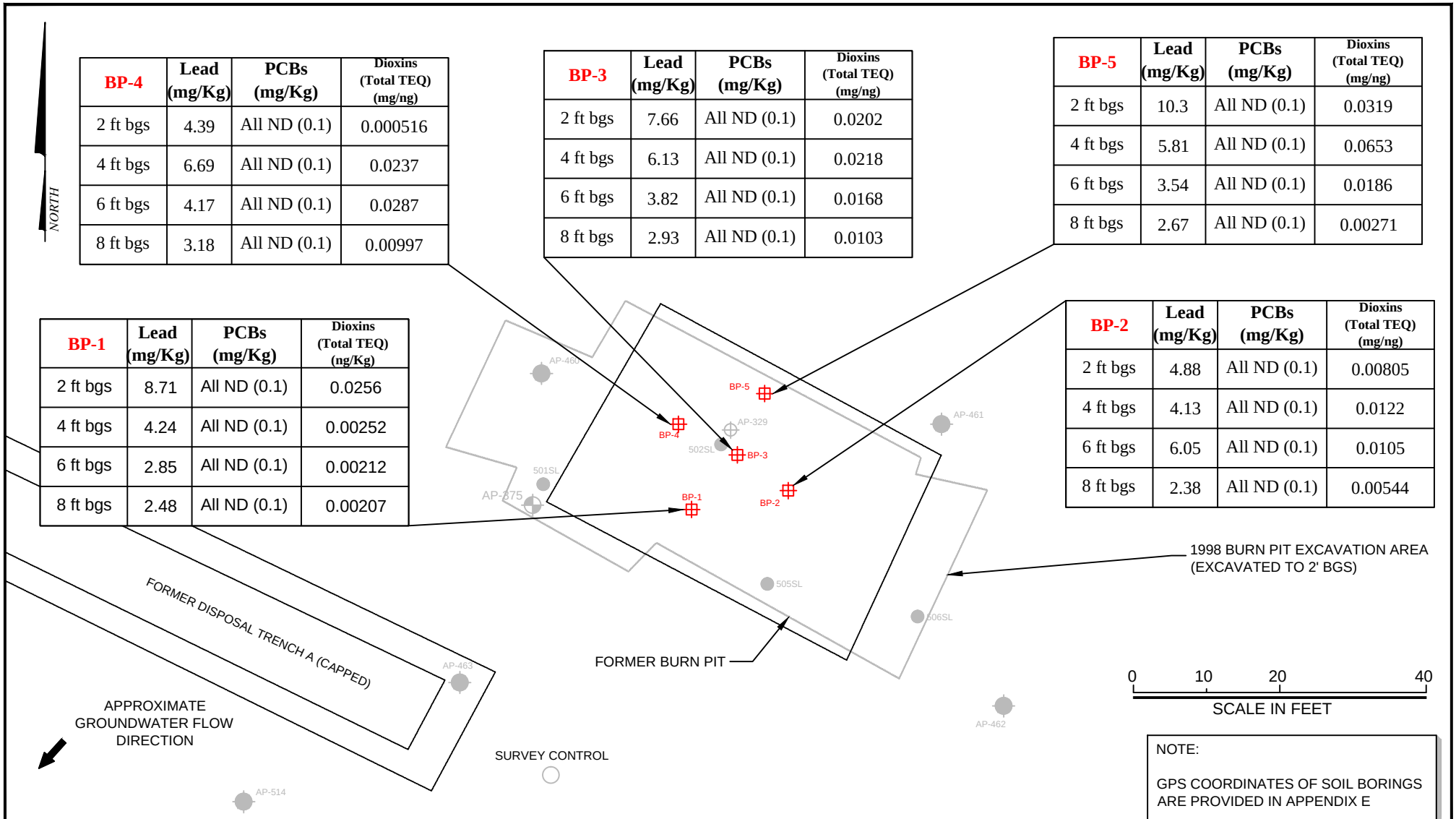
Twenty soil samples were collected from five soil borings; four sub-samples were collected from each boring at depth intervals of 2, 4, 6, and 8 feet bgs (Figure 6-1). A strong fuel odor was detected between 1 and 4 feet bgs in soil boring number 4 (BP-4). The fuel odor decreased below 4 feet, but was still present at 8 feet bgs. All samples were analyzed for lead, PCBs, and dioxins/furans. Lead and PCB project and QC samples were analyzed by CAS-Kelso, and dioxins/furans were sub-contracted to CAS-Houston.

Project and QC data were reviewed in order to assess whether analytical data met quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the SAP (FES, 2009), the ADEC Technical Memo 06-002 (ADEC, 2009b), and the DoD QSM, version 3.0 (DoD, 2006). The results of the review are included in the CDQR and the ADEC Data Review Checklist in Appendix A. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to the data quality review. Impacts to data quality were minor and generally affected sample results that were orders of magnitude below respective cleanup levels.

6.3 Contaminant Sample Results

The results of the chemical analyses were compared to Table B2 the ADEC 18 AAC 75.341, Oil and Hazardous Substances Pollution Control. In addition, the measured concentrations of dioxin-related compounds were adjusted using toxicity equivalence factors (TEFs; WHO, 2005) to account for differing degrees of toxicity, then summed for a toxicity equivalent (TEQ) relative to the concentration of one of the most toxic dioxins, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). TEQ concentrations were then compared to the 2,3,7,8-TCDD ADEC cleanup level. Lead, PCBs, and TEQ dioxin results are summarized in Figure 6-1. Complete analytical results (Table B8), TEF-adjusted dioxin concentrations (Table B9), and a soil sample tracking table (Table B2) are presented in Appendix B. Soil sample results are summarized below:

- Lead was detected in all soil samples at concentrations two orders of magnitude less than the most stringent ADEC soil cleanup level (residential land use; 400 mg/kg).
- PCBs were not detected in any soil samples at the Burn Pit site.
- TEQ dioxin concentrations were two to five orders of magnitude below the ADEC cleanup level (58 nanograms per kilogram (ng/kg)).



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CORPS OF ENGINEERS
ANCHORAGE, ALASKA

Former Trench Area Burn Pit Contaminant Concentrations

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

CONTRACT:	FIGURE:	DATE:
W911KB-08-D-0003	6-1	3/10

1494AF

7.0 MAINTENANCE BUILDING 55

7.1 Site Description and Previous Investigations

Maintenance Building 55 is located in the southeast corner of the Main Complex Area (Figure 1-2) and was utilized by the AFS for vehicle maintenance. During the RI, a POL-stained soil area of approximately 10 feet by 10 feet was identified on the east side of the building.

Sampling of surface soil, subsurface soil, and groundwater was conducted at Maintenance Building 55 during the RI. This included installation and sampling of one monitoring well, six microwells, and one soil boring. Surface soil results indicated POL contaminant concentrations exceeding cleanup levels corresponding with the stained soil area, but did not exceed cleanup levels beyond 10 feet bgs. Groundwater and soil contamination was limited to the area immediately below and downgradient of the POL-stained soil. In 1990, one cubic yard of the stained soil was removed.

A second small POL-contaminated groundwater plume was identified along the southwest side of Building 55. Total recoverable petroleum hydrocarbon (TRPH) was detected in groundwater at a concentration less than 1,000 µg/L; however, TRPH detection used a field laboratory method and is not directly comparable to Alaska State fuel methods and associated ADEC cleanup levels. The contaminant source was not identified (E & E, 1995).

7.2 2009 Site Reconnaissance

Reconnaissance was conducted inside and around the outside perimeter of Maintenance Building 55 in effort to locate a potential former leach field associated with a floor drain inside the building. Four floor drains were identified inside the building, which are reported to be connected to the City of Kenai Municipal sewer (City of Kenai records indicate Municipal sewer and water has been available at Wildwood since 1973; E & E, 1995). In addition, a contained sub-floor POL sump system was identified in the vehicle maintenance bay of the building. Evidence of a leach field around the perimeter of the building was not found, so soil samples were not collected. The site visit was conducted with the maintenance shop supervisor (who has reportedly been employed there for over 12 years) and he has no knowledge of a leach field associated with the building. Photographs of the drains and sub-floor POL sump system are provided in Appendix G, but the Wildwood Corrections Center prohibited picture taking around the building perimeter. Since a three to six inch snow cover was present during the inspection, another outside site inspection will be conducted in spring 2010.

8.0 REFERENCES

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APPENDIX A

CDQR AND ADEC LABORATORY DATA REVIEW CHECKLISTS

APPENDIX A
CHEMICAL DATA QUALITY REVIEW

FORMER WILDWOOD AIR FORCE STATION
NON-TANK FARM SITES (2009)

NPDL # 10-010

Kenai, Alaska

Prepared: February 26, 2010

Prepared for

Army Corps of Engineers- Alaska Division

Prepared by

Fairbanks Environmental Services, Inc.

I certify that all data quality review criteria described in Section 1.1 were assessed, and that qualifications were made according to the site-specific 2009 QAPP and Work Plan. The data qualifiers employed in this review are summarized in Section 1.2.

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Vanessa Ritchie
Project Chemist

EXECUTIVE SUMMARY

This Chemical Data Quality Report (CDQR) summarizes the technical review of analytical results generated in support of groundwater and soil sample collection by Fairbanks Environmental Services (FES) at several former Wildwood Air Force Station (AFS), non-Tank Farm sites, during 2009. The groundwater monitoring and soil assessment sampling events are summarized below. Groundwater and soil sample data quality is discussed in Sections 2 and 3, respectively. Groundwater and soil sample tracking tables and analytical results tables are presented in Appendix B.

A total of 16 project groundwater samples were collected from temporary monitoring wells; two at the former Landfill area; four at the former Quonset Hut area; and ten at three distinct areas within the former Operations Building site. The samples collected at the former Operations Building site include: four from the former Transformer area, three from the former Drum Storage area, and three from the former Aboveground Storage Tank (AST)/Underground Storage Tank (UST) area. Along with the project samples, two field duplicate samples were blindly submitted to the laboratory. All groundwater samples were shipped to Columbia Analytical Services (CAS) of Kelso, WA, in one Sample Data Group (SDG) and were analyzed by one or more of the following analytical methods: volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method SW8260B, semivolatile organic compounds (SVOCs) by EPA Method SW8270C, gasoline range organics (GRO) by Alaska Method AK101, diesel range organics (DRO) by Alaska Method AK102, and natural attenuation parameters. Natural attenuation parameters include field-filtered iron and manganese by EPA Method SW6010B, sulfate and chloride by EPA Method E300.0, nitrate + nitrite (total) by EPA Method 353.2, Kjeldahl nitrogen by EPA Method 351.4, and methane by method RSK-175. The methane analysis was subcontracted to CAS of Simi Valley, CA.

A total of 20 soil samples were collected from five soil borings at the former Trench Area Burn Pit; four samples from each boring at depth intervals of 2, 4, 6, and 8 feet. In addition, two field duplicates were collected and blindly submitted to the laboratory along with the project samples. All samples were shipped to CAS of Kelso, WA, in one SDG and analyzed by the following analytical methods: lead by EPA Method SW6020, polychlorinated biphenyls (PCBs) by EPA Method SW8082, and dioxins and furans by EPA Method SW8290D. The dioxins and furans analysis was subcontracted to CAS of Houston, TX.

One water-matrix trip blank was provided for VOC and GRO analyses, as appropriate, and accompanied the volatile sample cooler shipment to the laboratory. Trip blank data were assessed for possible blank contamination and the findings are included in this CDQR. No equipment blanks were collected during 2009 because groundwater samples were collected using a peristaltic pump and new, disposable tubing, and soil samples were collected using new, disposable boring liners, nitrile gloves, and spoons.

Based on the findings in the review minor data quality issues were identified, but no data were rejected. The chemical data may be used, as qualified, for project purposes. Two VOC and thirteen SVOC analytes (all non-detect) have limited usefulness due to elevated practical quantitation limits (PQLs) relative to the ADEC groundwater cleanup levels (see Section 2.8).

1.0 INTRODUCTION

This CDQR summarizes the technical review of analytical results generated in support of groundwater and soil sample collection by FES at several former Wildwood Air Force Station (AFS) non-Tank Farm sites during fall 2009. Temporary wells were installed and groundwater samples were collected from three sites; the former Landfill area, the former Quonset Hut area, and the former Operations Building area. The temporary wells were decommissioned following the sampling event. Soil samples obtained from soil borings were collected at the former Trench Area Burn Pit. The groundwater monitoring and soil assessment sampling events are summarized in Sections 1.3 and 1.4, respectively. Groundwater and soil sample tracking tables and analytical results tables are presented in Appendix B.

FES reviewed project and quality control (QC) analytical data to assess whether the data met the designated quality objectives and were acceptable for project use. The project data were reviewed for deviations to the requirements presented in the Sampling and Analysis Plan, the ADEC Technical Memo 06-002, and the Department of Defense (DoD) Quality Systems Manual (QSM), Version 3. The review included evaluation of the following: sample collection and handling, holding times, blanks (to assess contamination), project sample and laboratory quality control sample duplicates (to assess precision), laboratory control samples (LCSs) and sample surrogate recoveries (to assess accuracy), and matrix spike (MS) recoveries and relative percent differences (RPDs; to assess matrix effects). Practical quantitation levels (PQLs) were compared to 18 AAC 75 groundwater and soil cleanup levels. Calibration curves and continuing calibration verification recoveries were not reviewed. Quality control deviations, which do not impact data quality (e.g. high LCS recovery associated with non-detect results), are not discussed.

Groundwater sample data quality is discussed in Section 2, and data quality of the soil samples associated with the soil borings are discussed in Section 3. Applicable data quality indicators are discussed for each method under separate subheadings. Data which did not meet acceptance criteria have been described and the associated samples and data quality implications or qualifications are summarized. Alaska Department of Environmental Conservation (ADEC) Laboratory Data Review Checklists are included at the end of Appendix A.

1.1 Analytical Methods and Data Quality Objectives

The analytical methods and associated data quality objectives (DQO) used for this review were established in the Work Plan and Quality Assurance Program Plan (QAPP) (FES, 2009). The DQO represent the minimum acceptable quality control limits and goals for analytical measurements and are used as comparison criteria during data quality review to determine both the quality and usability of the analytical data. Tables A1 and A2 below summarize the analytical methods employed, and the associated DQO goals, for groundwater and soil samples collected at the former Wildwood, non-Tank Farm sites, during 2009.

Table A1 – Analytical Methods and Data Quality Objectives (Groundwater)

Parameter	Matrix	Method	Precision (RPD)	Accuracy (%)	Completeness (%)
Volatile Organic Compounds (VOC)	Water	SW5030B/ SW8260B	30	Analyte specific[a]	90
Semivolatile Organic Compounds (SVOC)	Water	SW3520C/ SW8270C	30	Analyte specific[a]	90
Gasoline Range Organics (GRO)	Water	SW5030B/ AK101	20	60-120	90
Diesel Range Organics (DRO)	Water	SW3510C/ AK102	20	75-125	90
Chloride	Water	300.0	20	90-110	90
Sulfate	Water	300.0	20	90-110	90
Nitrate/Nitrite as Nitrogen	Water	E353.2[b]	20	88-110	90
Kjeldahl Nitrogen	Water	E351.4[b]	20	78-117	90
Methane	Water	RSK-175	10	79-114	90
Dissolved Iron and Manganese	Water	CLP ILM 4.0/ SW6010	20	80-120	90

[a] The LCS precision and accuracy criteria for all analytes are consistent with the DoD QSM, Version 3

[b] Preparation method is included in the analytical method

Table A2 – Analytical Methods and Data Quality Objectives (Soil)

Parameter	Matrix	Analytical Method	Precision (RPD)	Accuracy (%)	Completeness (%)
Dioxins and Furans	Soil	SW8290A[b]	20	Analyte Specific[a]	90
Polychlorinated Biphenyls (PCBs)	Soil	SW3541/ SW8082	40	40	90
Lead	Soil	SW3050B-SW6020	20	80-120	90

[a] The LCS precision and accuracy criteria for all analytes are consistent with the DoD QSM, Version 3

[b] Preparation method is included in the analytical method

The six DQO used for this review were accuracy, precision, representativeness, comparability, sensitivity, and completeness.

- *Accuracy* measures the correctness, or the closeness, between the true value and the quantity detected. It is measured by calculating the percent recovery of known concentrations of spiked compounds that were introduced into the appropriate sample matrix. Surrogate, LCS, and MS sample recoveries were used to measure accuracy for this project. LCS and surrogate recovery criteria are defined in the QSM.
- *Precision* measures the reproducibility of repetitive measurements. It is measured by calculating the RPD between duplicate samples. Laboratory duplicate samples, field duplicate samples, MS and matrix spike duplicate (MSD) sample pairs, and LCS and laboratory control sample duplicate (LCSD) pairs were used to measure precision for this project. LCS/LCSD

precision criteria are defined in the QSM and field duplicate precision criteria are defined in the ADEC Laboratory Data Review Checklist (water: 30%; soil: 50%).

- R*epresentativeness* describes the degree to which data accurately and precisely represents site characteristics. This is addressed in more detail below.
- *Comparability* describes whether two data sets can be considered equivalent with respect to the project goal. This is addressed in more details below.
- S*ensitivity* describes the lowest concentration that the analytical method can reliably quantitate; and is evaluated by verifying that the detected results and/or PQLs meet the applicable cleanup levels listed in the ADEC Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75).
- *Completeness* describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of valid measurements compared to the total number of measurements. The completeness goal for this project was set at 90 percent.

In addition to these criteria for the six DQOs described above, sample collection and handling procedures and blank samples were reviewed to ensure overall data quality. Sample collection forms were reviewed to verify that representative samples were collected and samples were without headspace (if applicable). Sample handling was reviewed to assess parameters such as chain-of-custody (COC) documentation, the use of appropriate sample containers and preservatives, shipment cooler temperature, and method-specified sample holding times. Blank samples were analyzed to detect potential field or laboratory cross-contamination. Each of these parameters contributes to the general representativeness and comparability of the project data. The combination of evaluations of the above-mentioned parameters will lead to a determination of the overall project data completeness.

1.2 Data Qualifiers

Table A3 below is a table outlines general flagging criteria used for this project, listed in increasing severity, to indicate quality control deficiencies. Data were qualified pursuant to findings determined in the review of project data.

Table A3 – Summary of Data Qualifiers

Qualifier	Definition
J	Analytical result is considered an estimated value because the level is below the laboratory PQL but above the method detection limit (MDL).
M, MH, ML	Analytical result is considered an estimated value biased (high, low) due to matrix effects.
B	Analytical result is considered a high estimated value due to contamination present in the blank samples.
Q, QH, QL	Analytical result is considered an estimated value biased (high, low) due to a quality control failure.
R	Analytical result is rejected – result is not suitable for project use.

1.3 Summary of Groundwater Samples

A total of 18 groundwater samples were collected at the former Wildwood AFS, non-Tank Farm sites, during November 2009; 16 primary samples and two field duplicates. In addition, one MS/MSD sample and one trip blank sample were analyzed. Since samples were collected with a peristaltic pump and only new, disposable tubing was used, no equipment rinsate samples were collected. Each sample was analyzed by one or more of the analytical methods listed in Table A1.

All project groundwater and quality control samples were analyzed by Columbia Analytical Services (CAS) of Kelso, Washington, with the exception of the methane samples, which were subcontracted to CAS of Simi Valley, California. CAS-Kelso is certified by the State of Alaska through the Contaminated Sites Program for the analyte methods employed. CAS-Kelso also has a Self-Declaration Letter on file at the Alaska District indicating adherence to the policies and procedures outlined in the QSM.

Groundwater samples were shipped in one SDG and assigned the CAS report number K0911422. A groundwater sample tracking table (Table B1) and analytical results tables (Table B3 through B7) are included in Appendix B. Groundwater sample data quality is discussed in Section 2.

1.4 Summary of Soil Samples

A total of 22 soil samples were collected at the former Wildwood AFS, non-Tank Farm sites, during November 2009; 20 primary samples and two field duplicates. In addition, one MS/MSD sample was analyzed. Trip blanks were not required as no samples were being analyzed for volatile compounds. A decontamination or equipment blank was not required in this sampling event as new, disposable boring liners were used for each sample collection, as well as disposable nitrile gloves and spoons. Each sample was analyzed by the analytical methods listed in Table A2.

All project soil and quality control samples were analyzed by CAS of Kelso, Washington, with the exception of the dioxin/furan samples, which were subcontracted to CAS of Houston, Texas. CAS-Kelso is certified by the State of Alaska through the Contaminated Sites Program for the analyte methods employed. CAS-Kelso also has a Self-Declaration Letter on file at the Alaska District indicating adherence to the policies and procedures outlined in the QSM.

Samples were shipped in one SDG and assigned the CAS report number K0911425. A soil sample tracking table (Table B2) and analytical results table (Table B8) are included in Appendix B. Soil sample data quality is discussed in Section 3.

2.0 GROUNDWATER DATA QUALITY REVIEW

This section presents the findings of the data quality review and the resulting data qualifications for groundwater samples. Groundwater samples were shipped in one SDG; CAS report number K0911422. ***See the associated ADEC Laboratory Data Review Checklist for more elaborate data quality descriptions.***

2.1 Sample Collection

Groundwater sample collection forms were reviewed to ensure that well drawdown and groundwater parameters were stable prior to sample collection (except for turbidity, as explained below), and that all parameters met the low-flow sampling criteria (Puls and Barcelona, 1996). When applicable, groundwater samples were inspected in the field, as well as upon receipt at the laboratory, to ensure sample vials did not contain headspace. New, disposable peristaltic tubing was used for sample collection, so the collection of equipment rinsates was not required. The following sampling collection discrepancies were noted in the field or upon receipt at the laboratory.

- Turbidity did not stabilize prior to the collection of few groundwater samples. Samples were collected from temporary monitoring wells, so sand-packed screens were not employed. Sample collection proceeded prior to turbidity stabilization as stated in the approved Work Plan. Impact to data was minor as most wells were near stabilization, with turbidity measurements below 60 NTU (with the majority ranging between 5-30 NTUs). All other parameters were stabilized prior to sample collection. No data were qualified.
- One of six VOA vials for sample 09WWD13WG for VOC/GRO analysis contained headspace upon receipt at the CAS laboratory. VOC and GRO analyses were performed on the sample containers without headspace so no data were affected.
- One of three VOA vials for samples 09WWD16WG, 09WWD29WG, and 09WWD30WG for methane analysis contained headspace upon receipt at the CAS laboratory. Methane analysis was performed on the sample containers without headspace so no data were affected.

2.2 Sample Handling

Sample handling procedures include correct COC documentation, the use of appropriate sample containers and preservatives, proper cooler temperatures between above freezing and less than 6°C, and sample analysis within method-specified holding times. The following sample handling discrepancy was noted upon receipt at the laboratory.

- The COC indicated that 27 VOA vials for project sample 09WWD19WG, including MS/MSD samples, were shipped for VOC/GRO/methane analyses, but only 26 VOA vials were received at the CAS laboratory (report K0911422). There was adequate sample volume to complete all analyses as requested. No data were affected.

