2011 Site Investigation Report

Eklutna Army Sites
Formerly Used Defense Site (FUDS) F10AK0097
Hazardous, Toxic, and Radioactive Waste (HTRW)
Project 01
Eklutna, Alaska

Final
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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
AAP	Alaska Aggregate Products
ADEC	Alaska Department of Environmental Conservation
AIC	Alaska Interstate Corporation
ASTM	American Society for Testing and Materials
bgs	Below Ground Surface
CDQR	Chemical Data Quality Report
CIRI	Cook Inlet Region Incorporated
cm	centimeter
COC	Chain of Custody
CORS	Continuously Operating Reference Station
DOD	Department of Defense
DQO	Data Quality Objective
DRO	Diesel-Range Organics
EDF	Electronic Data Format
EMI	Environmental Management Incorporated
FUDS	Formerly Used Defense Site
GPS	Global Positioning System
GRO	Gasoline-Range Organics
HTRW	Hazardous, Toxic, and Radioactive Waste
IDW	Investigation-Derived Waste
INPR	Inventory Project Report
JBER	Joint Base Elmendorf-Richardson
LIF	Laser-Induced Fluorescence
LOQ	Limit of Quantitation
mL	Milliliter
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NGS	National Geodetic Survey

PA	Preliminary Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo Ionization Detector
POL	Petroleum-Oil-Lubricant
PPE	Personal Protective Equipment
ppm	Parts Per Million
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RRO	Residual-Range Organics
SAP	Sampling and Analysis Plan
SI	Site Investigation
SOP	Standard Operating Procedure
SVOC	Semi-Volatile Organic Compounds
USACE-AK	U.S. Army Corps of Engineers – Alaska District
UTV	Utility Vehicle
UV	Ultraviolet
UVOST	Ultraviolet Optical Screening Tool
VOCs	Volatile Organic Compounds

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1.0 INTRODUCTION

This Site Investigation (SI) Report was prepared by the U.S. Army Corps of Engineers, Alaska District (USACE-AK) to present the results from the Ultraviolet Optical Screening Tool (UVOST) and test pit SI conducted by USACE-AK personnel at the Eklutna Army Formerly Used Defense Site (FUDS) at Eklutna, Alaska.

This report is organized into six sections. The first section includes a site description, a summary of previous investigations, the current investigation objectives, and the project team assigned to complete these objectives. Section 2.0 describes the field investigation approach used during the 2011 SI. Section 3.0 references the chemical data categories and quality standards. Data gathered during the 2011 SI is presented in Section 4.0. Conclusions and recommendations for future site work are provided in Section 5.0. The references used in the preparation of this report are located in Section 6.0.

1.1 Site Description/History

The project is located 26 miles northeast of Anchorage, Alaska (Figure 1). The site was used by the United States Army as a supply and storage area from 1957 to 1971. The Army referred to the site as the Mohawk Command Post. Improvements made by the Army consisted of numerous structures, mainly metal Quonset huts and security fencing (Figure 3). In addition, the Army was given use of existing Bureau of Indian Affairs buildings.

A portion of the Eklutna Army Site is currently an active gravel pit and jointly owned by two Alaska Native Corporations: Eklutna, Inc. and Cook Inlet Region, Inc. (CIRI). Eklutna, Inc. owns the surface rights; subsurface rights are owned by CIRI. The landowners have contracted with Alaska Interstate Construction (AIC) to manage the gravel mining operations at the site. The current gravel pit is located approximately 0.6 miles southwest of the Eklutna interchange of the Glenn Highway (Figure 2).

On or about June 25, 2008, during normal gravel extraction operations within the current gravel pit, personnel from Alaska Aggregate Products (AAP), a subsidiary of AIC, uncovered some soil which exhibited a noticeable “volatile” petroleum, oil, and/or lubricant (POL) odor. Mr. Russell Vogel of AAP contacted Environmental Management, Inc. (EMI) to investigate the quantity and type of contamination. EMI performed soil screening and sampling on behalf of AAP on June 26, 2008. Photo Ionization Detector (PID) headspace readings were gathered from five different locations within an approximately 15-foot by 15-foot area where contamination seemed most prevalent. The highest PID readings ranged near 500 parts per million (ppm). The soil sample with the highest PID reading was sent for laboratory analysis of gasoline-range organics (GRO), diesel-range organics (DRO), residual-range organics (RRO), volatile organic compounds (VOCs), semi-volatile organics (SVOCs), pesticides, polychlorinated biphenyls (PCBs), pH, and eight Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury). Notable results were 1,680 milligrams per kilogram (mg/kg) DRO and 15.4 mg/kg GRO. Based on these results, AAP suspended gravel extraction operations in this area.

Between August and September, 2009, AIC contracted TERRASAT, Inc. (TERRASAT) to evaluate baseline ground water conditions as part of the permitting process for the expansion of

the gravel pit. TERRASAT installed four groundwater monitoring wells around the perimeter of the future gravel extraction area (Figure 2). Groundwater sample results from two of the wells (MW-3 and MW-4) contained DRO concentrations of 0.14 milligrams per liter (mg/L) and 0.47 mg/L, respectively.