2.3 Blanks

Trip blanks and method blanks were utilized to detect potential cross-contamination of project samples. Trip blanks assess field, shipment, and storage cross-contamination; and instrument and method blanks detect laboratory cross-contamination. *In the case where an associated sample result was either non-detect or greater than 5 times that of the blank sample (10 times the blank for common laboratory contaminants), data were not qualified and are not discussed below.* Blank contaminations that resulted in data qualification are summarized below.

- VOC analytes 1,2,4-trichlorobenzene, hexachlorobutadiene, naphthalene, and 1,2,3-trichlorobenzene were detected in the method blank sample, associated with QC batch KWG0911425, at concentrations greater than the MDL but less than the PQL. Of the aforementioned analytes, 1,2,4-trichlorobenzene and naphthalene were the only analytes detected in samples within five times that detected in the blank samples. The following samples were qualified (B) as possible cross-contamination. Impact to data quality was minor as the affected data were two to three orders of magnitude below the respective ADEC groundwater cleanup levels.
    - 1,2,4-trichlorobenzene: trip blank 09M55WG
    - naphthalene: 09WWD13WG and 09WWD29WG
- VOC analytes chloromethane and 1,2,4-trichlorobenzene were detected in the trip blank sample 09M55WG, shipped with cooler number 112301, at concentrations less than the MDL but greater than the PQL. Chloromethane was not detected in any project sample, so no data were qualified. Furthermore, the detected 1,2,4-trichlorobenzene concentration may be attributed to a laboratory cross-contamination, as indicated by the 1,2,4-trichlorobenzene detected in the associated method blank. The 1,2,4-trichlorobenzene result was qualified appropriately due to method blank contamination (see above).
- DRO was detected in the method blank sample, associated with QC batch KWG0911453, at a concentration greater than the MDL but less than the PQL. The reported DRO concentration in samples 09WWD14WG through 09WWD21WG were qualified (B) as possible cross-contamination. Impact to data quality was minor as the affected data were one to two orders of magnitude below the ADEC groundwater cleanup level.
- Total Kjeldahl Nitrogen (TKN) was detected in the method blank sample at a concentration greater than the MDL but less than the PQL. The reported TKN concentration in samples 09WWD16WG, 09WWD17WG, 09WWD23WG, and 09WWD26WG were qualified (B) as possible cross-contamination because the concentration detected in the samples were within five times that detected in the blank sample. Impact to data quality was minor as the potential cross-contamination was minor, and TKN is not a contaminant and therefore does not have a corresponding ADEC cleanup level.

2.4 Surrogate Recovery

Surrogate compounds were added to each project sample by the laboratory prior to analysis. Surrogate recoveries were then calculated as percentages and reported by the laboratory as a measure of analytical extraction efficiency. *In the case where a surrogate recovery was high-biased and the sample results were non-detect, data were not qualified and are not discussed below.* No surrogate recoveries were outside of established control limits and resulted in data qualification.

2.5 Laboratory Control Samples

Spike compounds were added to blank samples to assess laboratory extraction and instrument performance. *In the case where a LCS recovery was high-biased and the associated sample result was non-detect, data were not qualified and are not discussed below.* No LCS recoveries were outside of the established control limits and resulted in data qualification associated with this data package.

2.6 Matrix Spike Samples and Duplicates

Spike compounds were added to project samples to assess potential matrix interference. MS/MSDs were performed at the proper frequency and with every QC batch, per QSM requirements. Precision was evaluated using the RPD calculated from the MS/MSD pair. *In the case where MS/MSD recoveries were high-biased and the associated sample results were non-detect, or the concentration in the parent sample exceeded the spike concentration (i.e., QC control limits are not applicable), data were not qualified and are not discussed below.* The following MS/MSD recovery and/or RPD exceedance that resulted in data qualification is summarized below.

- MS and MSD recovery acceptance criteria were not met for SVOC analyte aniline, associated with QC batch KWG0911165, for project sample 09WWD19WG. Since low levels of aniline may not have been detected, if present, in the parent sample, the result was qualified (ML) as a possible low estimate. Impact to data quality was minor as aniline does not have an ADEC groundwater cleanup level.

2.7 Field Duplicates

Two field duplicate samples were collected and submitted to the laboratory as blind samples during 2009 groundwater sampling operations at the former Wildwood AFS, non-Tank Farm sites. The field duplicates were collected at a frequency of twelve percent, which meets the requirement identified in the Work Plan.

Field duplicate results for the former Wildwood AFS, non-Tank Farm sites, groundwater monitoring event are summarized in Tables A4 and A5 below. All field duplicate sample results were within the ADEC criterion of 30% and, therefore, are considered comparable.

Table A4 – Summary of Field Duplicate (QH-MW2)

Analyte	09WWD17WG (Primary)	09WWD18WG (Field Duplicate)	RPD	Comparable Criteria Met?[1]
GRO	ND [100]	ND [100]	0	Yes
DRO	25	24	4	Yes

Results are in µg/L.
[1] ADEC criterion for water-matrix field duplicates is less than 30 RPD.

Table A5 – Summary of Field Duplicate (DSA-MW7)

Analyte	09WWD20WG (Primary)	09WWD21WG (Field Duplicate)	RPD	Comparable Criteria Met?[1]
VOC	All ND	All ND	0	Yes
SVOC	All ND	All ND	0	Yes
GRO	ND [100]	0.51	6	Yes
DRO	1.9	2.4	23	Yes

Results are in µg/L.
[1] ADEC criterion for water-matrix field duplicates is less than 30 RPD.

2.8 Analytical Sensitivity

Several project data analytes were reported above the MDL but below the PQL and were thus qualified as estimates due to the unknown accuracy of the analytical method at those concentrations. These data qualifications are not reported again in this CDQR, but they are noted with a "J" in the associated results table in Appendix B.

Analytical sensitivity was evaluated to verify that the detected results and/or PQLs met the applicable cleanup levels. All associated ADEC groundwater cleanup levels listed in 18 AAC 75.345 were met, except for two VOC analytes (1,2,3-trichloropropane and 1,2-dibromoethane (EDB)), analyzed by method SW8260B, and 13 SVOC (2,4-dinitrotoluene, 2,6-dinitrotoluene, 3,3'-dichlorobenzidine, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, hexachlorobutadiene, indeno(1,2,3-cd)pyrene, pentachlorophenol, bis-(2-chloroethyl)ether, bis-(2,ethylhexyl)phthalate, and n-nitrosodi-n-propylamine), analyzed by method SW8270C. These analytes may not be detected, if present, at the respective cleanup levels. Therefore, the results of the two aforementioned VOC analytes (both non-detect) in two Landfill samples (09WWD29WG and 09WWD30WG), and the two aforementioned VOC and 13 SVOC analytes (all non-detect) in four samples at the Drum Storage area (09WWD13WG, and 09WWD19WG through 09WWD21WG), have limited usefulness.

2.9 Summary of Qualified Results

Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, no data were rejected pursuant to FES's data quality review. There was not adequate analytical sensitivity to detect 2 VOC and 13 SVOC analytes, if present, at respective cleanup levels so these data have limited usefulness (see Section 2.8).

Table A6 below summarizes the qualified 2009 groundwater results associated with the sampling event at the former Wildwood AFS, non-Tank Farm sites, including the associated sample numbers, analytes, and the reason for qualification.

Table A6 – Summary of Data Qualifications (Groundwater)

Data Package	Sample Numbers	Analytes	Qualification	Explanation
K0911422	09M55WG	1,2,4-Trichlorobenzene	B	Method blank and/or trip blank contamination
	09WWD13WG 09WWD29WG	Naphthalene		
	09WWD14WG – 09WWD21WG	DRO		
	09WWD16WG 09WWD17WG 09WWD23WG 09WWD26WG	Total Kjeldahl Nitrogen		
	09WWD19WG	Analine	ML	Low-biased MS/MSD Recoveries

2.10 Completeness

Completeness scores were calculated for each analytical method used for groundwater samples during 2009. Scores were obtained by assigning points to each of the twelve data quality criteria reviewed. A maximum of 10 points was awarded for each criterion; points were based on the number of samples successfully meeting data quality objectives for that criterion. The scores were then summed to determine the total points for a method, and completeness scores were determined as follows: (total points received)/(total points possible) x 100.

A breakdown of the points received for each criterion and method is shown in Table A7 below. All former Wildwood AFS, non-Tank Farm sites, met the completeness goal of 90 percent established in the QAPP for the 2009 groundwater sampling event.

Table A7 – Completeness Scores (Groundwater)

Data Quality Criteria	Points VOC	Points SVOC	Points GRO	Points DRO	Points Natural Attenuation Parameters[1]
Sample Collection	9	10	10	10	9
COC Documentation	9	10	9	10	9
Sample Containers/Preservation	10	10	10	10	10
Cooler Temperature	10	10	10	10	10
Holding Times	10	10	10	10	10
Trip Blanks	9	n/a	10	n/a	10
Method Blanks	9	10	10	6	9
Surrogate Recovery	10	10	10	10	n/a
LCS/LCSD Recovery & RPD	10	10	10	10	10
MS/MSD Recovery & RPD	10	9	10	10	10
Field Duplicate	10	10	10	10	n/a
Sensitivity (MDL/PQL)	9	8	10	10	10
Total Points Received	115	107	119	104	97
Total Points Possible	120	110	120	110	100
Percent Completeness	**96**	**97**	**99**	**95**	**97**

[1] Natural attenuation parameters include chloride/sulfate, nitrite/nitrate as total nitrogen, total Kjeldahl Nitrogen, methane, and dissolved iron/manganese.

3.0 SOIL DATA QUALITY REVIEW

This section presents the findings of the data quality review and the resulting data qualifications. Soil samples were shipped in one SDG; CAS report number K0911425. ***See the associated ADEC Laboratory Data Review Checklist for more elaborate data quality descriptions.***

3.1 Sample Collection and Handling

Sample collection and handling procedures include: correct sampling techniques, sample labeling, and COC documentation; the use of appropriate sample containers and preservatives; temperature blanks and cooler temperatures ranging between above freezing and less than 6°C; and, all sample analyses occurring within method-specified holding times. New, disposable boring liners, and disposable nitrile gloves and spoons, were used for sample collection, so the collection of equipment rinsates were not required. No sample collection and handling discrepancies were noted in the field or upon receipt at the laboratory.

3.2 Blanks

Method blanks were utilized to detect potential laboratory cross-contamination of project samples. Trip blanks (to assess field, shipment, and storage cross-contamination) were not required with this shipment as no samples were being analyzed for volatile compounds. *In the case where an associated sample result was either non-detect or greater than 5 times that of the blank sample (10 times the blank for common laboratory contaminants), the data are not qualified and are not discussed below.* The following data were qualified due to blank contamination associated with this sampling event.

- Analytes 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD), octachlorodibenzo-p-dioxin (OCDD), and total heptachlorodibenzo-p-dioxins (HpCDD) were detected in the method blank sample, associated with QC batch 101674, at concentrations greater than the MDL but less than the PQL. The reported concentrations of the aforementioned analytes in the following samples were qualified (B) as possible cross-contamination. Impact to data quality was minor as the affected samples have toxic equivalent (TEQ) concentrations a minimum of four orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)).
    - 1,2,3,4,6,7,8-HpCDD: 09WWBP02SO through 09WWBP08SO, 09WWBP13SO, and 09WWBP18SO
    - OCDD: 09WWBP02SO through 09WWBP05SO, 09WWBP07SO, 09WWBP08SO, 09WWBP18SO, and 09WWBP19SO
    - HpCDD: 09WWBP02SO, 09WWBP04SO, 09WWBP08SO, and 09WWBP18SO

3.3 Surrogate Recovery

Surrogate compounds were added to each project sample by the laboratory prior to analysis. Surrogate recoveries were then calculated as percentages and reported by the laboratory as a measure of analytical extraction efficiency. *In the case where surrogate recoveries were high-biased and the sample results were non-detect, data were not qualified and are not discussed below.* Surrogate recoveries that were outside of established control limits and resulted in data qualification are summarized below.

- Four of nine surrogate compounds (13C-1,2,3,6,7,8-hexachlorodibenzo-p-dioxin, 13C-1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin, 13C-octachlorodibenzo-p-dioxin, and 13C-1,2,3,4,6,7,8-heptachlorodibenzofurans) did not meet the acceptance criteria for the dioxins/furans sample 09WWBP19SO, associated with QC batch 101674. Detected and non-detected results in the aforementioned sample were qualified (QL) as possible low estimates. Impact to data quality is minor as more than half of the surrogates had recoveries within the control limits and the affected sample has a total TEQ concentration five orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-TCDD).

3.4 Laboratory Control Samples

Spike compounds were added to blank samples to assess laboratory extraction and instrument performance. *In the case where a LCS recovery was high-biased and the associated sample result was non-detect, data were not qualified and are not discussed below.* No LCS recoveries were outside of the established control limits and resulted in data qualification with this data package.

3.5 Matrix Spike Samples and Duplicates

Spike compounds were added to project samples to assess potential matrix interference. MS/MSDs were collected at the proper frequency and were analyzed with every QC batch, per QSM requirements. Precision was evaluated using the RPD calculated from the MS/MSD pair. *In the case where MS/MSD recoveries were high-biased and the associated sample results were non-detect, or the concentration in the parent sample exceeded the spike concentration (i.e., QC control limits are not applicable), data were not qualified and are not discussed below.* No MS/MSD recovery and/or RPD were outside the established control limits and resulted in data qualification with this data package.

3.6 Field Duplicates

Two field duplicate samples were collected and submitted to the laboratory as blind samples during 2009 soil sampling operations at the former Wildwood AFS (former Trench Area Burn Pit). The field duplicates were collected at a frequency of ten percent, which meets the requirement identified in the Work Plan. The field duplicate results are summarized in Tables A8 and A9 below.

Table A8 – Summary of Field Duplicate (BP3-2)

Analyte	09WWBP09SO (Project)	09WWBP10SO (Field Duplicate)	RPD	Comparable Criteria Met?[1]
Polychloroinated Biphenyls (PCBs)	All ND	All ND	0	Yes
Lead	7.66	8.97	16	Yes
1,2,3,4,6,7,8-HpCDD	1.49 J	1.57 J	3	Yes
OCDD	9.79	9.05	8	Yes
1,2,3,4,6,7,8-HpCDF	0.239 J	0.309 J	25	Yes
Total TCDD	0.793 J	0.675 J	16	Yes
Total HxCDD	ND [3.61]	0.396 J	160	**NO**
Total HpCDD	2.90 J	2.98 J	3	Yes
Total TCDF	4.78	4.00	18	Yes
Total HpCDF	2.87 J	ND [3.46]	19	Yes

Lead results are in mg/kg and dioxins/furans are in ng/kg.
[1] ADEC criterion for water-matrix field duplicates is less than 50 RPD.
J – Result is an estimate since it is reported below the PQL.

Field duplicate sample 09WWBP10SO results were comparable to that of project sample 09WWBP09SO results, except for total hexachlorodibenzo-p-dioxins (HxCDD), analyzed by method SW8290. HxCDD was detected in the field duplicate sample below the PQL and was not detected in the project sample. Since the results were either non-detect or below the PQL, the field duplicate criterion is not applicable. No data were qualified.

Table A9 – Summary of Field Duplicate (BP5-2)

Analyte	09WWBP14SO (Primary)	09WWBP15SO (Field Duplicate)	RPD	Comparable Criteria Met?[1]
Polychloroinated Biphenyls (PCBs)	All ND	All ND	0	Yes
Lead	10.3	11.4	10	Yes
1,2,3,4,6,7,8-HpCDD	2.34 J	6.63 J	96	**NO**
OCDD	15.2	75.7	133	**NO**
1,2,3,7,8-PeCDF	ND [4.93]	0.290 J	178	**NO**
1,2,3,4,7,8-HxCDF	ND [4.93]	0.227 J	182	**NO**
1,2,3,4,6,7,8-HpCDF	0.398 J	1.06 J	91	**NO**
OCDF	ND [4.93]	2.95 J	108	**NO**
Total TCDD	1.85 J	3.39 J	59	**NO**
Total HxCDD	ND [4.93]	0.594 J	157	**NO**
Total HpCDD	4.6 J	12.5	92	**NO**
Total TCDF	5.82	7.64	27	Yes
Total HxCDF	ND [4.93]	0.400 J	170	**NO**
Total HpCDF	0.658 J	3.48 J	136	**NO**

Lead results are in mg/kg and dioxins/furans are in ng/kg.
[1] ADEC criterion for water-matrix field duplicates is less than 50 RPD.
J – Result is an estimate since it is reported below the PQL.

Field duplicate 09WWBP15SO results were comparable to that of the project sample 09WWBP14SO except for several dioxins and furans. In all but one case, the primary sample result and/or the field duplicate result was reported below the PQL and, therefore, the field duplicate criterion is not applicable. However, the primary and field duplicate octachlorodibenzo-p-dioxin (OCDD) results were reported above the PQL, so the OCDD result in the primary sample (09WWBP14SO) was qualified (Q) as an estimate due to poor precision. Impact to data quality was minor as both the primary and field duplicate samples have total TEQ concentrations two orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)).

3.7 Analytical Sensitivity

Several project data analytes were reported above the MDL but below the PQL and were thus qualified as estimates due to the unknown accuracy of the analytical method at those concentrations. These data qualifications are not reported again in this CDQR, but they are noted with a "J" in the associated results table in Appendix B. Analytical sensitivity was evaluated to verify that the detected results and/or PQLs met the applicable cleanup levels. All associated ADEC soil cleanup levels listed in 18 AAC 75.341 were met.

3.8 Summary of Qualified Results

Overall, the review process deemed the soil project data acceptable for use. Several of the project samples had one or more results qualified as estimated values; however, no data were rejected pursuant to FES's data quality review. Table A10 below summarizes the qualified soil results associated with the sampling event at the former Wildwood AFS (former Trench Area Burn Pit), including the associated sample numbers, analytes, and the reason for qualification.

Table A10 – Summary of Data Qualifications (Soil)

Data Package	Sample Number	Analytes	Qualification	Explanation
K0911425	09WWBP02SO – 09WWBP08SO 09WWBP13SO 09WWBP18SO	1,2,3,4,6,7,8-HpCDD	B	Method and/or trip blank contamination
	09WWBP02SO – 09WWBP05SO 09WWBP07SO 09WWBP08SO 09WWBP18SO 09WWBP19SO	OCDD		
	09WWBP02SO 09WWBP04SO 09WWBP08SO 09WWBP18SO	HpCDD		
	09WWBP19SO	All Dioxins/Furans	QL	Low-biased surrogate recovery
	09WWBP14SO	OCDD	Q	Lack of field duplicate precision

3.9 Completeness

Completeness scores were calculated for each analytical method used for soil samples during 2009. Scores were obtained by assigning points to each of the twelve data quality criteria reviewed. A maximum of 10 points was awarded for each criterion; points were based on the number of samples successfully meeting data quality objectives for that criterion. The scores were then summed to determine the total points for a method, and completeness scores were determined as follows: (total points received)/(total points possible) x 100.

A breakdown of the points received for each criterion and method is shown in Table A11 below. All former Wildwood AFS, non-Tank Farm sites, met the completeness goal of 90 percent established in the QAPP for the 2009 soil sampling event.

Table A11 – Percent Completeness (Soil)

Data Quality Criteria	Points PCB	Points Lead	Points Dioxins/Furans
Sample Collection	10	10	10
COC Documentation	10	10	10
Containers/Preservation	10	10	10
Cooler Temperature	10	10	10
Holding Times	10	10	10
Trip Blanks	n/a	n/a	n/a
Method Blanks	10	10	5
Surrogate Recovery	10	n/a	9
LCS/LCSD Recovery and RPD	10	10	10
MS/MSD Recovery and RPD	10	10	10
Field Duplicate	10	10	9
Sensitivity (MDL/PQL)	10	10	10
Total Points Received	110	100	103
Total Points Possible	110	100	110
Percent Completeness	**100**	**100**	**94**

Laboratory Data Review Checklist

Completed by:	Vanessa Ritchie
Title:	Project Chemist
Date:	February 24, 2010
CS Report Name:	2009 Annual Report, Former Wildwood AFS, Non-Tank Farm Sites
Report Date:	December 22, 2009
Consultant Firm:	Fairbanks Environmental Services (FES)
Laboratory Name:	Columbia Analytical Services (CAS), Kelso, WA
Laboratory Report Number:	K0911422
ADEC File Number:	
ADEC RecKey Number:	

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ☉ Yes ○ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ○ Yes ☉ No Comments:

   Samples for methane analysis by method RSK 175 were subcontracted to CAS, Simi Valley, California. However, ADEC does not require state certification for this method.

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° ± 2° C)?

☐ Yes ☒ No Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

The COC indicated that 27 VOA vials for project sample 09WWD19WG (including MS/MSD samples) were shipped for VOC/GRO/methane analyses, but only 26 VOA vials were received at the CAS laboratory (report K0911422). There was adequate sample volume to complete all analyses as requested. No data were affected.

One of six VOA vials for sample 09WWD13WG for VOC/GRO analysis contained headspace upon receipt at the CAS laboratory (report K0911422). VOC/GRO analysis was performed on the sample containers without headspace and no data were affected.

One of three VOA vials for samples 09WWD16WG, 09WWD29WG, and 09WWD30WG for CH_4 analysis contained headspace upon receipt at the CAS laboratory (report K0911422). CH_4 analysis was performed on the sample containers without headspace and no data were affected.

e. Data quality or usability affected? Explain.

Comments:

Data quality was not impacted. See comments above.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No Comments:

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

☉ Yes ○ No Comments:

c. Were all corrective actions documented?

☉ Yes ○ No Comments:

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

Comments:

The case narrative only describes the laboratory qualifications made to the data based on problems encountered during sample receiving and analysis.

5. Samples 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?

○ Yes ○ No Comments:

No soils.

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

○ Yes ○ No Comments:

Analytical sensitivity was evaluated to verify that the detected results and/or PQLs met the applicable cleanup levels. All associated ADEC groundwater cleanup levels listed in 18 AAC 75.345 were met, except for two VOC analytes (1,2,3-trichloropropane and 1,2-dibromoethane (EDB)), analyzed by method SW8260B, and 13 SVOC (2,4-dinitrotoluene, 2,6-dinitrotoluene, 3,3'-dichlorobenzidine, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, hexachlorobutadiene, indeno(1,2,3-cd)pyrene, pentachlorophenol, bis-(2-chloroethyl)ether, bis-(2,ethylhexyl)phthalate, and n-nitrosodi-n-propylamine), analyzed by method SW8270C. These analytes may not be detected, if present, at the respective cleanup levels. Therefore, the results of the two aforementioned VOC analytes (both non-detect) in two Landfill samples (09WWD29WG and 09WWD30WG), and the two aforementioned VOC and 13 SVOC analytes (all non-detect) in four samples at the Drum Storage area (09WWD13WG, and 09WWD19WG through 09WWD21WG), have limited usefulness.

e. Data quality or usability affected?

Comments:

Impact to data is minor. See comment above.

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?

Comments:

VOC analytes 1,2,4-trichlorobenzene, hexachlorobutadiene, naphthalene, and 1,2,3-trichlorobenzene were detected in the method blank sample, associated with QC batch KWG0911425, at concentrations greater than the MDL but less than the PQL (report K0911422). Of the aforementioned analytes, 1,2,4-trichlorobenzene and naphthalene were the only analytes detected in samples within five times that detected in the blank samples. The following samples were qualified (B) as possible cross-contamination. Impact to data quality was minor as the affected data were two to three orders of magnitude below the respective ADEC groundwater cleanup levels.

- 1,2,4-trichlorobenzene: trip blank 09M55WG
- naphthalene: 09WWD13WG and 09WWD29WG

DRO was detected in the method blank sample, associated with QC batch KWG0911453, at a concentration greater than the MDL but less than the PQL (report K0911422). The reported DRO concentration in samples 09WWD14WG through 09WWD21WG were qualified (B) as possible cross-contamination because the concentration detected in the samples were within five times that detected in the blank sample. Impact to data quality was minor as the affected data were one to two orders of magnitude below the ADEC groundwater cleanup level.

Total Kjeldahl Nitrogen (TKN) was detected in the method blank sample at a concentration greater than the MDL but less than the PQL (report K0911422). The reported TKN concentration in samples 09WWD16WG, 09WWD17WG, 09WWD23WG, and 09WWD26WG were qualified (B) as possible cross-contamination because the concentration detected in the samples were within five times that detected in the blank sample. Impact to data quality was minor as the potential cross-contamination was minor, and TKN is not a contaminant and therefore does not have a corresponding ADEC cleanup level.

Methane was detected in the method blank sample at a concentration greater than the MDL but less than the PQL (report K0911422). However, the methane was not detected in any project samples within five times that found in the blank sample. No data were affected or qualified.

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

☑ Yes ☐ No Comments:

v. Data quality or usability affected? Explain.

Comments:

Impact to data quality was minor. See comments above.

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

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

☑ Yes ☐ No Comments:

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

☑ 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:

No, see comment below.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No Comments:

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

Comments:

MS and MSD recovery acceptance criteria were not met for SVOC analyte aniline (65%/52%), associated with QC batch KWG0911165, for project sample 09WWD19WG (report K0911422). Since low levels of aniline may not have been detected, if present, in the parent sample, the result was qualified (ML) as a possible low estimate. Impact to data quality was minor as aniline does not have an ADEC groundwater cleanup level.

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

☑ Yes ☐ No Comments:

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

Impact to data quality is minor. See comments above.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ 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)

☑ Yes ☐ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No Comments:

Not applicable.

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

Not applicable.

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

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

☑ Yes ☐ No Comments:

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

☑ Yes ☐ No Comments:

iii. All results less than PQL?

☐ Yes ☐ No Comments:

No, see comment below.

iv. If above PQL, what samples are affected?

Comments:

VOC analytes chloromethane and 1,2,4-trichlorobenzene were detected in the trip blank sample 09M55WG, shipped with cooler number 112301, at concentrations less than the MDL but greater than the PQL (report K0911422). Chloromethane was not detected in any project sample, so no data were qualified. Furthermore, the detected 1,2,4-trichlorobenzene concentration may be attributed to a laboratory cross-contamination, as indicated by the 1,2,4-trichlorobenzene detected in the associated method blank. The 1,2,3-trichlorobenzen result was qualified appropriately in the Method Blank section of this review.

v. Data quality or usability affected? Explain.

Comments:

Data quality is not impacted as no data were qualified due to trip blank contamination.

e. Field Duplicate

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

☒ Yes ☐ No Comments:

Sample 09WWD18WG is a field duplicate to project sample 09WWD17WG (QH-MW2). Sample 09WWD21WG is a field duplicate to project sample 09WWD20WG (DSA-MW7).

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☒ Yes ☐ No Comments:

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

Comments:

Not applicable.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below.)

☐ Yes ☐ No ☒ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected? Explain.

Comments:

A decontamination or equipment blank is not required in this sampling event as samples were collected with a peristaltic pump, employing new, disposable peristaltic tubing for each sample.

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

a. Defined and appropriate?

☒ Yes ☐ No Comments:

See Chemical Data Quality Review.

Laboratory Data Review Checklist

Completed by:	Vanessa Ritchie
Title:	Project Chemist
Date:	February 25, 2010
CS Report Name:	2009 Annual Report, Former Wildwood AFS, Non-Tank Farm Sites
Report Date:	December 28, 2009
Consultant Firm:	Fairbanks Environmental Services (FES)
Laboratory Name:	Columbia Analytical Services (CAS), Kelso, WA
Laboratory Report Number:	K0911425
ADEC File Number:	
ADEC RecKey Number:	

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ☉ Yes ○ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☉ Yes ○ No Comments:

   Samples for dioxins and furans analysis method SW8290D were subcontracted to CAS – Houston, TX. The Houston laboratory is an approved ADEC and DoD laboratory for that analysis.

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° ± 2° C)?

☐ Yes ☒ No Comments:

One cooler (ID number 112306), associated with report K0911425, was received at CAS with a temperature blank reading below the recommended temperature range (1.7ºC). Since the samples were reportedly in good condition, and both the temperature blank and cooler were above a freezing temperature (as required by the DoD QSM), no data qualifications were applied.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No Comments:

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

☐ Yes ☒ No Comments:

No discrepancies.

e. Data quality or usability affected? Explain.

Comments:

Not applicable.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

c. Were all corrective actions documented?

☒ Yes ☐ No Comments:

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

Comments:

The case narrative only describes the laboratory qualifications made to the data based on problems encountered during sample analysis.

5. Samples 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?

☑ 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?

Comments:

Not applicable.

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?

Comments:

Lead was detected in method blank samples, associated with QC batches 101936R 101936RB, at concentrations greater than the MDL but less than the PQL (report K09114252). However, lead was not detected in any project samples within five times that detected in the blank samples, so no data were affected or qualified.

Analytes 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD), octachlorodibenzo-p-dioxin (OCDD), and total heptachlorodibenzo-p-dioxins (HpCDD) were detected in the method blank sample, associated with QC batch 101674, at concentrations greater than the MDL but less than the PQL (report K09114252). The reported concentrations of the aforementioned analytes in the following samples were qualified (B) as possible cross-contamination because the concentration detected in the samples were within five times that detected in the blank sample. Impact to data quality was minor as the affected samples have toxic equivalent (TEQ) concentrations of a minimum of four orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)).

- 1,2,3,4,6,7,8-HpCDD: 09WWBP02SO through 09WWBP08SO, 09WWBP13SO, and 09WWBP18SO.
- OCDD: 09WWBP02SO through 09WWBP05SO, 09WWBP07SO, 09WWBP08SO, 09WWBP18SO, and 09WWBP19SO
- HpCDD: 09WWBP02SO, 09WWBP04SO, 09WWBP08SO, and 09WWBP18SO

Analytes octachlorodibenzo-p-dioxin (OCDD) and total heptachlorodibenzo-p-dioxins (HpCDD) were detected in the method blank sample, associated with QC batch 101675, at concentrations greater than the MDL but less than the PQL (report K09114252). However, the aforementioned analytes were not detected in any associated project samples within five times that detected in the blank sample, so no data were affected or qualified.

Analytes 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD) and octachlorodibenzo-p-dioxin (OCDD) were detected in the method blank sample, associated with QC batch 102132, at concentrations greater than the MDL but less than the PQL (report K09114252). However, the aforementioned analytes were not detected in any associated project samples within five times that detected in the blank samples, so no data were affected or qualified.

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

☉ Yes ○ No Comments:

v. Data quality or usability affected? Explain.

Comments:

Impact to data quality was minor. See comments above.

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

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

☉ Yes ○ No Comments:

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

☉ 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 (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☉ Yes ○ No Comments:

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

Comments:

Not applicable.

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

○ Yes ○ No Comments:

Not applicable.

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

Comments:

Not applicable.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☉ 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)

☐ Yes ☒ No Comments:

Four of nine surrogate compounds (13C-1,2,3,6,7,8-hexachlorodibenzo-p-dioxin (33%), 13C-1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (39%), 13C-octachlorodibenzo-p-dioxin (29%), and 13C-1,2,3,4,6,7,8-heptachlorodibenzofurans (39%)) did not meet the acceptance criteria for the dioxins/furans sample 09WWBP19SO, associated with QC batch 101674 (report K09114252). Detected and non-detected results in the aforementioned sample were qualified (QL) as possible low estimates. Impact to data quality is minor as more than half of the surrogates had recoveries within the control limits and the affected sample has a total toxic equivalent (TEQ) concentration five orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-TCDD).

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

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

Comments:

Impact to data quality is minor. See comment above.

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

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

☐ Yes ☒ No Comments:

No volatiles were associated with this shipment.

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

☐ Yes ☐ No Comments:

Not applicable.

iii. All results less than PQL?

☐ Yes ☐ No Comments:

Not applicable.

iv. If above PQL, what samples are affected?

Comments:

Not applicable.

v. Data quality or usability affected? Explain.

Comments:

Not applicable.

e. Field Duplicate

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

☒ Yes ☐ No Comments:

Sample 09WWBP10SO is a field duplicate of project sample 09WWBP09SO (BP3-2). Sample 09WWBP15SO is a field duplicate of project sample 09WWBP14SO (BP5-2).

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☐ Yes ☒ No Comments:

Field duplicate sample 09WWBP10SO results were comparable to that of project sample 09WWBP09SO results, except for total hexachlorodibenzo-p-dioxins (HxCDD), analyzed by method SW8290. HxCDD was detected in the field duplicate sample below the PQL and was not detected in the project sample. Since the results with either non-detect or below the PQL, the field duplicate criterion is not applicable. Impact to data quality was minor as both the primary and field duplicate samples have toxic equivalent (TEQ) concentrations of a minimum of three orders of magnitude below the ADEC soil cleanup level of the most toxic dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). Furthermore, both samples have total TEQ concentrations two orders of magnitude below the cleanup level. No data were qualified. Field duplicate 09WWBP15SO results were comparable to that of the project sample 09WWBP14SO except for several dioxins and furans. In all but one case, the primary sample result and/or the field duplicate result was reported below the PQL and, therefore, the field duplicate criterion is not applicable. However, the primary and field duplicate octachlorodibenzo-p-dioxin (OCDD) results were reported above the PQL, so the OCDD result in the primary sample was qualified (Q) as an estimate due to poor precision. Impact to data quality was minor as both the primary and field duplicate samples have total toxic equivalent (TEQ) concentrations two orders of magnitude below the ADEC soil cleanup level (58 ng/kg) of one of the most toxic dioxins (2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)).

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

Comments:

Impact to data quality was minor. See comments above.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below.)

☐ Yes ☐ No ☒ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected? Explain.

Comments:

A decontamination or equipment blank is not required in this sampling event as new, disposable boring liners were used for each sample collection, as well as new nitrile gloves and disposable spoons.

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

a. Defined and appropriate?

☒ Yes ☐ No Comments:

See Chemical Data Quality Review.

APPENDIX B

GROUNDWATER AND SOIL SAMPLE TRACKING AND ANALYTICAL RESULT TABLES

Table B1 - Groundwater Sample Tracking Table
Former Wildwood Air Force Station, Non-Tank Farm Sites
Kenai, Alaska

Sample Number	Location ID (Former ID)	Sample Type	Sample Matrix	Sampler Initials	Sample Date	Sample Time	VOC[1] (8260B)	SVOC[2] (8270C)	GRO[1] (AK101)	DRO[3] (AK102)	Natural Attenuation Parameters[4,5]	Work Order #	Cooler ID #	Lab	NPDL #
Former Landfill Area (Results - Table B3)															
09WWD29WG	LF-MW1 (AP-373)	Project	Water	CB	11/22/09	1000	X				X	K0911422	112301-112305	CAS	10-010
09WWD30WG	LF-MW2 (AP-369)	Project	Water	CB	11/22/09	1140	X				X	K0911422	112301-112305	CAS	10-010
Former Quonset Hut Area (Results - Table B4)															
09WWD14WG	QH-MW3 (AP-497)	Project	Water	VR	11/21/09	1100			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD15WG	QH-MW1 (AP-496)	Project	Water	CB	11/21/09	1215			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD16WG	QH-MW4 (AP-495)	Project	Water	CB	11/21/09	1050			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD17WG	QH-MW2 (AP-425)	Project	Water	VR	11/21/09	1240			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD18WG	QH-MW5 (AP-425)	Field Duplicate	Water	VR	11/21/09	1240			X	X	X	K0911422	112301-112305	CAS	10-010
Former Operations Building, Transformer Area (Results - Table B5)															
09WWD25WG	TA-MW4 (AP-449)	Project	Water	VR	11/22/09	1210			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD26WG	TA-MW3 (AP-448)	Project	Water	VR	11/22/09	1425			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD27WG	TA-MW2 (AP-450)	Project	Water	CB	11/22/09	1450			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD28WG	TA-MW1 (AP-515)	Project	Water	VR	11/22/09	1545			X	X	X	K0911422	112301-112305	CAS	10-010
Former Operations Building, Drum Storage Area (Results - Table B6)															
09WWD13WG	DSA-MW5 (AP-504)	Project	Water	CB	11/20/09	1415	X	X	X	X	X	K0911422	112301-112305	CAS	10-010
09WWD19WG	DSA-MW6 (AP-387)	Project/MS/MSD	Water	VR	11/21/09	1515	X	X	X	X	X	K0911422	112301-112305	CAS	10-010
09WWD20WG	DSA-MW7 (AP-317)	Project	Water	VR	11/21/09	1015	X	X	X	X	X	K0911422	112301-112305	CAS	10-010
09WWD21WG	DSA-MW11 (AP-317)	Field Duplicate	Water	VR	11/21/09	1045	X	X	X	X	X	K0911422	112301-112305	CAS	10-010
Former Operations Building, AST/UST Area (Results - Table B7)															
09WWD22WG	AST-MW9 (AP-507)	Project	Water	CB	11/21/09	1505			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD23WG	AST-MW8 (AP-446)	Project	Water	CB	11/21/09	1620			X	X	X	K0911422	112301-112305	CAS	10-010
09WWD24WG	AST-MW10 (AP-503)	Project	Water	CB	11/22/09	1335			X	X	X	K0911422	112301-112305	CAS	10-010
Trip Blank															
09M55WG	Trip Blank	Trip Blank	Water	VR	11/21/09	800	X		X			K0911422	112301	CAS	10-010

Notes:
[1] Samples are collected in three 40mL, HCl-preserved, VOA vials
[2] Samples are collected in two 1L, non-preserved, amber bottles
[3] Samples are collected in two 500mL, HCl-preserved, amber bottles
[4] Natural attenuation parameters include: dissolved iron/manganese (SW6010B), sulfate/chloride (E300.0), nitrate+nitrate, total (E353.2), Kjeldahl nitrogen (E351.4), and methane (RSK-175).
[5] Samples are collected in: iron/manganese (field-filtered, 1 HNO_3-preserved, 250 mL Nalgene bottle), sulfate/chloride (1 non-preserved, 250 mL Nalgene bottle), total Kjeldahl nitrogen and nitrate/nitrite as total (1 H_2SO_4-preserved, 250 mL Nalgene bottle), and methane (3 HCl-preserved, 40 mL VOA vials).

The standard 14-day turnaround time was requested for all analyses.

AST - Aboveground storage tank
CAS - Columbia Analytical Services, Kelso, Washington
CB - Chris Boese
DRO - Diesel range orgaics
GRO - Gasoline range organics
MS/MSD - Matrix spike/matrix spike duplicate
SVOC - Semivolatile organic compounds
UST - Belowground storage tank
VOC - Volatile organic compounds
VR - Vanessa Ritchie

Table B2 - Soil Sample Tracking Table
Former Wildwood Air Force Station, Non-Tank Farm Sites
Kenai, Alaska

Sample Number	Sample Location	Sample Type	Sample Matrix	Sampler Initials	Sample Date	Sample Time	Lead[1] (SW6020)	PCB[1] (SW8082)	Dioxins/ Furans[2] (SW8290D)	Work Order #	Cooler ID #	Lab	NPDL #
Former Trench Area, Burn Pit (Resutls - Table B8)													
09WWBP01SO	BP1-2	Project	Soil	CB/VR	11/19/09	1320	X	X	X	K0911425	112306	CAS	10-010
09WWBP02SO	BP1-4	Project	Soil	CB/VR	11/19/09	1325	X	X	X	K0911425	112306	CAS	10-010
09WWBP03SO	BP1-6	Project	Soil	CB/VR	11/19/09	1330	X	X	X	K0911425	112306	CAS	10-010
09WWBP04SO	BP1-8	Project	Soil	CB/VR	11/19/09	1335	X	X	X	K0911425	112306	CAS	10-010
09WWBP05SO	BP2-2	Project	Soil	CB/VR	11/19/09	1450	X	X	X	K0911425	112306	CAS	10-010
09WWBP06SO	BP2-4	Project	Soil	CB/VR	11/19/09	1455	X	X	X	K0911425	112306	CAS	10-010
09WWBP07SO	BP2-6	Project	Soil	CB/VR	11/19/09	1500	X	X	X	K0911425	112306	CAS	10-010
09WWBP08SO	BP2-8	Project	Soil	CB/VR	11/19/09	1505	X	X	X	K0911425	112306	CAS	10-010
09WWBP09SO	BP3-2	Project	Soil	CB/VR	11/19/09	1405	X	X	X	K0911425	112306	CAS	10-010
09WWBP10SO	BP3-2A	Field Duplicate	Soil	CB/VR	11/19/09	1407	X	X	X	K0911425	112306	CAS	10-010
09WWBP11SO	BP3-4	Project	Soil	CB/VR	11/19/09	1410	X	X	X	K0911425	112306	CAS	10-010
09WWBP12SO	BP3-6	Project	Soil	CB/VR	11/19/09	1415	X	X	X	K0911425	112306	CAS	10-010
09WWBP13SO	BP3-8	Project/MS/MSD	Soil	CB/VR	11/19/09	1425	X	X	X	K0911425	112306	CAS	10-010
09WWBP14SO	BP5-2	Project	Soil	CB/VR	11/19/09	1450	X	X	X	K0911425	112306	CAS	10-010
09WWBP15SO	BP5-2A	Field Duplicate	Soil	CB/VR	11/19/09	1515	X	X	X	K0911425	112306	CAS	10-010
09WWBP16SO	BP5-4	Project	Soil	CB/VR	11/19/09	1520	X	X	X	K0911425	112306	CAS	10-010
09WWBP17SO	BP5-6	Project	Soil	CB/VR	11/19/09	1525	X	X	X	K0911425	112306	CAS	10-010
09WWBP18SO	BP5-8	Project	Soil	CB/VR	11/19/09	1530	X	X	X	K0911425	112306	CAS	10-010
09WWBP19SO	BP4-2	Project	Soil	CB/VR	11/19/09	1535	X	X	X	K0911425	112306	CAS	10-010
09WWBP20SO	BP4-4	Project	Soil	CB/VR	11/19/09	1540	X	X	X	K0911425	112306	CAS	10-010
09WWBP21SO	BP4-6	Project	Soil	CB/VR	11/19/09	1545	X	X	X	K0911425	112306	CAS	10-010
09WWBP22SO	BP4-8	Project	Soil	CB/VR	11/19/09	1550	X	X	X	K0911425	112306	CAS	10-010

Notes:
[1] Samples were collected in one non-preserved, 8 oz jar.
[2] Samples were collected in one non-preserved, 4 oz amber jar.

The standard 14-day turnaround time was requested for all analyses.

CAS - Columbia Analytical Services. Lead and PCBs were analyzed at CAS-Kelso, WA. Dioxins and Furans were analyzed at CAS-Houston, TX
CB - Chris Boese
MS/MSD - Matrix spike/matrix spike duplicate sample pair
PCB - Polychlorinated Biphenyls
VR - Vanessa Ritchie

Table B3 - Former Quonset Hut Area Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

		Location	**Cleanup Level[1]**	**QH-MW1**	**QH-MW2**	**QH-MW5 (QH-MW2)**	**QH-MW3**	**QH-MW4**	**TripBlank**
		Former Location		**AP-496**	**AP-425**	**AP-425**	**AP-497**	**AP-495**	**-**
		Sample ID		09WWD15WG	09WWD17WG	09WWD18WG	09WWD14WG	09WWD16WG	09M55WG
		Laboratory		CAS	CAS	CAS	CAS	CAS	CAS
		Lab Sample ID		K091142203	K091142205	K091142206	K091142202	K091142204	K091142219
		Collect Date		11/21/2009	11/21/2009	11/21/2009	11/21/2009	11/21/2009	11/20/2009
		Matrix		WG	WG	WG	WG	WG	WG
		Sample Type		Project	Project	Field Duplicate	Project	Project	Trip Blank
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Gasoline Range Organics (C6-C10)	AK101	UG/L	**2,200**	ND [100]U	ND [100]U	ND [100]U	ND [100]U	ND [100]U	ND [100]U
Diesel Range Organics (C10-C25)	AK102	UG/L	**1,500**	64 [800] J,B	25 [800] J,B	24 [800] J,B	53 [800] J,B	35 [800] J,B	-
Chloride	E300.0	MG/L	**NA**	2.47 [0.20]	2.73 [0.20]	2.78 [0.20]	2.88 [0.20]	2.36 [0.20]	-
Sulfate	E300.0	MG/L	**NA**	7.68 [0.20]	8.53 [0.20]	9.08 [0.20]	8.71 [0.20]	7.46 [0.20]	-
Nitrogen, Kjeldahl, Total	E351.4	MG/L	**NA**	0.70 [0.20]	0.45 [0.20] B	0.70 [0.20]	0.93 [0.20]	0.55 [0.20] B	-
Nitrogen, Nitrate-Nitrite	E353.2	MG/L	**NA**	0.020 [0.050] J	0.277 [0.050]	0.269 [0.050]	0.348 [0.050]	0.124 [0.050]	-
Methane	RSK175	UG/L	**NA**	2.8 [1.3]	2.9 [1.3]	2.8 [1.3]	1.8 [1.3]	8.9 [1.3]	ND [1.3]U
Iron	SW6010B	UG/L	**NA**	5350 [10]	2570 [10]	2530 [10]	862 [10]	4810 [10]	-
Manganese	SW6010B	UG/L	**NA**	219 [0.6]	118 [0.6]	117 [0.6]	119 [0.6]	290 [0.6]	-

[1] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code, Chapter 75.345, Table C.

B - Possible cross-contaminant based on blank sample
CAS - Columbia Analytical Services
J - Result qualified as estimation because it is less than the PQL
MG/L - Milligrams per liter
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
U - Indicates result is non-detect
UG/L - Micrograms per liter
WG - Groundwater

Table B4 - Former Landfill Area Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**LF-MW1**	**LF-MW2**	**TripBlank**
			Former Location	**AP-373**	**AP-369**	**-**
			Sample ID	09WWD29WG	09WWD30WG	09M55WG
			Laboratory	CAS	CAS	CAS
			Lab Sample ID	K091142217	K091142218	K091142219
			Collect Date	11/22/2009	11/22/2009	11/20/2009
			Matrix	WG	WG	WG
			Sample Type	Project	Project	Trip Blank
			Cleanup Level[1]			
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Chloride	E300.0	MG/L	**NA**	2.95 [0.20]	4.12 [0.20]	-
Sulfate	E300.0	MG/L	**NA**	0.31 [0.20]	0.40 [0.20]	-
Nitrogen, Kjeldahl, Total	E351.4	MG/L	**NA**	1.91 [0.20]	1.30 [0.20]	-
Nitrogen, Nitrate-Nitrite	E353.2	MG/L	**NA**	0.123 [0.050]	0.073 [0.050]	-
Methane	RSK175	UG/L	**NA**	5900 [1.3]	2000 [1.3]	ND [1.3]U
Iron	SW6010B	UG/L	**NA**	74000 [10]	27200 [10]	-
Manganese	SW6010B	UG/L	**NA**	3410 [0.6]	1080 [0.6]	-
1,1,1,2-Tetrachloroethane	SW8260B	UG/L	**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,1-Trichloroethane	SW8260B	UG/L	**200**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,2,2-Tetrachloroethane	SW8260B	UG/L	**4.3**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,2-Trichloroethane	SW8260B	UG/L	**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1-Dichloroethane	SW8260B	UG/L	**7300**	ND [0.50]U	0.17 [0.50] J	ND [0.50]U
1,1-Dichloroethene	SW8260B	UG/L	**7**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1-Dichloropropene	SW8260B	UG/L	**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2,3-Trichlorobenzene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2,3-Trichloropropane	SW8260B	UG/L	**0.12**	ND [1.0]U	ND [1.0]U	ND [1.0]U
1,2,4-Trichlorobenzene	SW8260B	UG/L	**70**	ND [2.0]U	ND [2.0]U	0.10 [2.0] J,B
1,2,4-Trimethylbenzene	SW8260B	UG/L	**1800**	0.39 [2.0] J	0.12 [2.0] J	ND [2.0]U
1,2-Dibromo-3-chloropropane	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2-Dibromoethane	SW8260B	UG/L	**0.05**	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2-Dichlorobenzene	SW8260B	UG/L	**600**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2-Dichloroethane	SW8260B	UG/L	**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2-Dichloropropane	SW8260B	UG/L	**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,3,5-Trimethylbenzene	SW8260B	UG/L	**1800**	0.19 [2.0] J	ND [2.0]U	ND [2.0]U
1,3-Dichlorobenzene	SW8260B	UG/L	**3300**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,3-Dichloropropane	SW8260B	UG/L	**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,4-Dichlorobenzene	SW8260B	UG/L	**75**	ND [0.50]U	ND [0.50]U	ND [0.50]U
2,2-Dichloropropane	SW8260B	UG/L	**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U
2-Butanone	SW8260B	UG/L	**22000**	ND [20]U	ND [20]U	ND [20]U
2-Chlorotoluene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
2-Hexanone	SW8260B	UG/L	**NA**	ND [20]U	ND [20]U	ND [20]U
4-Chlorotoluene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
4-Isopropyltoluene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
4-Methyl-2-pentanone	SW8260B	UG/L	**2900**	ND [20]U	ND [20]U	ND [20]U
Acetone	SW8260B	UG/L	**33000**	ND [20]U	ND [20]U	ND [20]U
Benzene	SW8260B	UG/L	**5**	0.26 [0.50] J	0.29 [0.50] J	ND [0.50]U
Bromobenzene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
Bromochloromethane	SW8260B	UG/L	**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromodichloromethane	SW8260B	UG/L	**14**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromoform	SW8260B	UG/L	**110**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromomethane	SW8260B	UG/L	**51**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Carbon disulfide	SW8260B	UG/L	**3700**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Carbon tetrachloride	SW8260B	UG/L	**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chlorobenzene	SW8260B	UG/L	**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chloroethane	SW8260B	UG/L	**290**	ND [0.50]U	0.50 [0.50]	ND [0.50]U
Chloroform	SW8260B	UG/L	**140**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chloromethane	SW8260B	UG/L	**66**	ND [0.50]U	ND [0.50]U	0.070 [0.50] J

Table B4 - Former Landfill Area Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**LF-MW1**	**LF-MW2**	**TripBlank**
			Former Location	**AP-373**	**AP-369**	**-**
			Sample ID	09WWD29WG	09WWD30WG	09M55WG
			Laboratory	CAS	CAS	CAS
			Lab Sample ID	K091142217	K091142218	K091142219
			Collect Date	11/22/2009	11/22/2009	11/20/2009
			Matrix	WG	WG	WG
			Sample Type	Project	Project	Trip Blank
Analyte	**Method**	**Units**	**Cleanup Level[1]**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Dibromochloromethane	SW8260B	UG/L	**10**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Dibromomethane	SW8260B	UG/L	**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Dichlorodifluoromethane	SW8260B	UG/L	**7300**	3.4 [0.50]	0.95 [0.50]	ND [0.50]U
Ethylbenzene	SW8260B	UG/L	**700**	0.26 [0.50] J	ND [0.50]U	ND [0.50]U
Hexachlorobutadiene	SW8260B	UG/L	**7.3**	ND [2.0]U	ND [2.0]U	ND [2.0]U
Isopropylbenzene	SW8260B	UG/L	**3700**	ND [2.0]U	ND [2.0]U	ND [2.0]U
Methyl-tert-butyl ether (MTBE)	SW8260B	UG/L	**470**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Methylene chloride	SW8260B	UG/L	**5**	ND [2.0]U	ND [2.0]U	ND [2.0]U
Naphthalene	SW8260B	UG/L	**730**	0.12 [2.0] J,B	ND [2.0]U	ND [2.0]U
Styrene	SW8260B	UG/L	**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Tetrachloroethene (PCE)	SW8260B	UG/L	**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Toluene	SW8260B	UG/L	**1000**	0.24 [0.50] J	0.19 [0.50] J	ND [0.50]U
Trichloroethene (TCE)	SW8260B	UG/L	**5**	0.20 [0.50] J	0.36 [0.50] J	ND [0.50]U
Trichlorofluoromethane	SW8260B	UG/L	**11000**	ND [0.50]U	ND [0.50]U	ND [0.50]U
Vinyl chloride	SW8260B	UG/L	**2**	0.12 [0.50] J	0.18 [0.50] J	ND [0.50]U
Xylene, Isomers m & p	SW8260B	UG/L	**10000**	1.1 [0.50]	0.21 [0.50] J	ND [0.50]U
cis-1,2-Dichloroethene	SW8260B	UG/L	**70**	0.52 [0.50]	0.53 [0.50]	ND [0.50]U
cis-1,3-Dichloropropene	SW8260B	UG/L	**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U
n-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U
n-Propylbenzene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U
o-Xylene	SW8260B	UG/L	**10000**	0.14 [0.50] J	ND [0.50]U	ND [0.50]U
sec-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U
tert-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U
trans-1,2-Dichloroethene	SW8260B	UG/L	**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U
trans-1,3-Dichloropropene	SW8260B	UG/L	**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U

Bold and highlighted results exceed cleanup levels.

[1] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code, Chapter 75.345, Table C.

B - Possible cross-contaminant based on blank sample
CAS - Columbia Analytical Services
J - Result qualified as estimation because it is less than the PQL
MG/L - Milligrams per liter
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
U - Indicates result is non-detect
UG/L - Micrograms per liter
WG - Groundwater

Table B5 - Former Operations Building (Transformer Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

		Location	**Cleanup Level[1]**	**TA-MW1**	**TA-MW2**	**TA-MW3**	**TA-MW4**	**TripBlank**
		Former Location		**AP-515**	**AP-450**	**AP-448**	**AP-449**	**-**
		Sample ID		09WWD28WG	09WWD27WG	09WWD26WG	09WWD25WG	09M55WG
		Laboratory		CAS	CAS	CAS	CAS	CAS
		Lab Sample ID		K091142216	K091142215	K091142214	K091142213	K091142219
		Collect Date		11/22/2009	11/22/2009	11/22/2009	11/22/2009	11/20/2009
		Matrix		WG	WG	WG	WG	WG
		Sample Type		Project	Project	Project	Project	Trip Blank
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Gasoline Range Organics (C6-C10)	AK101	UG/L	**2,200**	58 [100] J	18 [100] J	24 [100] J	81 [100] J	ND [100]U
Diesel Range Organics (C10-C25)	AK102	UG/L	**1,500**	440 [800] J	160 [800] J	190 [800] J	370 [800] J	-
Chloride	E300.0	MG/L	**NA**	2.33 [0.20]	2.29 [0.20]	2.40 [0.20]	2.56 [0.20]	-
Sulfate	E300.0	MG/L	**NA**	2.37 [0.20]	6.16 [0.20]	2.94 [0.20]	3.41 [0.20]	-
Nitrogen, Kjeldahl, Total	E351.4	MG/L	**NA**	0.93 [0.20]	0.69 [0.20]	0.55 [0.20] B	0.71 [0.20]	-
Nitrogen, Nitrate-Nitrite	E353.2	MG/L	**NA**	0.014 [0.050] J	0.014 [0.050] J	0.017 [0.050] J	ND [0.050]U	-
Methane	RSK175	UG/L	**NA**	860 [1.3]	31 [1.3]	190 [1.3]	450 [1.3]	ND [1.3]U
Iron	SW6010B	UG/L	**NA**	2240 [10]	2330 [10]	3100 [10]	2350 [10]	-
Manganese	SW6010B	UG/L	**NA**	75.4 [0.6]	74.5 [0.6]	85.8 [0.6]	84.9 [0.6]	-

[1] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code, Chapter 75.345, Table C.

B - Possible cross-contaminant based on blank sample
CAS - Columbia Analytical Services
J - Result qualified as estimation because it is less than the PQL
MG/L - Milligrams per liter
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
U - Indicates result is non-detect
UG/L - Micrograms per liter
WG - Groundwater

Table B6 - Former Operations Building (Drum Storage Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**Cleanup Level[1]**	**DSA-MW5**	**DSA-MW6**	**DSA-MW7**	**DSA-MW11 (DSA-MW7)**	**TripBlank**
			Former Location		**AP-504**	**AP-387/AP-411**	**AP-317**	**AP-317**	**-**
			Sample ID		09WWD13WG	09WWD19WG	09WWD20WG	09WWD21WG	09M55WG
			Laboratory		CASK	CASK	CASK	CASK	CASK
			Lab Sample ID		K091142201	K091142207	K091142208	K091142209	K091142219
			Collect Date		11/20/2009	11/21/2009	11/22/2009	11/22/2009	11/20/2009
			Matrix		WG	WG	WG	WG	WG
			Sample Type		Project	Project	Project	Field Duplicate	Trip Blank
Analyte	**Method**	**Units**			**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Gasoline Range Organics (C6-C10)	AK101	UG/L		**2,200**	17 [100] J	ND [100]U	ND [100]U	ND [100]U	ND [100]U
Diesel Range Organics (C10-C25)	AK102	UG/L		**1,500**	190 [800] J	32 [800] J,B	43 [800] J,B	37 [800] J,B	-
Chloride	E300.0	MG/L		**NA**	2.43 [0.20]	2.35 [0.20]	2.31 [0.20]	2.33 [0.20]	-
Sulfate	E300.0	MG/L		**NA**	2.72 [0.20]	3.44 [0.20]	3.34 [0.20]	6.25 [0.20]	-
Nitrogen, Kjeldahl, Total	E351.4	MG/L		**NA**	1.13 [0.20]	0.65 [0.20]	0.82 [0.20]	0.70 [0.20]	-
Nitrogen, Nitrate-Nitrite	E353.2	MG/L		**NA**	0.062 [0.050]	0.152 [0.050]	0.189 [0.050]	0.190 [0.050]	-
Methane	RSK175	UG/L		**NA**	97 [1.3]	2.3 [1.3] B	2.6 [1.3]	2.7 [1.3]	ND [1.3]U
Iron	SW6010B	UG/L		**NA**	1500 [10]	1680 [10]	1630 [10]	1640 [10]	-
Manganese	SW6010B	UG/L		**NA**	67.2 [0.6]	58 [0.6]	48.4 [0.6]	48 [0.6]	-
1,1,1,2-Tetrachloroethane	SW8260B	UG/L		**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,1-Trichloroethane	SW8260B	UG/L		**200**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,2,2-Tetrachloroethane	SW8260B	UG/L		**4.3**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1,2-Trichloroethane	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1-Dichloroethane	SW8260B	UG/L		**7300**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1-Dichloroethene	SW8260B	UG/L		**7**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,1-Dichloropropene	SW8260B	UG/L		**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2,3-Trichlorobenzene	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2,3-Trichloropropane	SW8260B	UG/L		**0.12**	ND [1.0]U	ND [1.0]U	ND [1.0]U	ND [1.0]U	ND [1.0]U
1,2,4-Trichlorobenzene	SW8260B	UG/L		**70**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	0.10 [2.0] J,B
1,2,4-Trimethylbenzene	SW8260B	UG/L		**1800**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2-Dibromo-3-chloropropane	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2-Dibromoethane	SW8260B	UG/L		**0.05**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,2-Dichlorobenzene	SW8260B	UG/L		**600**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2-Dichloroethane	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2-Dichloropropane	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,3,5-Trimethylbenzene	SW8260B	UG/L		**1800**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
1,3-Dichlorobenzene	SW8260B	UG/L		**3300**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,3-Dichloropropane	SW8260B	UG/L		**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,4-Dichlorobenzene	SW8260B	UG/L		**75**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
2,2-Dichloropropane	SW8260B	UG/L		**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
2-Butanone	SW8260B	UG/L		**22000**	ND [20]U	ND [20]U	ND [20]U	ND [20]U	ND [20]U

Table B6 - Former Operations Building (Drum Storage Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**Cleanup Level[1]**	**DSA-MW5**	**DSA-MW6**	**DSA-MW7**	**DSA-MW11 (DSA-MW7)**	**TripBlank**
			Former Location		**AP-504**	**AP-387/AP-411**	**AP-317**	**AP-317**	**-**
			Sample ID		09WWD13WG	09WWD19WG	09WWD20WG	09WWD21WG	09M55WG
			Laboratory		CASK	CASK	CASK	CASK	CASK
			Lab Sample ID		K091142201	K091142207	K091142208	K091142209	K091142219
			Collect Date		11/20/2009	11/21/2009	11/22/2009	11/22/2009	11/20/2009
			Matrix		WG	WG	WG	WG	WG
			Sample Type		Project	Project	Project	Field Duplicate	Trip Blank
Analyte	**Method**	**Units**			**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
2-Chlorotoluene	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
2-Hexanone	SW8260B	UG/L		**NA**	ND [20]U	ND [20]U	ND [20]U	ND [20]U	ND [20]U
4-Chlorotoluene	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
4-Isopropyltoluene	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
4-Methyl-2-pentanone	SW8260B	UG/L		**2900**	ND [20]U	ND [20]U	ND [20]U	ND [20]U	ND [20]U
Acetone	SW8260B	UG/L		**33000**	ND [20]U	ND [20]U	ND [20]U	ND [20]U	ND [20]U
Benzene	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromobenzene	SW8260B	UG/L		**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
Bromochloromethane	SW8260B	UG/L		**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromodichloromethane	SW8260B	UG/L		**14**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromoform	SW8260B	UG/L		**110**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Bromomethane	SW8260B	UG/L		**51**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Carbon disulfide	SW8260B	UG/L		**3700**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Carbon tetrachloride	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chlorobenzene	SW8260B	UG/L		**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chloroethane	SW8260B	UG/L		**290**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chloroform	SW8260B	UG/L		**140**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Chloromethane	SW8260B	UG/L		**66**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	0.070 [0.50] J
Dibromochloromethane	SW8260B	UG/L		**10**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Dibromomethane	SW8260B	UG/L		**NA**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Dichlorodifluoromethane	SW8260B	UG/L		**7300**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Ethylbenzene	SW8260B	UG/L		**700**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Hexachlorobutadiene	SW8260B	UG/L		**7.3**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
Isopropylbenzene	SW8260B	UG/L		**3700**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
Methyl-tert-butyl ether (MTBE)	SW8260B	UG/L		**470**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Methylene chloride	SW8260B	UG/L		**5**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
Naphthalene	SW8260B	UG/L		**730**	0.10 [2.0] J,B	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
Styrene	SW8260B	UG/L		**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Tetrachloroethene (PCE)	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Toluene	SW8260B	UG/L		**1000**	0.070 [0.50] J	0.060 [0.50] J	ND [0.50]U	ND [0.50]U	ND [0.50]U
Trichloroethene (TCE)	SW8260B	UG/L		**5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Trichlorofluoromethane	SW8260B	UG/L		**11000**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
Vinyl chloride	SW8260B	UG/L		**2**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U

Table B6 - Former Operations Building (Drum Storage Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

Location			Cleanup Level[1]	DSA-MW5	DSA-MW6	DSA-MW7	DSA-MW11 (DSA-MW7)	TripBlank
Former Location				AP-504	AP-387/AP-411	AP-317	AP-317	-
Sample ID				09WWD13WG	09WWD19WG	09WWD20WG	09WWD21WG	09M55WG
Laboratory				CASK	CASK	CASK	CASK	CASK
Lab Sample ID				K091142201	K091142207	K091142208	K091142209	K091142219
Collect Date				11/20/2009	11/21/2009	11/22/2009	11/22/2009	11/20/2009
Matrix				WG	WG	WG	WG	WG
Sample Type				Project	Project	Project	Field Duplicate	Trip Blank
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Xylene, Isomers m & p	SW8260B	UG/L	**10000**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
cis-1,2-Dichloroethene	SW8260B	UG/L	**70**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
cis-1,3-Dichloropropene	SW8260B	UG/L	**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
n-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
n-Propylbenzene	SW8260B	UG/L	**NA**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
o-Xylene	SW8260B	UG/L	**10000**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
sec-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
tert-Butylbenzene	SW8260B	UG/L	**370**	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U	ND [2.0]U
trans-1,2-Dichloroethene	SW8260B	UG/L	**100**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
trans-1,3-Dichloropropene	SW8260B	UG/L	**8.5**	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U	ND [0.50]U
1,2,4-Trichlorobenzene	SW8270C	UG/L	**70**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
1,2-Dichlorobenzene	SW8270C	UG/L	**600**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
1,3-Dichlorobenzene	SW8270C	UG/L	**3300**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
1,4-Dichlorobenzene	SW8270C	UG/L	**75**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,4,5-Trichlorophenol	SW8270C	UG/L	**3700**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,4,6-Trichlorophenol	SW8270C	UG/L	**77**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,4-Dichlorophenol	SW8270C	UG/L	**110**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,4-Dimethylphenol	SW8270C	UG/L	**730**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,4-Dinitrophenol	SW8270C	UG/L	**73**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
2,4-Dinitrotoluene	SW8270C	UG/L	**1.3**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2,6-Dinitrotoluene	SW8270C	UG/L	**1.3**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2-Chloronaphthalene	SW8270C	UG/L	**2900**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2-Chlorophenol	SW8270C	UG/L	**180**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2-Methyl-4,6-dinitrophenol	SW8270C	UG/L	**NA**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
2-Methylnaphthalene	SW8270C	UG/L	**150**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2-Methylphenol (o-Cresol)	SW8270C	UG/L	**1800**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
2-Nitroaniline	SW8270C	UG/L	**NA**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
2-Nitrophenol	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
3,3'-Dichlorobenzidine	SW8270C	UG/L	**1.9**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
3-Nitroaniline	SW8270C	UG/L	**180**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
4-Bromophenyl phenyl ether	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
4-Chloro-3-methylphenol	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-

Table B6 - Former Operations Building (Drum Storage Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

Location			Cleanup Level[1]	DSA-MW5	DSA-MW6	DSA-MW7	DSA-MW11 (DSA-MW7)	TripBlank
Former Location				AP-504	AP-387/AP-411	AP-317	AP-317	-
Sample ID				09WWD13WG	09WWD19WG	09WWD20WG	09WWD21WG	09M55WG
Laboratory				CASK	CASK	CASK	CASK	CASK
Lab Sample ID				K091142201	K091142207	K091142208	K091142209	K091142219
Collect Date				11/20/2009	11/21/2009	11/22/2009	11/22/2009	11/20/2009
Matrix				WG	WG	WG	WG	WG
Sample Type				Project	Project	Project	Field Duplicate	Trip Blank
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
4-Chloroaniline	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
4-Chlorophenyl phenyl ether	SW8270C	UG/L	**16**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
4-Methylphenol (p-Cresol)	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
4-Nitroaniline	SW8270C	UG/L	**NA**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
4-Nitrophenol	SW8270C	UG/L	**NA**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
Acenaphthene	SW8270C	UG/L	**2200**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Acenaphthylene	SW8270C	UG/L	**2200**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Aniline	SW8270C	UG/L	**NA**	ND [24]U	ND [24]U,ML	ND [25]U	ND [24]U	-
Anthracene	SW8270C	UG/L	**11000**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzo(a)anthracene	SW8270C	UG/L	**1.2**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzo(a)pyrene	SW8270C	UG/L	**0.2**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzo(b)fluoranthene	SW8270C	UG/L	**1.2**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzo(g,h,i)perylene	SW8270C	UG/L	**1100**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzo(k)fluoranthene	SW8270C	UG/L	**12**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzoic acid	SW8270C	UG/L	**150000**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
Benzyl alcohol	SW8270C	UG/L	**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Benzyl butyl phthalate	SW8270C	UG/L	**7300**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Carbazole	SW8270C	UG/L	**43**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Chrysene	SW8270C	UG/L	**120**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Di-n-butyl phthalate	SW8270C	UG/L	**3700**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Di-n-octyl phthalate	SW8270C	UG/L	**1500**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Dibenzo(a,h)anthracene	SW8270C	UG/L	**0.12**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Dibenzofuran	SW8270C	UG/L	**73**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Diethyl phthalate	SW8270C	UG/L	**29000**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Dimethyl phthalate	SW8270C	UG/L	**370000**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Fluoranthene	SW8270C	UG/L	**1500**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Fluorene	SW8270C	UG/L	**1500**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Hexachlorobenzene	SW8270C	UG/L	**1**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Hexachlorobutadiene	SW8270C	UG/L	**7.3**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Hexachlorocyclopentadiene	SW8270C	UG/L	**50**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Hexachloroethane	SW8270C	UG/L	**40**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Indeno(1,2,3-cd)pyrene	SW8270C	UG/L	**1.2**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Isophorone	SW8270C	UG/L	**900**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-

Table B6 - Former Operations Building (Drum Storage Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**Cleanup Level[1]**	**DSA-MW5**	**DSA-MW6**	**DSA-MW7**	**DSA-MW11 (DSA-MW7)**	**TripBlank**
			Former Location		**AP-504**	**AP-387/AP-411**	**AP-317**	**AP-317**	**-**
			Sample ID		09WWD13WG	09WWD19WG	09WWD20WG	09WWD21WG	09M55WG
			Laboratory		CASK	CASK	CASK	CASK	CASK
			Lab Sample ID		K091142201	K091142207	K091142208	K091142209	K091142219
			Collect Date		11/20/2009	11/21/2009	11/22/2009	11/22/2009	11/20/2009
			Matrix		WG	WG	WG	WG	WG
			Sample Type		Project	Project	Project	Field Duplicate	Trip Blank
Analyte	**Method**	**Units**			**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Naphthalene	SW8270C	UG/L		**730**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Nitrobenzene	SW8270C	UG/L		**18**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Pentachlorophenol	SW8270C	UG/L		**1**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
Phenanthrene	SW8270C	UG/L		**11000**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Phenol	SW8270C	UG/L		**11000**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
Pyrene	SW8270C	UG/L		**1100**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
bis(2-Chloroisopropyl)ether	SW8270C	UG/L		**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
bis-(2-Chloroethoxy)methane	SW8270C	UG/L		**NA**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
bis-(2-Chloroethyl)ether	SW8270C	UG/L		**0.77**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
bis-(2-Ethylhexyl)phthalate	SW8270C	UG/L		**6**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
n-Nitrosodi-n-propylamine	SW8270C	UG/L		**0.12**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-
n-Nitrosodimethylamine	SW8270C	UG/L		**NA**	ND [24]U	ND [24]U	ND [25]U	ND [24]U	-
n-Nitrosodiphenylamine	SW8270C	UG/L		**170**	ND [9.6]U	ND [9.6]U	ND [9.8]U	ND [9.6]U	-

[1] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code, Chapter 75.345, Table C.

B - Possible cross-contaminant based on blank sample
CAS - Columbia Analytical Services
J - Result qualified as estimation because it is less than the PQL
MG/L - Milligrams per liter
ML - Data qualified as a low estimate based on MS and/or MSD recovery failure
MS/MSD - Matrix spike/matrix spike duplicate sample pair
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
U - Indicates result is non-detect
UG/L - Micrograms per liter
WG - Groundwater

Table B7 - Former Operations Building (AST/UST Area) Groundwater Analytical Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

			Location	**Cleanup Level[1]**	**AST-MW8**	**AST-MW9**	**AST-MW10**	**TripBlank**
			Former Location		**AP-446**	**AP-507**	**AP-503**	**-**
			Sample ID		09WWD23WG	09WWD22WG	09WWD24WG	09M55WG
			Laboratory		CASK	CASK	CASK	CASK
			Lab Sample ID		K091142211	K091142210	K091142212	K091142219
			Collect Date		11/21/2009	11/21/2009	11/22/2009	11/20/2009
			Matrix		WG	WG	WG	WG
			Sample Type		Project	Project	Project	Trip Blank
Analyte	**Method**	**Units**			**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Gasoline Range Organics (C6-C10)	AK101	UG/L	**2,200**		61 [100] J	96 [100] J	180 [100]	ND [100]U
Diesel Range Organics (C10-C25)	AK102	UG/L	**1,500**		720 [800] J	1000 [800]	**3800 [800]**	-
Chloride	E300.0	MG/L	**NA**		2.37 [0.20]	2.14 [0.20]	2.24 [0.20]	-
Sulfate	E300.0	MG/L	**NA**		3.26 [0.20]	2.64 [0.20]	4.41 [0.20]	-
Nitrogen, Kjeldahl, Total	E351.4	MG/L	**NA**		0.47 [0.20] B	0.74 [0.20]	0.67 [0.20]	-
Nitrogen, Nitrate-Nitrite	E353.2	MG/L	**NA**		0.019 [0.050] J	0.048 [0.050] J	0.024 [0.050] J	-
Methane	RSK175	UG/L	**NA**		6.4 [1.3] B	110 [1.3]	3.1 [1.3] B	ND [1.3]U
Iron	SW6010B	UG/L	**NA**		4700 [10]	7370 [10]	4920 [10]	-
Manganese	SW6010B	UG/L	**NA**		75.8 [0.6]	170 [0.6]	80.1 [0.6]	-

Bold and highlighted results exceed cleanup levels.

[1] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code, Chapter 75.345, Table C.

B - Possible cross-contaminant based on blank sample
CAS - Columbia Analytical Services
J - Result qualified as estimation because it is less than the PQL
MG/L - Milligrams per liter
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
U - Indicates result is non-detect
UG/L - Micrograms per liter
WG - Groundwater

Table B8 - Former Trench Area, Burn Pit Soil Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #1 (sample depth intervals: 2, 4, 6, 8 feet bgs)

			Location	**BP1-2**	**BP1-4**	**BP1-6**	**BP1-8**
			Sample ID	09WWBP01SO	09WWBP02SO	09WWBP03SO	09WWBP04SO
			Laboratory	CAS	CAS	CAS	CAS
			Lab Sample ID	K091142501	K091142502	K091142503	K091142504
			Collect Date	11/19/2009	11/19/2009	11/19/2009	11/19/2009
			Matrix	SO	SO	SO	SO
			Sample Type	Project	Project	Project	Project
Analyte	**Method**	**Units**	**Cleanup Level [a]**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Total Solids	E160.3M	Percent	**NA**	86.6 [0]	85.1 [0]	96.5 [0]	96.4 [0]
Lead	SW6020	MG/KG	**400 [b]**	8.710 [0.170]	4.240 [0.175]	2.850 [0.152]	2.480 [0.154]
PCB-1016 (Aroclor 1016)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1221 (Aroclor 1221)	SW8082	MG/KG		ND [0.20]U	ND [0.20]U	ND [0.20]U	ND [0.20]U
PCB-1232 (Aroclor 1232)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1242 (Aroclor 1242)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1248 (Aroclor 1248)	SW8082	MG/KG	**1 [c]**	ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1254 (Aroclor 1254)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1260 (Aroclor 1260)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1262 (Aroclor 1262)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
PCB-1268 (Aroclor 1268)	SW8082	MG/KG		ND [0.099]U	ND [0.099]U	ND [0.099]U	ND [0.10]U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	SW8290D	NG/KG		1.26 [2.74] J	0.214 [2.66] J,B	0.183 [2.52] J,B	0.182 [2.47] B,J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	SW8290D	NG/KG		0.262 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,4,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		0.0733 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
1,2,3,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58 [d]**	ND [1.10]U	ND [1.06]U	ND [1.01]U	ND [0.990]U
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG		ND [1.10]U	ND [1.06]U	ND [1.01]U	ND [0.990]U
Octachlorodibenzo-p-dioxin	SW8290D	NG/KG		9.53 [5.48]	1.25 [5.32] B,J	0.981 [5.05] B,J	0.829 [4.95] B,J
Octachlorodibenzofuran	SW8290D	NG/KG		0.515 [5.48] J	ND [5.32]U	ND [5.05]U	ND [4.95]U
Total Heptachlorodibenzo-p-dioxins (HpCDD)	SW8290D	NG/KG		1.26 [2.74] J	0.489 [2.66] B,J	ND [2.52]U	0.396 [2.47] J,B
Total Heptachlorodibenzofurans (HpCDF)	SW8290D	NG/KG		0.486 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
Total Hexachlorodibenzo-p-dioxins (HxCDD)	SW8290D	NG/KG		1.03 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
Total Hexachlorodibenzofurans (HxCDF)	SW8290D	NG/KG		0.0715 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	SW8290D	NG/KG		0.086 [2.74] J	ND [2.66]U	ND [2.52]U	ND [2.47]U
Total Pentachlorodibenzofurans (PeCDF)	SW8290D	NG/KG		ND [2.74]U	ND [2.66]U	ND [2.52]U	ND [2.47]U
Total Tetrachlorodibenzo-p-dioxins (TCDD)	SW8290D	NG/KG		ND [1.10]U	0.29 [1.06] J	0.291 [1.01] J	0.141 [0.990] J
Total Tetrachlorodibenzofurans (TCDF)	SW8290D	NG/KG		2.07 [1.10]	ND [1.06]U	ND [1.01]U	0.195 [0.990] J

[a] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code (ACC), Chapter 75.341, Table B1.

[b] Cleanup level etablished from 18 ACC 75.341, Table B1 (residential land use).

[c] Cleanup level etablished from 18 ACC 75.341, Table B1 (unrestricted land use).

[d] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD) only).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
Q - Data qualified as an estimate based on quality control failure
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
U - Indicates result is non-detect

Table B8 - Former Trench Area, Burn Pit Soil Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #2 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	BP2-2	BP2-4	BP2-6	BP2-8
Sample ID				09WWBP05SO	09WWBP06SO	09WWBP07SO	09WWBP08SO
Laboratory				CAS	CAS	CAS	CAS
Lab Sample ID				K091142505	K091142506	K091142507	K091142508
Collect Date				11/19/2009	11/19/2009	11/19/2009	11/19/2009
Matrix				SO	SO	SO	SO
Sample Type				Project	Project	Project	Project
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Total Solids	E160.3M	Percent	**NA**	89.7 [0]	86.3 [0]	82.0 [0]	96.3 [0]
Lead	SW6020	MG/KG	**400** [b]	4.880 [0.164]	4.130 [0.170]	6.050 [0.179]	2.380 [0.153]
PCB-1016 (Aroclor 1016)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1221 (Aroclor 1221)	SW8082	MG/KG		ND [0.20]U	ND [0.20]U	ND [0.20]U	ND [0.20]U
PCB-1232 (Aroclor 1232)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1242 (Aroclor 1242)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1248 (Aroclor 1248)	SW8082	MG/KG	**1** [c]	ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1254 (Aroclor 1254)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1260 (Aroclor 1260)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1262 (Aroclor 1262)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
PCB-1268 (Aroclor 1268)	SW8082	MG/KG		ND [0.10]U	ND [0.096]U	ND [0.098]U	ND [0.098]U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	SW8290D	NG/KG		0.668 [2.69] B,J	0.779 [2.80] B,J	0.726 [2.96] B,J	0.364 [2.51] B,J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	0.299 [2.80] J	0.191 [2.96] J	0.118 [2.51] J
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,4,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
1,2,3,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58** [d]	ND [1.08]U	ND [1.12]U	ND [1.18]U	ND [1.00]U
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG		ND [1.08]U	ND [1.12]U	ND [1.18]U	ND [1.00]U
Octachlorodibenzo-p-dioxin	SW8290D	NG/KG		4.21 [5.38] B,J	4.83 [5.60] J	4.38 [5.92] B,J	1.79 [5.02] B,J
Octachlorodibenzofuran	SW8290D	NG/KG		0.354 [5.38] J	ND [5.60]U	ND [5.92]U	0.285 [5.02] J
Total Heptachlorodibenzo-p-dioxins (HpCDD)	SW8290D	NG/KG		1.32 [2.69] J	1.5 [2.80] J	1.5 [2.96] J	0.819 [2.51] J,B
Total Heptachlorodibenzofurans (HpCDF)	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
Total Hexachlorodibenzo-p-dioxins (HxCDD)	SW8290D	NG/KG		0.143 [2.69] J	0.456 [2.80] J	0.395 [2.96] J	ND [2.51]U
Total Hexachlorodibenzofurans (HxCDF)	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
Total Pentachlorodibenzofurans (PeCDF)	SW8290D	NG/KG		ND [2.69]U	ND [2.80]U	ND [2.96]U	ND [2.51]U
Total Tetrachlorodibenzo-p-dioxins (TCDD)	SW8290D	NG/KG		1.09 [1.08]	0.56 [1.12] J	5.92 [1.18]	ND [1.00]U
Total Tetrachlorodibenzofurans (TCDF)	SW8290D	NG/KG		1.17 [1.08]	0.979 [1.12] J	1.96 [1.18]	ND [1.00]U

[a] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code (ACC), Chapter 75.341, Table B1.

[b] Cleanup level etablished from 18 ACC 75.341, Table B1 (residential land use).

[c] Cleanup level etablished from 18 ACC 75.341, Table B1 (unrestricted land use).

[d] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD) only).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
Q - Data qualified as an estimate based on quality control failure
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
U - Indicates result is non-detect

Table B8 - Former Trench Area, Burn Pit Soil Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #3 (sample depth intervals: 2, 4, 6, 8 feet bgs)

			Location	**BP3-2**	**BP3-2A**	**BP3-4**	**BP3-6**	**BP3-8**
			Sample ID	09WWBP09SO	09WWBP10SO	09WWBP11SO	09WWBP12SO	09WWBP13SO
			Laboratory	CAS	CAS	CAS	CAS	CAS
			Lab Sample ID	K091142509	K091142510	K091142511	K091142512	K091142513
			Collect Date	11/19/2009	11/19/2009	11/19/2009	11/19/2009	11/19/2009
			Matrix	SO	SO	SO	SO	SO
			Sample Type	Project	Field Duplicate	Project	Project	Project
Analyte	**Method**	**Units**	**Cleanup Level [a]**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Total Solids	E160.3M	Percent	**NA**	67.5 [0]	69.5 [0]	82.0 [0]	95.8 [0]	93.0 [0]
Lead	SW6020	MG/KG	**400 [b]**	7.660 [0.156]	8.970 [0.154]	6.130 [0.179]	3.820 [0.154]	2.930 [0.160]
PCB-1016 (Aroclor 1016)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1221 (Aroclor 1221)	SW8082	MG/KG		ND [0.20]U	ND [0.20]U	ND [0.20]U	ND [0.20]U	ND [0.20]U
PCB-1232 (Aroclor 1232)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1242 (Aroclor 1242)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1248 (Aroclor 1248)	SW8082	MG/KG	**1 [c]**	ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1254 (Aroclor 1254)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1260 (Aroclor 1260)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1262 (Aroclor 1262)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
PCB-1268 (Aroclor 1268)	SW8082	MG/KG		ND [0.10]U	ND [0.10]U	ND [0.098]U	ND [0.099]U	ND [0.10]U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	SW8290D	NG/KG		1.49 [3.61] J	1.57 [3.46] J	1.52 [2.93] J	1.36 [2.41] J	0.828 [2.43] B,J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	SW8290D	NG/KG		0.239 [3.61] J	0.309 [3.46] J	0.377 [2.93] J	ND [2.41]U	ND [2.43]U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,4,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
1,2,3,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58 [d]**	ND [1.44]U	ND [1.38]U	ND [1.17]U	ND [0.963]U	ND [0.972]U
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG		ND [1.44]U	ND [1.38]U	ND [1.17]U	ND [0.963]U	ND [0.972]U
Octachlorodibenzo-p-dioxin	SW8290D	NG/KG		9.79 [7.22]	9.05 [6.92]	9.31 [5.86]	10.7 [4.82]	6.41 [4.86]
Octachlorodibenzofuran	SW8290D	NG/KG		ND [7.22]U	ND [6.92]U	ND [5.86]U	ND [4.82]U	0.18 [4.86] J
Total Heptachlorodibenzo-p-dioxins (HpCDD)	SW8290D	NG/KG		2.9 [3.61] J	2.98 [3.46] J	2.66 [2.93] J	2.75 [2.41]	1.64 [2.43] J
Total Heptachlorodibenzofurans (HpCDF)	SW8290D	NG/KG		0.287 [3.61] J	ND [3.46]U	0.377 [2.93] J	0.166 [2.41] J	ND [2.43]U
Total Hexachlorodibenzo-p-dioxins (HxCDD)	SW8290D	NG/KG		ND [3.61]U	0.396 [3.46] J	0.503 [2.93] J	ND [2.41]U	ND [2.43]U
Total Hexachlorodibenzofurans (HxCDF)	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
Total Pentachlorodibenzofurans (PeCDF)	SW8290D	NG/KG		ND [3.61]U	ND [3.46]U	ND [2.93]U	ND [2.41]U	ND [2.43]U
Total Tetrachlorodibenzo-p-dioxins (TCDD)	SW8290D	NG/KG		0.793 [1.44] J	0.675 [1.38] J	0.627 [1.17] J	0.891 [0.963] J	1.24 [0.972]
Total Tetrachlorodibenzofurans (TCDF)	SW8290D	NG/KG		4.78 [1.44]	4 [1.38]	3.21 [1.17]	0.679 [0.963] J	ND [0.972]U

[a] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code (ACC), Chapter 75.341, Table B1.

[b] Cleanup level etablished from 18 ACC 75.341, Table B1 (residential land use).

[c] Cleanup level etablished from 18 ACC 75.341, Table B1 (unrestricted land use).

[d] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD) only).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
Q - Data qualified as an estimate based on quality control failure
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
U - Indicates result is non-detect

Table B8 - Former Trench Area, Burn Pit Soil Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #4 (sample depth intervals: 2, 4, 6, 8 feet bgs)

			Location	**BP4-2**	**BP4-4**	**BP4-6**	**BP4-8**
			Sample ID	09WWBP19SO	09WWBP20SO	09WWBP21SO	09WWBP22SO
			Laboratory	CAS	CAS	CAS	CAS
			Lab Sample ID	K091142519	K091142520	K091142521	K091142522
			Collect Date	11/19/2009	11/19/2009	11/19/2009	11/19/2009
			Matrix	SO	SO	SO	SO
			Sample Type	Project	Project	Project	Project
Analyte	**Method**	**Units**	**Cleanup Level [a]**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Total Solids	E160.3M	Percent	**NA**	52.4 [0]	83.2 [0]	96.0 [0]	95.7 [0]
Lead	SW6020	MG/KG	**400 [b]**	4.390 [0.159]	6.690 [0.177]	4.170 [0.153]	3.180 [0.157]
PCB-1016 (Aroclor 1016)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1221 (Aroclor 1221)	SW8082	MG/KG		ND [0.20]U	ND [0.20]U	ND [0.20]U	ND [0.20]U
PCB-1232 (Aroclor 1232)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1242 (Aroclor 1242)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1248 (Aroclor 1248)	SW8082	MG/KG	**1 [c]**	ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1254 (Aroclor 1254)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1260 (Aroclor 1260)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1262 (Aroclor 1262)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
PCB-1268 (Aroclor 1268)	SW8082	MG/KG		ND [0.10]U	ND [0.099]U	ND [0.098]U	ND [0.099]U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.40]U,QL	1.76 [2.16] J	2.24 [2.43] J	0.779 [2.32] J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	0.156 [2.16] J	ND [2.43]U	ND [2.32]U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,4,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
1,2,3,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58 [d]**	ND [1.76]U,QL	ND [0.865]U	ND [0.973]U	ND [0.929]U
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG		ND [1.76]U,QL	ND [0.865]U	ND [0.973]U	ND [0.929]U
Octachlorodibenzo-p-dioxin	SW8290D	NG/KG		1.72 [8.81] B,J,QL	14.9 [4.32]	21.1 [4.86]	7.26 [4.65]
Octachlorodibenzofuran	SW8290D	NG/KG		ND [8.81]U,QL	0.32 [4.32] J	ND [4.86]U	ND [4.65]U
Total Heptachlorodibenzo-p-dioxins (HpCDD)	SW8290D	NG/KG		ND [4.40]U,QL	3.55 [2.16]	2.48 [2.43]	1.66 [2.32] J
Total Heptachlorodibenzofurans (HpCDF)	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
Total Hexachlorodibenzo-p-dioxins (HxCDD)	SW8290D	NG/KG		ND [4.40]U,QL	0.286 [2.16] J	ND [2.43]U	ND [2.32]U
Total Hexachlorodibenzofurans (HxCDF)	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	SW8290D	NG/KG		ND [4.40]U,QL	0.146 [2.16] J	ND [2.43]U	ND [2.32]U
Total Pentachlorodibenzofurans (PeCDF)	SW8290D	NG/KG		ND [4.40]U,QL	ND [2.16]U	ND [2.43]U	ND [2.32]U
Total Tetrachlorodibenzo-p-dioxins (TCDD)	SW8290D	NG/KG		3.21 [1.76]QL	2.59 [0.865]	0.758 [0.973] J	ND [0.929]U
Total Tetrachlorodibenzofurans (TCDF)	SW8290D	NG/KG		18.2 [1.76]QL	3.84 [0.865]	ND [0.973]U	ND [0.929]U

[a] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code (ACC), Chapter 75.341, Table B1.

[b] Cleanup level etablished from 18 ACC 75.341, Table B1 (residential land use).

[c] Cleanup level etablished from 18 ACC 75.341, Table B1 (unrestricted land use).

[d] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD) only).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
Q - Data qualified as an estimate based on quality control failure
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
U - Indicates result is non-detect

Table B8 - Former Trench Area, Burn Pit Soil Results
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #5 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	BP5-2	BP5-2A	BP5-4	BP5-6	BP5-8
Sample ID				09WWBP14SO	09WWBP15SO	09WWBP16SO	09WWBP17SO	09WWBP18SO
Laboratory				CAS	CAS	CAS	CAS	CAS
Lab Sample ID				K091142514	K091142515	K091142516	K091142517	K091142518
Collect Date				11/19/2009	11/19/2009	11/19/2009	11/19/2009	11/19/2009
Matrix				SO	SO	SO	SO	SO
Sample Type				Project	Field Duplicate	Project	Project	Project
Analyte	**Method**	**Units**		**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**	**Result[PQL]Qualifier**
Total Solids	E160.3M	Percent	**NA**	49.6 [0]	46.1 [0]	87.0 [0]	97.1 [0]	95.2 [0]
Lead	SW6020	MG/KG	**400** [b]	10.3 [0.137]	11.4 [0.148]	5.810 [0.171]	3.540 [0.151]	2.670 [0.158]
PCB-1016 (Aroclor 1016)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1221 (Aroclor 1221)	SW8082	MG/KG		ND [0.20]U	ND [0.22]U	ND [0.19]U	ND [0.20]U	ND [0.20]U
PCB-1232 (Aroclor 1232)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1242 (Aroclor 1242)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1248 (Aroclor 1248)	SW8082	MG/KG	**1** [c]	ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1254 (Aroclor 1254)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1260 (Aroclor 1260)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1262 (Aroclor 1262)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
PCB-1268 (Aroclor 1268)	SW8082	MG/KG		ND [0.10]U	ND [0.11]U	ND [0.094]U	ND [0.099]U	ND [0.098]U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	SW8290D	NG/KG		2.34 [4.93] J	6.63 [10.2] J	3.33 [2.70]	1.58 [2.45] J	0.233 [2.64] J,B
1,2,3,4,6,7,8-Heptachlorodibenzofuran	SW8290D	NG/KG		0.398 [4.93] J	1.06 [10.2] J	1.07 [2.70] J	ND [2.45]U	ND [2.64]U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,4,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	0.227 [10.2] J	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	0.14 [2.70] J	ND [2.45]U	ND [2.64]U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
1,2,3,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	0.29 [10.2] J	ND [2.70]U	ND [2.45]U	ND [2.64]U
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58** [d]	ND [1.97]U	ND [4.10]U	ND [1.08]U	ND [0.980]U	ND [1.05]U
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG		ND [1.97]U	ND [4.10]U	ND [1.08]U	ND [0.980]U	ND [1.05]U
Octachlorodibenzo-p-dioxin	SW8290D	NG/KG		15.2 [9.87] Q	75.7 [20.5]	24.2 [5.40]	9.42 [4.90]	1.28 [5.27] J,B
Octachlorodibenzofuran	SW8290D	NG/KG		ND [9.87]U	2.95 [20.5] J	0.257 [5.40] J	ND [4.90]U	ND [5.27]U
Total Heptachlorodibenzo-p-dioxins (HpCDD)	SW8290D	NG/KG		4.6 [4.93] J	12.5 [10.2]	5.42 [2.70]	2.87 [2.45]	0.333 [2.64] J,B
Total Heptachlorodibenzofurans (HpCDF)	SW8290D	NG/KG		0.658 [4.93] J	3.48 [10.2] J	ND [2.70]U	ND [2.45]U	ND [2.64]U
Total Hexachlorodibenzo-p-dioxins (HxCDD)	SW8290D	NG/KG		ND [4.93]U	0.594 [10.2] J	1.2 [2.70] J	ND [2.45]U	0.529 [2.64] J
Total Hexachlorodibenzofurans (HxCDF)	SW8290D	NG/KG		ND [4.93]U	0.4 [10.2] J	ND [2.70]U	ND [2.45]U	ND [2.64]U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
Total Pentachlorodibenzofurans (PeCDF)	SW8290D	NG/KG		ND [4.93]U	ND [10.2]U	ND [2.70]U	ND [2.45]U	ND [2.64]U
Total Tetrachlorodibenzo-p-dioxins (TCDD)	SW8290D	NG/KG		1.85 [1.97] J	3.39 [4.10] J	1.04 [1.08] J	1.31 [0.980]	ND [1.05]U
Total Tetrachlorodibenzofurans (TCDF)	SW8290D	NG/KG		5.82 [1.97]	7.64 [4.10]	3.01 [1.08]	ND [0.980]U	ND [1.05]U

[a] Cleanup level etablished from ADEC Title 18, Alaska Administrative Code (ACC), Chapter 75.341, Table B1.

[b] Cleanup level etablished from 18 ACC 75.341, Table B1 (residential land use).

[c] Cleanup level etablished from 18 ACC 75.341, Table B1 (unrestricted land use).

[d] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD) only).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
NA - Not applicable
ND - Not detected
PQL - Practical quantitation limit
Q - Data qualified as an estimate based on quality control failure
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
U - Indicates result is non-detect

Table B9 - Soil Dioxin/Furan TEQ Concentrations
Former Tench Area Burn Pit
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #2 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	TEF	BP2-2			BP2-4			BP2-6			BP2-8		
Sample ID					09WWBP05SO			09WWBP06SO			09WWBP07SO			09WWBP08SO		
Laboratory					CAS			CAS			CAS			CAS		
Lab Sample ID					K091142505			K091142506			K091142507			K091142508		
Collect Date					11/19/2009			11/19/2009			11/19/2009			11/19/2009		
Matrix					SO			SO			SO			SO		
Sample Type					Project			Project			Project			Project		
Analyte	**Method**	**Units**			**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	SW8290D	NG/KG		0.01	0.668	0.00668	J,B	0.779	0.00779	J,B	0.726	0.00726	J,B	0.364	0.00364	J,B
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	SW8290D	NG/KG		0.01	ND			0.299	0.00299	J	0.191	0.00191	J	0.118	0.00118	J
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	SW8290D	NG/KG		0.03	ND			ND			ND			ND		
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58**		ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
Octachlorodibenzo-p-dioxin (OCDD)	SW8290D	NG/KG		0.0003	4.21	0.001263	J,B	4.83	0.001449	J	4.38	0.001314	J,B	1.79	0.000537	J,B
Octachlorodibenzofuran (OCDF)	SW8290D	NG/KG		0.0003	0.354	0.0001062	J	ND			ND			0.285	0.0000855	J
TOTAL TEQ		**NG/KG**				**0.008**			**0.012**			**0.010**			**0.005**	

[a] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD)).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
NG/KG - Nanograms per kilogram
ND - Not detected
TEF - Toxicity equivalency factor (2005 WHO TEFs)
TEQ - Toxicity equivalence, where TEQ = Σ(Ci * TEFi)
Q - Data qualified as an estimate based on quality control failure
Qual - Qualifier
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
WHO - World Health Organization

Table B9 - Soil Dioxin/Furan TEQ Concentrations
Former Tench Area Burn Pit
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #3 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	TEF	BP3-2			BP3-4			BP3-6			BP3-8		
Sample ID					09WWBP09SO			09WWBP11SO			09WWBP12SO			09WWBP13SO		
Laboratory					CAS			CAS			CAS			CAS		
Lab Sample ID					K091142509			K091142511			K091142512			K091142513		
Collect Date					11/19/2009			11/19/2009			11/19/2009			11/19/2009		
Matrix					SO			SO			SO			SO		
Sample Type					Project			Project			Project			Project		
Analyte	**Method**	**Units**			**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	SW8290D	NG/KG		0.01	1.49	0.0149	J	1.52	0.0152	J	1.36	0.0136	J	0.828	0.00828	J,B
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	SW8290D	NG/KG		0.01	0.239	0.00239	J	0.377	0.00377	J	ND			ND		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	SW8290D	NG/KG		0.03	ND			ND			ND			ND		
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58**		ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
Octachlorodibenzo-p-dioxin (OCDD)	SW8290D	NG/KG		0.0003	9.79	0.002937		9.31	0.002793		10.7	0.00321		6.41	0.001923	
Octachlorodibenzofuran (OCDF)	SW8290D	NG/KG		0.0003	ND			ND			ND			0.18	0.000054	J
TOTAL TEQ		**NG/KG**				**0.020**			**0.022**			**0.017**			**0.010**	

[a] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD)).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
NG/KG - Nanograms per kilogram
ND - Not detected
TEF - Toxicity equivalency factor (2005 WHO TEFs)
TEQ - Toxicity equivalence, where TEQ = Σ(Ci * TEFi)
Q - Data qualified as an estimate based on quality control failure
Qual - Qualifier
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
WHO - World Health Organization

Table B9 - Soil Dioxin/Furan TEQ Concentrations
Former Tench Area Burn Pit
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #4 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	TEF	BP4-2			BP4-4			BP4-6			BP4-8		
Sample ID					09WWBP19SO			09WWBP20SO			09WWBP21SO			09WWBP22SO		
Laboratory					CAS			CAS			CAS			CAS		
Lab Sample ID					K091142519			K091142520			K091142521			K091142522		
Collect Date					11/19/2009			11/19/2009			11/19/2009			11/19/2009		
Matrix					SO			SO			SO			SO		
Sample Type					Project			Project			Project			Project		
Analyte	**Method**	**Units**			**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	SW8290D	NG/KG		0.01	ND			1.76	0.0176	J	2.24	0.0224	J	0.779	0.00779	J
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	SW8290D	NG/KG		0.01	ND			0.156	0.00156	J	ND			ND		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	SW8290D	NG/KG		0.03	ND			ND			ND			ND		
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58**		ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
Octachlorodibenzo-p-dioxin (OCDD)	SW8290D	NG/KG		0.0003	1.72	0.000516	J,B,QL	14.9	0.00447		21.1	0.00633		7.26	0.002178	
Octachlorodibenzofuran (OCDF)	SW8290D	NG/KG		0.0003	ND			0.32	0.000096	J	ND			ND		
TOTAL TEQ		**NG/KG**				**0.001**			**0.024**			**0.029**			**0.010**	

[a] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD)).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
NG/KG - Nanograms per kilogram
ND - Not detected
TEF - Toxicity equivalency factor (2005 WHO TEFs)
TEQ - Toxicity equivalence, where TEQ = Σ(Ci * TEFi)
Q - Data qualified as an estimate based on quality control failure
Qual - Qualifier
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
WHO - World Health Organization

Table B9 - Soil Dioxin/Furan TEQ Concentrations
Former Tench Area Burn Pit
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

SOIL BORING #5 (sample depth intervals: 2, 4, 6, 8 feet bgs)

Location			Cleanup Level [a]	TEF	BP5-2			BP5-4			BP5-6			BP5-8		
Sample ID					09WWBP14SO			09WWBP16SO			09WWBP17SO			09WWBP18SO		
Laboratory					CAS			CAS			CAS			CAS		
Lab Sample ID					K091142514			K091142516			K091142517			K091142518		
Collect Date					11/19/2009			11/19/2009			11/19/2009			11/19/2009		
Matrix					SO			SO			SO			SO		
Sample Type					Project			Project			Project			Project		
Analyte	**Method**	**Units**			**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**	**Result**	**TEF-Adjusted Result**	**Qual**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	SW8290D	NG/KG		0.01	2.34	0.0234	J	3.33	0.0333		1.58	0.0158	J	0.233	0.00233	J,B
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	SW8290D	NG/KG		0.01	0.398	0.00398	J	1.07	0.0107	J	ND			ND		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	SW8290D	NG/KG		0.1	ND			0.14	0.014	J	ND			ND		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8,9-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	SW8290D	NG/KG			ND			ND			ND			ND		
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	SW8290D	NG/KG		0.03	ND			ND			ND			ND		
2,3,4,6,7,8-Hexachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,4,7,8-Pentachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	SW8290D	NG/KG	**58**		ND			ND			ND			ND		
2,3,7,8-Tetrachlorodibenzofuran	SW8290D	NG/KG			ND			ND			ND			ND		
Octachlorodibenzo-p-dioxin (OCDD)	SW8290D	NG/KG		0.0003	15.2	0.00456	Q	24.2	0.00726		9.42	0.002826		1.28	0.000384	J,B
Octachlorodibenzofuran (OCDF)	SW8290D	NG/KG		0.0003	ND			0.257	0.0000771	J	ND			ND		
TOTAL TEQ		**NG/KG**				**0.032**			**0.065**			**0.019**			**0.003**	

[a] Cleanup level etablished from 18 ACC 75.341, Table B1 (for 2,3,7,8-Tetrachlorordibenzo-p-Dioxin (TCDD)).

B - Possible cross-contaminant based on blank sample
bgs - below ground surface
CAS - Columbia Analytical Services
J - Result is an estimation because it is less than the PQL
NG/KG - Nanograms per kilogram
ND - Not detected
TEF - Toxicity equivalency factor (2005 WHO TEFs)
TEQ - Toxicity equivalence, where TEQ = Σ(Ci * TEFi)
Q - Data qualified as an estimate based on quality control failure
Qual - Qualifier
QL - Data qualified as a low estimate based on quality control failure
SO - Soil matrix
WHO - World Health Organization

APPENDIX C

GROUNDWATER SAMPLE FORMS

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/21/09 | **Probe/Well #:** QH - MW1

Time: 1215 | **Sample ID:** 09WWD15WG

Sampler: CB

Weather: PT CLOUDY | **Outside Temperature:** 40°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/(No)**

Purge Method: (Peristaltic Pump)/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump)/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GEO.

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.65

Depth to Water from TOC (feet): - 14.02

Column of Water in Probe/Well (feet): = 5.63

Volume to be Purged

Column of Water in Probe/Well (feet): X 5.63

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .4 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	3.91	0.119	1.35	6.23	8.2	33.3	14.05
1	20	3.81	0.115	1.21	6.37	10.9	35.6	↓
1.25	25	3.85	0.116	1.15	6.42	14.7	30.9	
1.5	30	3.79	0.113	1.10	6.50	14.5	28.5	
1.75	35	3.81	0.112	1.09	6.55	13.9	30.7	
2	40	3.78	0.113	1.08	6.57	14.1	31.1	↓

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/(N) Labeled (AP-XXXX) Y/(N) **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 16.8 feet below Top of Casing

Sheen: Yes/(No) **Odor: Yes/(No)** **Notes/Comments:** SCREENED 7'-17'.

Laboratory Analyses (Circle): VOC, SVOC, (GRO), (DRO), (Fe/Mn), SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 4

Surface Discharge thru GAC Filter? (Yes)/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11.21.09 | **Probe/Well #:** QH-MW2

Time: 1240 | **Sample ID:** 09WWD ~~15~~ 17 WG

Sampler: VR

Weather: Overcast | **Outside Temperature:** 2°F

QA/QC Sample ID/Time/LOCID: 09WWD18WG / 1310 / QH-MW5 | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TTT Rental

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:** | Screened @ 7'-17'

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.52

Depth to Water from TOC (feet): - 14.08

Column of Water in Probe/Well (feet): = 5.44

Volume to be Purged

Column of Water in Probe/Well (feet): X 5.44

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = ~0.3 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
2.0	30	4.22	0.089	2.02	5.47	-209.9	79.9	14.10
2.25	35	3.80	0.090	0.98	5.59	-243.4	59.8	14.10
2.50	40	3.58	0.090	0.94	5.60	-218.3	45.8	14.10
2.75	45	3.65	0.090	0.96	5.59	-190.3	40.2	14.10
3.0	50	3.32	0.091	0.99	5.61	-186.8	31.2	14.10
3.25	55	3.35	0.091	0.98	5.61	-189.3	29.5	14.10

Did groundwater parameters stabilize? Yes/No **If no, why not?** Turbidity. Temp well, not developed or sand-packed

Did drawdown stabilize? Yes/No **If no, why not?**

Was flowrate between 0.03 and 0.15 GPM? Yes/No **If no, why not?**

Water Color: Clear | Yellow | Orange | Brown/Black (Sand/Silt) | Other: slightly cloudy

Well Condition: Lock Y/N | Labeled (AP-XXXX) Y/N **Comments:** Temporary Well

Tubing Set at (middle of wetted casing volume): Approx. ~17' feet below Top of Casing

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:**

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 3.25 | Surface Discharge thru GAC Filter? Yes/No | If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11.21.09 | **Probe/Well #:** QH-MW3

Time: 1100 | **Sample ID:** 09WWD 14 WG

Sampler: VR

Weather: overcast, cold | **Outside Temperature:** 2°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/(No)**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TT Rented

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

screened ~~5'-15'~~ 5'-15'

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): ~~13.80~~ 16.73

Depth to Water from TOC (feet): - 13.45

Column of Water in Probe/Well (feet): = 3.28

Volume to be Purged

Column of Water in Probe/Well (feet): X 3.28

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = ~0.2 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	4.03	0.091	3.0	5.57	59.9	—	13.48
1.0	20	3.00	0.091	1.23	5.44	72.6	5.53	13.48
1.25	25	2.89	0.093	1.00	5.40	67.3	3.45	13.48
1.5	30	3.01	0.093	1.11	5.41	65.7	2.66	13.48
1.75	35	2.94	0.093	1.24	5.36	69.7	2.29	13.48
2.0	40	3.04	0.093	1.29	5.36	61.4	2.37	13.48
			~~0.093~~					

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/(N) Labeled (AP-XXXX) Y/N **Comments:** Removed 3 casing volumes to clear up

Tubing Set at (middle of wetted casing volume): Approx. ~15' feet below Top of Casing

Sheen: Yes/(No) **Odor: Yes/(No)** **Notes/Comments:** Temporary well. Decommission after sampling

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 2.0 Surface Discharge thru GAC Filter? Yes/(No) If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/21/09 | **Probe/Well #:** QH-MW4

Time: 1050 | **Sample ID:** 09WWD16 WG

Sampler: CB

Weather: PT CLOUDY | **Outside Temperature:** 4 °F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/(No)**

Purge Method: (Peristaltic Pump/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** ~~FEET~~ GEO.

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): ~~16.60~~ 19.63

Depth to Water from TOC (feet): - ~~10.74~~ 13.2

Column of Water in Probe/Well (feet): = 6.43

Volume to be Purged

Column of Water in Probe/Well (feet): X 6.43

Circle: Gallons per foot of 1.25" (X 0.06) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = 1.4+ (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	3.08	0.130	1.45	6.41	35.5	33.6	13.23
1	20	3.05	0.130	1.35	6.41	34.7	28.9	
1.25	25	3.03	0.129	1.21	6.42	34.5	25.2	
1.5	30	3.01	0.130	1.23	6.45	34.1	17.17	
1.75	35	3.04	0.131	1.22	6.47	33.2	20.5	
2	40	3.00	0.130	1.20	6.48	33.5	20.5	

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/(N) Labeled (AP-XXXX) Y/(N) **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 16.4 feet below Top of Casing INITIAL TURB = 585

Sheen: Yes/(No) **Odor: Yes/(No)** **Notes/Comments:** REMOVED 2 GALLONS THRU GAC PRIOR TO TAKING PARAMETERS.

Laboratory Analyses (Circle): VOC, SVOC, (GRO) (DRO) Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

SCREEN 7-17

Purge Water

Gallons generated: 4 | Surface Discharge thru GAC Filter? (Yes)/No | If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/22/09 | **Probe/Well #:** LF - MW1

Time: 1000 | **Sample ID:** 09WWD29WG

Sampler: CB

Weather: OVERCAST + WIND | **Outside Temperature:** 25°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GEO.

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.80

Depth to Water from TOC (feet): - 14.19

Column of Water in Probe/Well (feet): = 5.61

Volume to be Purged

Column of Water in Probe/Well (feet): X 5.61

Circle: Gallons per foot of 1.25" (X 0.06) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .4+ (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	4.99	0.348	1.41	5.79	-3.9	70.5	14.23
1	20	4.90	0.345	1.26	5.83	-2.6	73.5	
1.25	25	4.95	0.340	1.16	5.87	-1.1	65.8	
1.5	30	4.91	0.338	1.11	5.90	1.7	62.9	
1.75	35	4.89	0.338	1.11	5.91	1.9	05.6	↓
2	40	4.88	0.336	1.10	5.94	2.0	68.7	14.24

Did groundwater parameters stabilize? Yes/No If no, why not?

Did drawdown stabilize? Yes/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 17 feet below Top of Casing

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:** SCREENED 7-17' BGS.

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 5 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/22/09 | **Probe/Well #:** LF-MW2

Time: 1140 | **Sample ID:** 09WWD30WG

Sampler: CB

Weather: OVERCAST | **Outside Temperature:** 25 °F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/(No)**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** a LEO.

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.71

Depth to Water from TOC (feet): - 11.31

Column of Water in Probe/Well (feet): = 8.4

Volume to be Purged

Column of Water in Probe/Well (feet): X 8.4

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .54 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	3.07	0.202	1.62	6.53	20.3	40.9	11.36
1	20	3.05	0.202	1.50	6.60	10.4	35.6	|
1.25	25	3.08	0.201	1.25	6.65	8.9	38.5	|
1.5	30	3.02	0.200	1.13	6.72	5.8	40.7	|
1.75	35	3.05	0.201	1.05	6.75	4.9	35.6	|
2	40	2.97	0.201	1.07	6.75	4.5	34.9	|
2.25	45	3.02	0.201	1.06	6.76	3.7	32.7	↓

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/(N) Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 15.5 feet below Top of Casing

Sheen: Yes/(No) **Odor: Yes/(No)** **Notes/Comments:** SCREENED 9-19' BGS

Laboratory Analyses (Circle): (VOC) SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 5 Surface Discharge thru GAC Filter? (Yes)/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 1-22-09 | **Probe/Well #:** TA-MW1

Time: 1545 | **Sample ID:** 09WWD 28 WG

Sampler: VR

Weather: overcast, cold | **Outside Temperature:** 18°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TTI Rental

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.68

Depth to Water from TOC (feet): - 12.14

Column of Water in Probe/Well (feet): = 6.54

Volume to be Purged

Column of Water in Probe/Well (feet): x 6.54

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = ~0.4 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
1	30	4.97	0.095	1.23	5.85	-42.5	13.16	12.16
1.25	35	4.65	0.095	1.18	5.81	-40.6	56.2	12.16
1.5	40	4.55	0.093	1.14	5.78	-39.6	18.92	12.16
1.75	45	4.61	0.093	0.95	5.87	-39.9	10.58	12.16
2	50	4.66	0.093	0.95	5.81	-39.7	9.73	12.16

Did groundwater parameters stabilize? Yes/No If no, why not? Turbidity. Temporary Well - Not developed

Did drawdown stabilize? Yes/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:** Temp. Well

Tubing Set at (middle of wetted casing volume): Approx. ~15' feet below Top of Casing

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:** screened 7'-17' bgs

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 2.0 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/22/09 | **Probe/Well #:** TA-MW2

Time: 1450 | **Sample ID:** 09WWD ~~26~~ 27 WG

Sampler: CB

Weather: OVERCAST | **Outside Temperature:** 27 °F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed?** Yes (No)

Purge Method: (Peristaltic Pump)/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump)/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GED.

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.00

Depth to Water from TOC (feet): - 12.94

Column of Water in Probe/Well (feet): = 6.06

Volume to be Purged

Column of Water in Probe/Well (feet): X 6.06

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .4+ (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	5.13	0.075	1.95	7.27	26.9	46.5	13.00
1	20	5.05	0.74	1.41	7.30	21.5	50.9	↓
1.25	25	5.01	0.74	1.21	7.30	20.8	41.8	
1.5	30	4.92	0.073	1.06	7.32	19.6	40.7	
1.75	35	5.03	0.072	0.95	7.33	22.8	37.6	
2	40	5.05	0.072	0.92	7.33	23.0	35.9	
2.25	45	5.02	0.070	0.94	7.32	23.5	37.8	↓

Did groundwater parameters stabilize? (Yes)/No **If no, why not?**

Did drawdown stabilize? (Yes)/No **If no, why not?**

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No **If no, why not?**

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/(N) Labeled (AP-XXXX) (Y)/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 16 feet below Top of Casing

Sheen: Yes/(No) **Odor: Yes/(No)** **Notes/Comments:**

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 3.75 Surface Discharge thru GAC Filter? (Yes)/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11-22-09 | **Probe/Well #:** TA-MW3

Time: 1425 | **Sample ID:** 09WWD 26 WG

Sampler: VR

Weather: Overcast | **Outside Temperature:** 20°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: (Peristaltic Pump)/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump)/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TTT Rental

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.55

Depth to Water from TOC (feet): - 11.46

Column of Water in Probe/Well (feet): = 7.09

Volume to be Purged

Column of Water in Probe/Well (feet): X 7.09

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = 1.2 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
1	30	5.10	0.068	0.75	5.75	-12.6	138	11.48
1.25	35	4.57	0.069	0.84	5.78	-12.8	57.4	11.48
1.5	40	4.52	0.069	0.72	5.78	-19.3	51.6	11.48
1.75	45	4.52	0.069	0.68	5.76	-20.3	24.1	11.48
2.0	50	4.51	0.069	0.74	5.76	-23.5	15.91	11.48
2.25	55	4.47	0.068	0.57	5.75	-25.8	9.39	11.48
2.5	60	4.42	0.068	0.53	5.74	-26.8	9.46	11.48
~~3.0~~ 2.75	65	4.41	0.068	0.52	5.74	-26.9	9.35	11.48

Did groundwater parameters stabilize? Yes/No | **If no, why not?**

Did drawdown stabilize? Yes/No | **If no, why not?**

Was flowrate between 0.03 and 0.15 GPM? Yes/No | **If no, why not?**

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y(N) Labeled (AP-XXXX) Y/N | **Comments:** Temporary well

Tubing Set at (middle of wetted casing volume): Approx. ~14' feet below Top of Casing

Sheen: Yes/(No) | **Odor: Yes/(No)** | **Notes/Comments:** screened 7'-17'

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 275 | Surface Discharge thru GAC Filter? Yes/(No) | If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11-22-09 | **Probe/Well #:** TA-MW4

Time: 1210 | **Sample ID:** 09WWD 25WG

Sampler: VR

Weather: overcast | **Outside Temperature:** 22°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/(No)**

Purge Method: (Peristaltic Pump)/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump)/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TTT Rental

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.50

Depth to Water from TOC (feet): - 11.06

Column of Water in Probe/Well (feet): = 7.44

Volume to be Purged

Column of Water in Probe/Well (feet): X 7.44

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = ~0.5 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
2.0	30	4.52	0.069	0.80	5.70	-41.0	16.16	11.08
2.25	35	3.98	0.070	0.91	5.71	-38.9	8.47	11.08
2.5	40	3.99	0.070	0.87	5.71	-38.3	6.26	11.08
2.75	45	3.98	0.070	0.74	5.70	-37.3	6.52	11.08
3.0	50	3.95	0.070	0.71	5.70	-37.1	6.37	11.08

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear | Yellow | Orange | ~~Brown/Black (Sand/Silt)~~ | Other:

Well Condition: Lock Y/(N) | Labeled (AP-XXXX) Y/(N) | **Comments:** TEMPORARY WELL

Tubing Set at (middle of wetted casing volume): Approx. ~14' feet below Top of Casing

Sheen: Yes/(No) | **Odor: Yes/(No)** | **Notes/Comments:** screened 7'-17'

Laboratory Analyses (Circle): VOC, SVOC, (GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4)

Purge Water

Gallons generated: 3.0 | Surface Discharge thru GAC Filter? Yes/(No) | If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/20/09 | **Probe/Well #:** DSA-MW5

Time: 1415 | **Sample ID:** 09WWD13WG

Sampler: CB

Weather: CLEAR | **Outside Temperature:** 1 °F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 4 | **Water Level:** GED.

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 16.60

Depth to Water from TOC (feet): - 10.74

Column of Water in Probe/Well (feet): = 5.86

Volume to be Purged

Column of Water in Probe/Well (feet): X 5.86

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .4+ (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
.75	15	3.79	0.071	1.55	5.65	32.5	8.89	10.80
1	20	3.55	0.071	1.40	5.32	30.1	5.59	↓
1.25	25	3.20	0.070	1.32	5.30	25.9	5.51	
1.5	30	3.11	0.070	1.37	5.25	20.2	6.09	
1.75	35	3.52	0.070	1.37	5.25	20.7	6.48	
2	40	3.60	0.069	1.35	5.26	19.1	7.26	↓

Did groundwater parameters stabilize? Yes/No If no, why not?

Did drawdown stabilize? Yes/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 13 feet below Top of Casing

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:**

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 4 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11.21.09 | **Probe/Well #:** DSA-MW6

Time: 1515 | **Sample ID:** 09WWD 19 WG

Sampler: VR

Weather: partly cloudy | **Outside Temperature:** 18°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed?** Yes/No

Purge Method: (Peristaltic Pump/ Bail/ Submersible) | **Sample Method:** (Peristaltic Pump/ Bail/ Submersible)

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** TTT Rental

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 19.65

Depth to Water from TOC (feet): - 10.42

Column of Water in Probe/Well (feet): = 9.23

Volume to be Purged

Column of Water in Probe/Well (feet): X 9.23

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): =~0.5 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
2.0	30	3.83	0.054	3.07	5.54	-118.1	59.16	10.45
2.85	35	3.31	0.056	2.17	5.69	-139.7	43.2	10.45
2.5	40	3.07	0.057	2.25	5.67	-133.0	39.6	10.45
3.75	45	3.06	0.057	2.15	5.68	-138.5	37.1	10.45
3.0	50	3.02	0.057	2.05	5.68	-141.6	39.5	10.45

Did groundwater parameters stabilize? Yes/No **If no, why not?**

Did drawdown stabilize? Yes/No **If no, why not?**

Was flowrate between 0.03 and 0.15 GPM? Yes/No **If no, why not?**

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. ~15' feet below Top of Casing

Sheen: Yes/No **Odor:** Yes/No **Notes/Comments:** Temporary Well

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 3.0 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11-22-09 | **Probe/Well #:** DSA-MW7

Time: 1015 | **Sample ID:** 09WWD 20 WG

Sampler: VR

Weather: overcast | **Outside Temperature:** 20°F

QA/QC Sample ID/Time/LOCID: 09WWD21WG / 1045 / DSA-MW11 | **MS/MSD Performed? Yes/(No)**

Purge Method: (Peristaltic Pump/ Bail/ Submersible | **Sample Method:** (Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 6 | **Turbidity Meter #:** 5 | **Water Level:** III rental

Free Product Observed in Probe/Well? Yes/(No) | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.90

Depth to Water from TOC (feet): - 10.28

Column of Water in Probe/Well (feet): = 8.62

Volume to be Purged

Column of Water in Probe/Well (feet): X 8.62

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = ~0.5 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		1 Degree	3%	10%	0.1 Units	10 Millivolts	10%	0.33 Feet
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
2.0	30	3.98	0.057	2.67	6.42	-16.3	35.1	10.30
2.25	35	3.68	0.055	2.31	6.01	-35.7	28.6	10.30
2.50	40	3.65	0.055	2.29	5.98	-44.1	38.4	10.30
2.75	45	3.62	0.055	2.22	5.94	-48.9	35.6	10.30
3.0	50	3.60	0.055	2.14	5.88	-52.0	30.2	10.30
3.25	55	3.58	0.056	2.27	5.81	-52.9	32.9	10.30

Did groundwater parameters stabilize? (Yes)/No If no, why not?

Did drawdown stabilize? (Yes)/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: Clear | Yellow | Orange | (Brown/Black (Sand/Silt) | Other:

Well Condition: Lock Y/(N) | Labeled (AP-XXXX) Y/N | **Comments:** Temporary well

Tubing Set at (middle of wetted casing volume): Approx. ~14' feet below Top of Casing

Sheen: Yes/(No) | **Odor: Yes/(No)** | **Notes/Comments:** screened 7'-17'

Laboratory Analyses (Circle): (VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4)

Purge Water

Gallons generated: 3.25 | Surface Discharge thru GAC Filter? (Yes)/No | If No, why not?

Sampler's Initials: VR

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/21/09 | **Probe/Well #:** AST - MW8

Time: 1620 | **Sample ID:** 09WWD23WG

Sampler: CB

Weather: PT CLOUDY | **Outside Temperature:** 20°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GEO.

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.75

Depth to Water from TOC (feet): - 10.33

Column of Water in Probe/Well (feet): = 8.42

Volume to be Purged

Column of Water in Probe/Well (feet): X 8.42

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .54 (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	4.39	0.075	1.36	6.50	14.4	37.9	10.36
1	20	4.30	0.075	1.20	6.55	14.7	35.6	↓
1.25	25	4.31	0.075	1.04	6.58	15.9	27.9	↓
1.5	30	4.35	0.074	0.95	6.60	15.5	25.2	↓
1.75	35	4.29	0.074	0.92	6.61	15.2	24.1	↓
2	40	4.27	0.073	0.93	6.60	15.7	20.7	↓

Did groundwater parameters stabilize? Yes/No If no, why not?

Did drawdown stabilize? Yes/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 14.5 feet below Top of Casing.

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:**

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 4 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/21/09 | **Probe/Well #:** AST - MW89

Time: 1505 | **Sample ID:** 09WWD22WG

Sampler: CB

Weather: PT CLOUDY | **Outside Temperature:** 20°F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GEO.

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.75

Depth to Water from TOC (feet): - 10.35

Column of Water in Probe/Well (feet): = 8.40

Volume to be Purged

Column of Water in Probe/Well (feet): X 8.40

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = .5+ (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	5.05	0.085	1.57	6.40	1.1	49.3	10.38
1	20	5.09	0.084	1.21	6.31	2.7	40.6	↓
1.25	25	5.12	0.080	1.17	6.28	2.9	35.4	
1.5	30	5.05	0.081	1.13	6.25	3.5	32.8	
1.75	35	5.14	0.080	1.09	6.22	3.4	31.7	

Did groundwater parameters stabilize? Yes/No | **If no, why not?**

Did drawdown stabilize? Yes/No | **If no, why not?**

Was flowrate between 0.03 and 0.15 GPM? Yes/No | **If no, why not?**

Water Color: Clear | Yellow | Orange | Brown/Black (Sand/Silt) | Other:

Well Condition: Lock Y/N | Labeled (AP-XXXX) Y/N | **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 14.6 feet below Top of Casing

Sheen: Yes/No | **Odor: Yes/No** | **Notes/Comments:** SCREENED 7-17

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 3.75 | Surface Discharge thru GAC Filter? Yes/No | If No, why not?

Sampler's Initials: CB

Groundwater Sample Form | **Wildwood** | **Kenai, Alaska**

Project #: 5004-10 | **Site Location:** Wildwood - Non-Tank Farm Sites

Date: 11/22/09 | **Probe/Well #:** AST-MW10

Time: 1335 | **Sample ID:** 09WWD 24 WG

Sampler: CB

Weather: OVERCAST + WIND | **Outside Temperature:** 27 · F

QA/QC Sample ID/Time/LOCID: | **MS/MSD Performed? Yes/ No**

Purge Method: Peristaltic Pump/ Bail/ Submersible | **Sample Method:** Peristaltic Pump/ Bail/ Submersible

Equipment Used for Sampling: YSI # 5 | **Turbidity Meter #:** 4 | **Water Level:** GEO.

Free Product Observed in Probe/Well? Yes/No | **If Yes, Depth to Product:**

Column of Water in Probe/Well

Total Depth in Probe/Well (feet): 18.60

Depth to Water from TOC (feet): - 10.26

Column of Water in Probe/Well (feet): = 8.34

Volume to be Purged

Column of Water in Probe/Well (feet): X 8.34

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.17) or 4" (X 0.65)

Min. Volume of Water in Probe/Well Casing (gal): = (1 Casing Vol)

Remove at least 1 casing volume while micropurging well/probe at a rate of 0.03 to 0.15 GPM

Field Parameters		**1 Degree**	**3%**	**10%**	**0.1 Units**	**10 Millivolts**	**10%**	**0.33 Feet**
Gallons Removed	Minutes Purged	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential	Turbidity (NTU)	Water Level
0.75	15	4.77	0.064	1.72	7.18	6.7	60.9	10.29
1	20	4.70	0.65	1.72	7.20	4.0	56.5	↓
1.25	25	4.67	0.65	1.72	7.21	3.5	52.9	↓
1.5	30	4.64	0.065	1.72	7.21	3.7	50.1	↓

Did groundwater parameters stabilize? Yes/No If no, why not?

Did drawdown stabilize? Yes/No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock Y/N Labeled (AP-XXXX) Y/N **Comments:**

Tubing Set at (middle of wetted casing volume): Approx. 14.4 feet below Top of Casing

Sheen: Yes/No **Odor: Yes/No** **Notes/Comments:** SCREENED 7-17 BGS.

Laboratory Analyses (Circle): VOC, SVOC, GRO, DRO, Fe/Mn, SO4/Cl, NO3/NO2, TKN, CH4

Purge Water

Gallons generated: 5 Surface Discharge thru GAC Filter? Yes/No If No, why not?

Sampler's Initials: CB

APPENDIX D

ADEC CSM FORMS

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: Former Wildwood Air Force Station
Operations Building Facility, AST Area

Completed By: Fairbanks Environmental Services
Date Completed: March 25, 2010

Follow the directions below. Do not consider engineering or land use controls when describing pathways.

(1)
Check the media that could be directly affected by the release.

(2)
For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Briefly list other mechanisms or reference the report for details.

(3)
Check exposure media identified in (2).

(4)
Check exposure pathways that are complete or need further evaluation. The pathways identified must agree with Sections 2 and 3 of the CSM Scoping Form.

(5)
Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.

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

Revised 3/21/06

Human Health Conceptual Site Model
Scoping Form

Site Name: Former Wildwood Air Force Station

File Number:

Completed by: Fairbanks Environmental Services

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, a CSM graphic and text must be submitted with the site characterization work plan.

General Instructions: Follow the italicized instructions in each section below.

1. *General Information:*

Sources *(check potential sources at the site)*

- ☐ USTs
- ☑ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other: _____

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☑ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other: _____

Impacted Media *(check potentially-impacted media at the site)*

- ☑ Surface soil (0-2 feet bgs*)
- ☑ Subsurface Soil (>2 feet bgs)
- ☑ Air
- ☑ Groundwater
- ☐ Surface water
- ☐ Other: _____

Receptors (*check receptors that could be affected by contamination at the site)*

- ☐ Residents (adult or child)
- ☐ Commercial or industrial worker
- ☑ Construction worker
- ☐ Subsistence harvester (i.e., gathers wild foods)
- ☐ Subsistence consumer (i.e., eats wild foods)
- ☑ Site visitor
- ☑ Trespasser
- ☑ Recreational user
- ☐ Farmer
- ☐ Other: _____

* bgs – below ground surface

2. *Exposure Pathways:* *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact –

1 Incidental Soil Ingestion

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

If both boxes are checked, label this pathway complete: Complete

2 Dermal Absorption of Contaminants from Soil

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Can the soil contaminants permeate the skin? (Contaminants listed below, or within the groups listed below, should be evaluated for dermal absorption). ☑

Arsenic	Lindane
Cadmium	PAHs
Chlordane	Pentachlorophenol
2,4-dichlorophenoxyacetic acid	PCBs
Dioxins	SVOCs
DDT	

If all of the boxes are checked, label this pathway complete: Complete

b) Ingestion –

1 Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, OR are contaminants expected to migrate to groundwater in the future? ☑

Could the potentially affected groundwater be used as a current or future drinking water source? *Please note, only leave the box unchecked if ADEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.* ☑

If both the boxes are checked, label this pathway complete: Complete

2 Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water OR are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? *Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).* ☐

If both boxes are checked, label this pathway complete: _____

3 Ingestion of Wild Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild food? ☑

Do the site contaminants have the potential to bioaccumulate (*see* Appendix A)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. the top 6 feet of soil, in groundwater that **could be** connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: _____

c) Inhalation

1 Inhalation of Outdoor Air

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Are the contaminants in soil volatile (*See Appendix B*)? ☑

If all of the boxes are checked, label this pathway complete: Complete

2 Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be placed on the site in an area that could be affected by contaminant vapors? (i.e., within 100 feet, horizontally or vertically, of the contaminated soil or groundwater, or subject to "preferential pathways" that promote easy airflow, like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (*See Appendix C*)? ☐

If both boxes are checked, label this pathway complete: _____

3. Additional Exposure Pathways: *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- Climate permits recreational use of waters for swimming,
- Climate permits exposure to groundwater during activities, such as construction, without protective clothing, or
- Groundwater or surface water is used for household purposes.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Household Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- The contaminated water is used for household purposes such as showering, laundering, and dish washing, and
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix B)

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Generally DEC soil ingestion cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway, although this is not true in the case of chromium. Examples of conditions that may warrant further investigation include:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers. This size can be inhaled and would be of concern for determining if this pathway is complete.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during recreational or some types of subsistence activities. People then incidentally **ingest** sediment from normal hand-to-mouth activities. In addition, **dermal absorption of contaminants** may be of concern if people come in contact with sediment and the contaminants are able to permeate the skin (see dermal exposure to soil section). This type of exposure is rare but it should be investigated if:

- Climate permits recreational activities around sediment, and/or
- Community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

ADEC soil ingestion cleanup levels are protective of direct contact with sediment. If they are determined to be over-protective for sediment exposure at a particular site, other screening levels could be adopted or developed.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

The CSM is based on the assumption that a limited area of residual DRO contamination above the ADEC cleanup level remains in the soil and groundwater in the vicinity of AST-MW10 (former well AP-503). This assumption has been derived from findings reported in the1995 RI (E & E, 1995), the 2007 ROST investigation (USACE, 2007), and the 2009 groundwater monitoring event (FES, 2009). The ROST investigation showed the soil DRO contamination (1,240 mg/kg to 2,090 mg/kg) is limited to an approximate depth between 2 to 12 feet bgs, and is localized around the former AST area, extending downgradient approximately 100 feet. Although the DRO concentration in well AST-MW10 (3,800 µg/L) is over two times the groundwater cleanup level (1,500 µg/L), it has decreased significantly since the removal of 345 cubic yards of POL-contaminated soil from the AST area in 1997. It is presumed that the concentration will continue to decrease over time through biodegradation. Furthermore, the two downgradient wells, AST-MW8 (AP-446) and AST-MW9 (AP-507), were below the DRO cleanup level in the 2009 groundwater sampling event, which indicates limited contamination migration.

APPENDIX A

BIOACCUMULATIVE COMPOUNDS

Table A-1: List of Compounds of Potential Concern for Bioaccumulation

Organic compounds are identified as bioaccumulative if they have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5. Inorganic compounds are identified as bioaccumulative if they are listed as such by EPA (2000). Those compounds in Table X of 18 AAC 75.345 that are bioaccumulative, based on the definition above, are listed below.

Aldrin	DDT	Lead
Arsenic	Dibenzo(a,h)anthracene	Mercury
Benzo(a)anthracene	Dieldrin	Methoxychlor
Benzo(a)pyrene	Dioxin	Nickel
Benzo(b)fluoranthene	Endrin	PCBs
Benzo(k)fluoranthene	Fluoranthene	
Cadmium	Heptachlor	Pyrene
Chlordane	Heptachlor epoxide	Selenium
Chrysene	Hexachlorobenzene	Silver
Copper	Hexachlorocyclopentadiene	Toxaphene
DDD	Indeno(1,2,3-c,d)pyrene	Zinc
DDE		

Because BCF values can relatively easily be measured or estimated, the BCF is frequently used to determine the potential for a chemical to bioaccumulate. A compound with a BCF greater than 1,000 is considered to bioaccumulate in tissue (EPA 2004b).

For inorganic compounds, the BCF approach has not been shown to be effective in estimating the compound's ability to bioaccumulate. Information available, either through scientific literature or site-specific data, regarding the bioaccumulative potential of an inorganic site contaminant should be used to determine if the pathway is complete.

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000). The BCF can also be estimated from a chemical's physical and chemical properties. A chemical's octanol-water partitioning coefficient (K_{ow}) along with defined regression equations can be used to estimate the BCF. EPA's Persistent, Bioaccumulative, and Toxic (PBT) Profiler (EPA 2004) can be used to estimate the BCF using the K_{ow} and linear regressions presented by Meylan et al. (1996). The PBT Profiler is located at http://www.pbtprofiler.net/. For compounds not found in the PBT Profiler, DEC recommends using a log K_{ow} greater than 3.5 to determine if a compound is bioaccumulative.

APPENDIX B

VOLATILE COMPOUNDS

Table B-1: List of Volatile Compounds of Potential Concern
Common volatile contaminants of concern at contaminated sites. A chemical is defined as volatile if the Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater and the molecular weight less than 200 g/mole (g/mole; EPA 2004a). Those compounds in Table X of 18 AAC 75.345 that are volatile, based on the definition above, are listed below.

Acenaphthene	1,4-dichlorobenzene	Pyrene
Acetone	1,1-dichloroethane	Styrene
Anthracene	1,2-dichloroethane	1,1,2,2-tetrachloroethane
Benzene	1,1-dichloroethylene	Tetrachloroethylene
Bis(2-chlorethyl)ether	Cis-1,2-dichloroethylene	Toluene
Bromodichloromethane	Trans-1,2-dichloroethylene	1,2,4-trichlorobenzene
Carbon disulfide	1,2-dichloropropane	1,1,1-trichloroethane
Carbon tetrachloride	1,3-dichloropropane	1,1,2-trichloroethane
Chlorobenzene	Ethylbenzene	Trichloroethylene
Chlorodibromomethane	Fluorene	Vinyl acetate
Chloroform	Methyl bromide	Vinyl chloride
2-chlorophenol	Methylene chloride	Xylenes
Cyanide	Naphthalene	GRO
1,2-dichlorobenzene	Nitrobenzene	DRO

APPENDIX C

COMPOUNDS OF CONCERN FOR VAPOR MIGRATION

Table C-1: List of Compounds of Potential Concern for the Vapor Migration

A chemical is considered sufficiently toxic if the vapor concentration of the pure component poses an incremental lifetime cancer risk greater than 10-6 or a non-cancer hazard index greater than 1. A chemical is considered sufficiently volatile if it's Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater.

Acenaphthene	Dibenzofuran	Hexachlorobenzene
Acetaldehyde	1,2-Dibromo-3-chloropropane	Hexachlorocyclopentadiene
Acetone	1,2-Dibromoethane (EDB)	Hexachloroethane
Acetonitrile	1,3-Dichlorobenzene	Hexane
Acetophenone	1,2-Dichlorobenzene	Hydrogen cyanide
Acrolein	1,4-Dichlorobenzene	Isobutanol
Acrylonitrile	2-Nitropropane	Mercury (elemental)
Aldrin	N-Nitroso-di-n-butylamine	Methacrylonitrile
alpha-HCH (alpha-BHC)	n-Propylbenzene	Methoxychlor
Benzaldehyde	o-Nitrotoluene	Methyl acetate
Benzene	o-Xylene	Methyl acrylate
Benzo(b)fluoranthene	p-Xylene	Methyl bromide
Benzylchloride	Pyrene	Methyl chloride chloromethane)
beta-Chloronaphthalene	sec-Butylbenzene	Methylcyclohexane
Biphenyl	Styrene	Methylene bromide
Bis(2-chloroethyl)ether	tert-Butylbenzene	Methylene chloride
Bis(2-chloroisopropyl)ether	1,1,1,2-Tetrachloroethane	Methylethylketone (2-butanone)
Bis(chloromethyl)ether	1,1,2,2-Tetrachloroethane	Methylisobutylketone
Bromodichloromethane	Tetrachloroethylene	Methylmethacrylate
Bromoform	Dichlorodifluoromethane	2-Methylnaphthalene
1,3-Butadiene	1,1-Dichloroethane	MTBE
Carbon disulfide	1,2-Dichloroethane	m-Xylene
Carbon tetrachloride	1,1-Dichloroethylene	Naphthalene
Chlordane	1,2-Dichloropropane	n-Butylbenzene
2-Chloro-1,3-butadiene (chloroprene)	1,3-Dichloropropene	Nitrobenzene
Chlorobenzene	Dieldrin	Toluene
1-Chlorobutane	Endosulfan	trans-1,2-Dichloroethylene
Chlorodibromomethane	Epichlorohydrin	1,1,2-Trichloro-1,2,2-trifluoroethane
Chlorodifluoromethane	Ethyl ether	1,2,4-Trichlorobenzene
Chloroethane (ethyl chloride)	Ethylacetate	1,1,2-Trichloroethane
Chloroform	Ethylbenzene	1,1,1-Trichloroethane
2-Chlorophenol	Ethylene oxide	Trichloroethylene
2-Chloropropane	Ethylmethacrylate	Trichlorofluoromethane
Chrysene	Fluorene	1,2,3-Trichloropropane
cis-1,2-Dichloroethylene	Furan	1,2,4-Trimethylbenzene
Crotonaldehyde (2-butenal)	Gamma-HCH (Lindane)	1,3,5-Trimethylbenzene
Cumene	Heptachlor	Vinyl acetate
DDE	Hexachloro-1,3-butadiene	Vinyl chloride (chloroethene)

Source: EPA 2002.

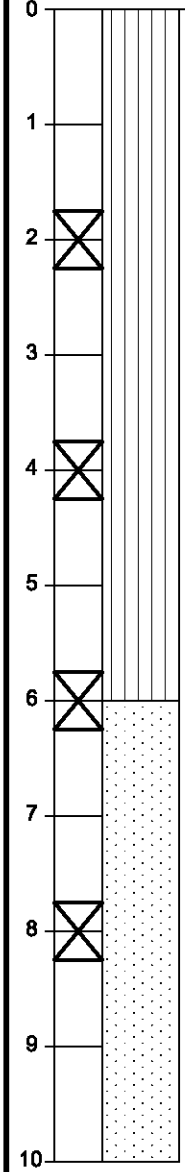
APPENDIX E

SOIL BORING LOGS

LOG OF BORING BP-1

Location: Wildwood, Kenai Alaska
Date Completed: 11/19/09
Northing Coord: 2417691.770
Easting Coord: 1407703.580

FES Representative: V. Ritchie & C. Boese
Drilling Contractor: Hammer Environmental
Drilling Method: Direct Push
Sampling Method: MacroCore



Depth (ft)	USCS	Sample Description	Sample Number	Time	Sample Depth (ft.)
0	ML	SILT with sand, brown, moist, organic layer in the top 6"			
2			09WWBP01SO	1320	1.75'-2.25'
4			09WWBP02SO	1325	3.75'-4.25'
6	SP	SAND with gravel, brown, moist, clay lense from 7' to 7'2", white, gravel size decreases below 7'	09WWBP03SO	1330	5.75'-6.25'
8			09WWBP04SO	1335	7.75'-8.25'
10		Bottom of Boring 10'			

Sample Analysis: PCB's, Dioxins, Lead

FAIRBANKS ENVIRONMENTAL SERVICES
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FAIRBANKS, ALASKA

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

LOG OF BORING BP-1

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

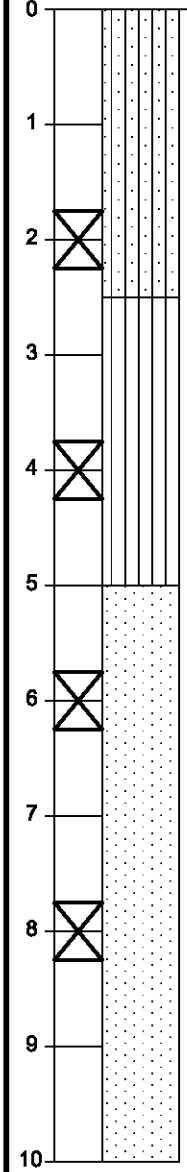
CONTRACT:	FIGURE:	DATE:
W911KB-08-D-0003		3/10

boring

LOG OF BORING BP-2

Location: Wildwood, Kenai Alaska
Date Completed: 11/19/09
Northing Coord: 2417694.350
Easting Coord: 1407716.800

FES Representative: V. Ritchie & C. Boese
Drilling Contractor: Hammer Environmental
Drilling Method: Direct Push
Sampling Method: MacroCore



Depth (ft)	USCS	Sample Description	Sample Number	Time	Sample Depth (ft.)
0	SM	silty SAND with gravel, gray, dry, organic layer in the top 6"			
2			09WWBP05SO	1450	1.75'-2.25'
3	ML	SILT with gravel, brown, moist, wood pieces observed from 3'2" to 4'			
4			09WWBP06SO	1455	3.75'-4.25'
5	SP	SAND with gravel, gray, moist,			
6			09WWBP07SO	1500	5.75'-6.25'
7		gravel absent from 7' to 7'6"			
8			09WWBP08SO	1505	7.75'-8.25'
9		black staining from 9'3" to 10'			
10		Bottom of Boring 10'			

Sample Analysis: PCB's, Dioxins, Lead

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CORPS OF ENGINEERS
ANCHORAGE, ALASKA

LOG OF BORING BP-2

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

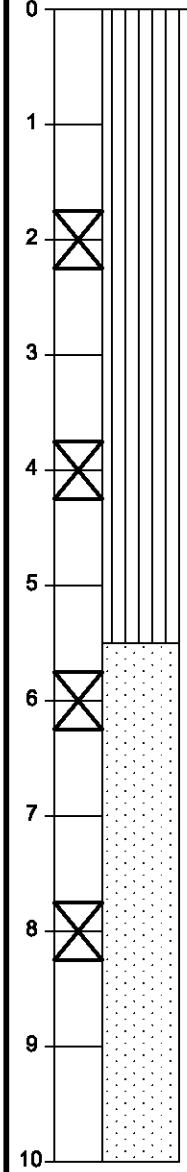
CONTRACT:	FIGURE:	DATE:
W911KB-08-D-0003		3/10

boring

LOG OF BORING BP-3

Location: Wildwood, Kenai Alaska
Date Completed: 11/19/09
NorthingCoord: 2417699.230
Easting Coord: 1407709.830

FES Representative: V. Ritchie & C. Boese
Drilling Contractor: Hammer Environmental
Drilling Method: Direct Push
Sampling Method: MacroCore



Depth (ft)	USCS	Sample Description	Sample Number	Time	Sample Depth (ft.)
0	ML	SILT, brown and gray, moist, organic layer in the top 6", twigs from 3'5" to 5'5", some sand observed between 1' and 2'			
2			09WWBP09SO	1405	1.75'-2.25'
			(09WWBP10SO is a duplicate of 09WWBP09SO)		
4			09WWBP11SO	1410	3.75'-4.25'
5	SP	SAND with gravel, gray, moist, 3" lense of brown sand from 5'5" to 5'9"			
6			09WWBP12SO	1415	5.75'-6.25'
8			09WWBP13SO	1425	7.75'-8.25'
10		Bottom of Boring 10'			

Sample Analysis: PCB's, Dioxins, Lead

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FAIRBANKS, ALASKA

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ANCHORAGE, ALASKA

LOG OF BORING BP-3

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

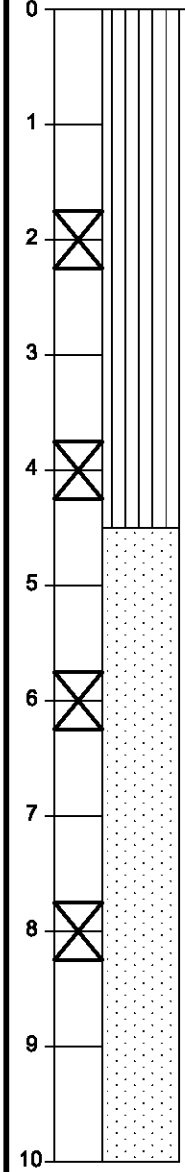
CONTRACT:	FIGURE:	DATE:
W911KB-08-D-0003		3/10

boring

LOG OF BORING BP-4

Location: Wildwood, Kenai Alaska
Date Completed: 11/19/09
NorthingCoord: 2417703.420
Easting Coord: 1407701.780

FES Representative: V. Ritchie & C. Boese
Drilling Contractor: Hammer Environmental
Drilling Method: Direct Push
Sampling Method: MacroCore



Depth (ft)	USCS	Sample Description	Sample Number	Time	Sample Depth (ft.)
0	ML	SILT with gravel, brown, moist, organic layer in the top 6", cobbles from 3'-4.5', twigs from 7" to 3'2"			
2			09WWBP19SO	1535	1.75'-2.25'
4			09WWBP20SO	1540	3.75'-4.25'
5	SP	SAND with gravel, gray, moist, strong unidentified odor from 5'-10'			
6			09WWBP21SO	1545	5.75'-6.25'
8		no gravel below 8'	09WWBP22SO	1550	7.75'-8.25'
10		Bottom of Boring 10'			

Sample Analysis: PCB's, Dioxins, Lead

FAIRBANKS ENVIRONMENTAL SERVICES
3538 INTERNATIONAL STREET
FAIRBANKS, ALASKA

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

LOG OF BORING BP-4

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

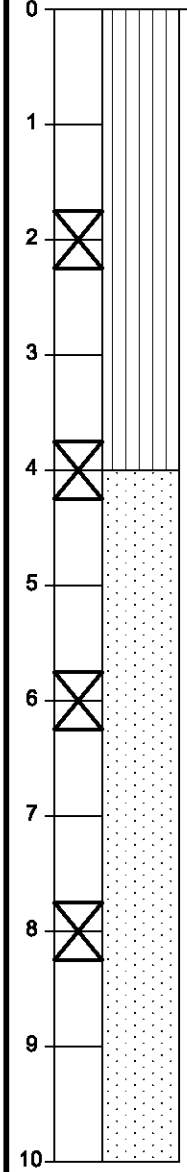
CONTRACT:	FIGURE:	DATE:
W911KB-08-D-0003		3/10

boring

LOG OF BORING BP-5

Location: Wildwood, Kenai Alaska
Date Completed: 11/19/09
NorthingCoord: 2417707.610
Easting Coord: 1407713.570

FES Representative: V. Ritchie & C. Boese
Drilling Contractor: Hammer Environmental
Drilling Method: Direct Push
Sampling Method: MacroCore



Depth (ft)	USCS	Sample Description	Sample Number	Time	Sample Depth (ft.)
0	ML	SILT with gravel, brown and gray, moist, organic layer in the top 6", twigs from 2' to 3'			
2			09WWBP14SO	1510	1.75'-2.25'
		some small gravel observed below 2.5'	*(09WWBP15SO is a duplicate of 09WWBP14SO)*		
4	SP	SAND with gravel, gray, moist	09WWBP16SO	1520	3.75'-4.25'
6			09WWBP17SO	1525	5.75'-6.25'
7		no gravel below 7'			
8			09WWBP18SO	1530	7.75'-8.25'
10		Bottom of Boring 10'			

Sample Analysis: PCB's, Dioxins, Lead

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LOG OF BORING BP-5

2009 Report
Non-Tank Farm Sites at the Former Wildwood AFS
Kenai, Alaska

CONTRACT: W911KB-08-D-0003 | FIGURE: | DATE: 3/10

boring

APPENDIX F

GPS DATA

Table F1 - Sample Location GPS Coordinates
Former Wildwood AFS, Non-Tank Farm Sites
Kenai, Alaska

Location	Easting NAD83 ASPC Zone 4 (Feet)	Northing NAD83 ASPC Zone 4 (Feet)
Former Landfill (Groundwater)		
LF-MW1	1407235.570	2418627.610
LF-MW2	1406985.500	2418544.640
Former Operations Building Facility (Groundwater)		
TA-MW1	1409074.700	2415981.800
TA-MW2	1409101.800	2415967.910
TA-MW3	1409085.830	2416000.050
TA-MW4	1409137.530	2416016.890
DSA-MW7	1409221.830	2416066.860
DSA-MW6	1409217.350	2416073.330
DSA-MW5	1409142.070	2416041.430
AST-MW8	1409152.500	2415867.580
AST-MW9	1409148.130	2415899.940
AST-MW10	1409227.590	2415937.670
Southeast Corner of Building 101	1409219.970	2415988.030
Northeast Corner of Building 101	1409222.990	2416049.330
Northwest Corner of Building 101	1409146.290	2416034.840
Southwest Corner of Building 101	1409145.150	2415990.160
Northeast Corner of Building 100	1409129.030	2415951.430
Northwest Corner of Building 100	1408962.660	2415963.740
Southeast Corner of Building 100	1409124.310	2415822.170
Southwest Corner of Building 100	1408961.790	2415827.700
Former Quonset Hut (Groundwater)		
QH-MW1	1409783.470	2408162.210
QH-MW2	1409794.870	2408194.620
QH-MW4	1409820.720	2408162.600
QH-MW3	1409834.950	2408197.440
Northwest Corner of Pad	1409837.800	2408201.790
Southwest Corner of Pad	1409843.550	2408201.250
Northeast Corner of Pad	1409836.770	2408222.870
Southeast Corner of Pad	1409842.840	2408222.110
Former Trench Area Burn Pit (Soil Boring)		
BP-1	1407703.580	2417691.770
BP-2	1407716.800	2417694.350
BP-3	1407709.830	2417699.230
BP-4	1407701.780	2417703.420
BP-5	1407713.570	2417707.610

ASPC = Alaska State Plane Coordinates
NAD83 = North American Datum 1983

Note:

Sample locations are approximate. Multipath interference was encountered near trees at the Trench Area Burn Pit and the Landfill, and near buildings at the Operations Building Facility. Swing ties (provided by USACE) were used to locate former monitoring well locations at the Operations Building Facility and Landfill, which are presented in Supplemental Data.

APPENDIX G

PHOTO LOG

Photo Log
Fieldwork November 2009

Former Quonset Hut Area **– Temporary monitoring well (QH-MW4) being Installed by Hammer Environmental (View to SE)**

Former Operations Building Facility (N of Building 100) **– Temporary Monitoring Well (TA-MW2) being installed in the former Transformer Storage Area (View to W)**

Former Operations Building Facility (E of Building 100) **– Temporary Monitoring Well (AST-MW8) being sampled (View to SW)**

Former Trench Area Burn Pit **– Hammer Environmental collecting core samples (View to NW)**

b 

Former Trench Area Burn Pit **– Soil core sample (BP-1)**

Maintenance Building 55 **- Typical floor drain found during building inspection**

Maintenance Building 55 **– A contained sub-floor POL sump system found in vehicle maintenance bay of building**

APPENDIX H

FIELD NOTES

11/17/09 10 HRS.
730 - SHOP > LEAVE FOR AIRPORT
- AIRPORT FBX. > FLY TO ANCH
PICK UP RENTAL CARS. - MB
HOUSE > PICK UP LYNDEN
SHIPMENT - GOLDSTREAK >
PICK UP SHIPMENT - ITT >
PICK UP SUPPLIES. ~1500 >
DRIVE FROM ANCH. TO
KENAI. ARRIVE KENAI ~1800.
HAVE DINNER W/ PAUL
CARON > DISCUSS PROJECT.
- HOTEL > CHECK IN.

11/18/09 10 HRS
-800 > MEET PAUL CARON.
- THANKFARM (WILDWOOD) >
TRY TO ACCESS QUONSET
HUT SITE > UNABLE TO
ENTER THRU ROAD GATE.
- OP's SITE > GPS WELLS
LOCATIONS. UNABLE TO
GET GOOD LOCS W/
GPS (SOME INTERFERENCE).
- PAUL CARON PICK UP
MARTI AT AIRPORT.

Scale: 1 square = Chi Boese

- CB/UR > SAFEWAY > PICK
UP SUPPLIES - HOTEL >
PRINT EMAILS - OP's
SITE > SWING TIE TO
MW LOCATIONS > PAUL
H/S TAILGATE MEETING >
PAUL CARON DRILL &
INSTALL 10 MW WELLS.
(SEE PICS). NOTE - ALL
WELLS SCREENED 7'-17'
BGS EXCEPT MW-5 IS
5'-15'. - CB/UR GO TO
WILDWOOD PRISON AND
DO SITE VISIT AT
MAIT. BLDG. 55 > DID
NOT SEE ANY SIGN OF
A LEACH FIELD. LOCATED
4 FLOOR DRAINS +
1 OIL PIT (SEE PICS).
MAIT. MAN SAYS DRAINS
GO TO SEWER LINE.
- LANDFILL > LOCATE MW1/
MW2. - HOTEL > CALIBRATE
YSI 5/6 > FIELDBOOK.

Chi Boese.

Scale: 1 square = _____

10/19/09 10 HRS
-8 > MEET HAMMER ENV. AT THANKFARM > GET ACCESS TO QUONSET HUT GATE > LOCATE MW1-4 W GPS & SWINGTIE.> INSTALL MW1-4. -LANDFILL> USE SWING TIE DATA TO VERIFY GPS LOCS - -BURNPIT > GPS SAMPLE POINTS > SHOW HAMMER DRILL LOCS. > HAMMER + VR DO SOIL SAMPS AT BURNPIT (+ MW1-2 AT LANDFILL) CB > MAKE SURE WELLS INSTALLED AT LANDFILL / OP'S / QUONSET HUT PRODUCE WATER FOR G.W.S. - CLEAN UP > MOBE TO HOTEL.

Chris Boese

10/20/09 6 HOURS
-HOTEL > PREP FOR OPS > GWS OSA MW-5

Scale: 1 square = _____

10/20/09 CONT. (SEE FORM).
-HOTEL > CLASSIFY / PACK SOIL SAMPLES W/ VR.

10/21/09 10 HOURS
-8 AM-HOTEL > GWS PREP QUONSET HUT > GET ACCESS G.W.S. QH MW4 / QH MW1 (SEE FORMS) > VR GWS QH MW2 / QH MW3. > GPS ALL MW's + CONCRETE PAD + EXISTING WELLS. REMOVE MW's > FILL WITH SEAL. -TOP's BLDG > G.W.S. AST-MW8 / AST MW9 > CLEAN-UP. TRANFER STATION. HOTEL > THANKFARM > GPS FENCE CORNERS. -HOTEL > CLEAN UP > CALIBRATE YSI's > CHANGE OUT ICE IN COOLERS.

Chris Boese

10/22/09 12 HOURS
-HOTEL > GWS PREP > CALIB. D.O.'s YSI 5/6. -LANDFILL > G.W.S. LF-MW1 / LF-MW-2

Chris Boese

Scale: 1 square = _____

5

11/22/09 CONT.
(SEE FORMS). > GPS LF
MW1 / MW2 > PULL WELLS
POST O.W.S. > FILL W/
SEAL, - BURNPIT > GPS.
SOIL SAMP. LOCS. > SWING
TIE POINT 4 + TREE

SB	FES04	TREE
1	13'	28' 6"
2	10' 9"	15' 11"
3	8' 4"	18' 4"
4	8'	28' 4"
5	4' 7"	12' 5"
FES04	-	16' 6"

-OP's BLDG > O.W.S. ABT-
MW10 / TH-MW2 (SEE FORMS)
REMOVE & SEAL ALL WELLS >
GPS WELL IN YARD - PICK
UP ALL TRASH - TAKE TO
TRANSFER STATION - HOTEL >
PACKAGE SAMPLES > PACK
GEAR FOR TRIP TO
ANCHORAGE

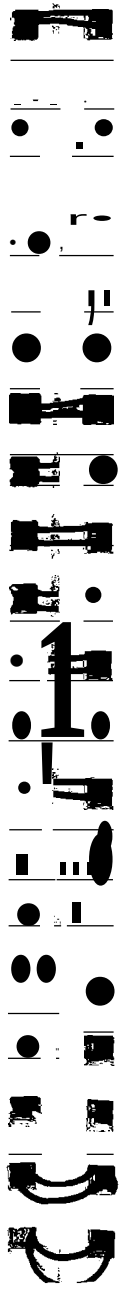
Alex Bodle

Scale: 1 square = _____

Wildwood AFS, Non-Tank Farm Sites L
No". 2009

11-17-09 10 hours

730	Meet at shop. Drive to airport
900	fly to Anchorage
1000-1500	Pick up car rentals. Pick up GoldStreak shipment. Pick up Lynden's shipment at Mike Boese's house. Pick up supplies Olt TTT.
1500-1800	Drive to Kenai
1800	Meet Paul Caron to discuss project
1930	Hotel, check in



Wildwood- cont.

11-18-09 10 hours (clear skies, 0°-5°F)

800	Meet Paul Caron. Drive around for site visit. Find gate blocking road to Quonset Hut. No security guard near so leave to find Operations Bldg. Attempt to locate well locations with GPS but having multipath interference problems, as we were warned by USACE.
1030	Paul leaves to pick up Marti at Kenai airport (helper). CB/VR pick up supplies at Safeway. Go to hotel to print HHSP for safety meeting.
1200	Return to Ops site. CB/VR swing tie all MW locations (provided by Gordy, USACE). Paul and Marti return and install all 10 MWs. MW-5 (former AP-504) is screened at 5'-15'. All others are screened at 7'-17'.

Maintenance Building 55

While Paul is drilling at Ops site, CB/VR requests access to Maintenance Bldg which is inside prison fence. Inside the Building, 4 drains & 1 contained oil pit are located. Take pictures inside, but only allowed to if camera is pointed directly at floor. Prohibited to take pictures outside. Walk around perimeter of building. See no evidence of a former leach field. There are a few inches of snow on the ground, which may be obstructing view (although seems unlikely) Can revisit site in Spring 2010. No reason to sample currently.

1~~7~~00 Landfill

CB/VR Locate the 2 MW's at Landfill using GPS. Will verify their locations tomorrow using swing ties provided by Gordy. Paul done at Ops.

1800 Hotel. Field notes.

11-19-09 10 hrs

800 Quonset Hut

Meet Paul & Marti. Gain access to Quonset Hut. Locate the 4 MW's w/ GPS. Install all wells.

Landfill

Verify the 2 MW's locations using swing ties provided by Gordy (USACE). Paul installs wells. Screend 9-19' (MW2) 7-17' (MW1).

Burn Pit

Locate spots for five soil borings. Paul drills. Frost is driven down the full length of the 10' borings. Obtaining samples from boring is difficult.

Meanwhile, CB re-visits all sites to ensure wells have adequate recharge. Good recharge at all sites.

1800 Hotel. Field notes. Organize sampling gear

Wildwood - cont 5

11-20-09 5 hrs (5°-20°F, overcast)

800 ~~Pickup~~ Pickup supplies. CB samples DSA-MW5. VR Classify and pack soil samples. Pick up ice for cooler. Waste to transfer station.

11-21-09 11 hrs

800 Quonset Hut

Prep for GW sampling. Gain access to Quonset Hut. CB & VR Sample MW1 → MW4. GPS MW's, concrete pad & existing wells. Decommission MW1 → MW4. Clean up. Leave site Completed with site.

(see field forms →)

1400 Op's Bldg

GW sample 3 MWs (DSA-MW6, ~~MW7,~~ AST-MW8, AST-MW9) See field forms.

1730 Pickup supplies

1800 Hotel. Haul in gear so doesn't freeze. Field notes. Work on Chain of custody.

Wildwood - cont

11-22-09 12 hours (overcast 5°F - 27°F)

800 Prep for GW sampling. Drive to Op's.

Op's Bldg

VR finish GW sampling at Op's Bldg. see field forms. Decommission wells.

Landfill

CB GW samples the 2 MW's at landfill. see field forms. CB GPS MW locations. Decommission wells.

Burn Pit

CB GPS boring holes. Return remainin soil to bore holes. Grout holes.

1600 All GW sampling complete. Clean up. All temporary well are decommissioned Chris dumps PVC and misc. waste at Kenai transfer site.

1630 Back at hotel. Unload supplies to pack for shipment. Wrap samples. Write CoC.

2030 Field notes. End.

Wildwood - cont.

11-23-09

sec Finish writting chain of custody. Email to Mike so he can print. Load vehicles. Drive to Anchorage.

~~2020~~ At MB's prepare samples for fin.. shipment. Add «e & COC v, Clean out rental vehicles of supplies & clean out mud, etc. Drop off rented supplies at TIT, Drop off samples at Goldstreak. Return rental vehicles. Flight Home to Fairbanks.

2020 Arrive Fbks.
2030 Taxi to Shop.