USACE-AK conducted a site visit on June 3, 2010 to determine if the reported DRO-contaminated soil was a result of activities at the Eklutna Army FUDS. USACE-AK visually inspected the area of contaminated soil and met with AAP, TERRASAT, Eklutna Inc., and Native Village of Eklutna personnel. Results of the site visit lead USACE-AK to complete a revised Inventory Project Report (INPR) which authorized a Hazardous, Toxic, and Radioactive Waste (HTRW) project for the site.

A Preliminary Assessment (PA) will be completed during 2012 to identify all potential areas of concern at the Eklutna Army FUDS. Results from the PA will be used to develop a work plan for a Remedial Investigation (RI). A full RI is tentatively scheduled for fiscal year (FY) 2013.

1.2 2011 Site Investigation Objectives

Based on discussions with stakeholders, field observations, and analytical results, USACE-AK determined that an expedited site investigation of the future gravel extraction area was required to avoid future disruptions to the gravel mining operations. The objectives of the 2011 SI are summarized below:

- Identify the extent of POL-impacted surface and subsurface soil contamination at the cleared future gravel extraction area
- Develop a correlation between petroleum contaminants and field screening results.

1.3 Project Team

FUDS Project Manager (USACE AK District) – **Christy Baez**: Ms. Baez is responsible for granting final approval of project plans and reports and has the authority to commit the resources necessary to meet project objectives and requirements.

Alaska Department of Environmental Conservation (ADEC) Regulatory Representative – **Debra Caillouet**: The ADEC is the lead regulatory authority and Ms. Caillouet is the ADEC representative for this project. Ms. Caillouet will review and comment on this report.

Quality Assurance / Quality Control Officer – **Lisa Geist**: Ms. Geist reviews all work products before submitting them to ADEC. She has signature authority over format, content, and all technical components of work products produced by the investigation team.

Project Chemist – Sean Benjamin: Mr. Benjamin served as the lead chemist for the project. He helped prepare the Sample Analysis Plan (SAP), coordinated the laboratory contract, and reviewed laboratory data to assess usability of the data. Mr. Benjamin also performed sample collection, packing, and delivery. Appendix I summarizes Mr. Benjamin's qualifications demonstrating that he meets the requirements of an ADEC qualified person as defined by 18 Alaska Administrative Code (AAC) 75.990(100).

Project Engineer – Neil Folcik: Mr. Folcik served as the project engineer on the team. His responsibilities include preparing the work plan and this report. Appendix I summarizes Mr. Folcik's qualifications demonstrating that he meets the requirements of an ADEC qualified person as defined by 18 AAC 75.990(100).

2.0 FIELD INVESTIGATION APPROACH

In May 2011 USACE-AK attempted to perform a UVOST investigation at the Eklutna Army Site. The UVOST investigation was not completed. Site geology resulted in an elevated UVOST detection limit and substantial damage to the UVOST tooling. A revised approach and work plan were developed that included excavating test pits and collecting analytical samples to achieve the 2011 SI project objectives. In general, field work was performed using methods specified in the revised work plan entitled *Site Investigation Work Plan, Eklutna Army Sites, Formerly Used Defense Site F10AK0097, Eklutna, Alaska* (USACE 2011). The field investigation consisted of the following subtasks:

- Mobilization
- UVOST Investigation
- Test Pit Investigation
- Global Positioning System (GPS) Survey
- Investigative-Derived Waste (IDW)
- Demobilization

2.1 Mobilization

Mobilization included gaining site property access, conducting utility locates, and mobilizing equipment and personnel to the project site.

2.1.1 Right of Entry

The investigation area within the Eklutna Army Site is jointly owned between Eklutna Inc. and CIRI. Both property owners granted access to the site for the purpose of performing this SI.

2.1.2 Utility Locates

No active utilities were present within the investigation area.

2.1.3 Equipment and Personnel Mobilization

Mobilization for the initial UVOST investigation was performed on May 5, 2011. All equipment was mobilized from Joint Base Elmendorf-Richardson (JBER) to the Eklutna Army Site by the USACE-AK field team. Equipment consisted of a Ford F450 truck, Geoprobe drill rig, Polaris Ranger 4x4 utility vehicle (UTV), and an equipment trailer. The trailer and equipment remained onsite for 3 days. The F450 truck was utilized to travel between the work site and JBER.

Mobilization for the follow on test pit investigation was performed on September 20, 2011. The field crew mobilized from JBER to the Eklutna Army Site using a government vehicle at the start of each duty day. The current gravel mine operator AAP provided an excavator and operator on days that investigation activities were performed. At the conclusion of each duty day, the field crew packaged analytical samples and traveled back to JBER in the government vehicle.

2.2 UVOST Investigation

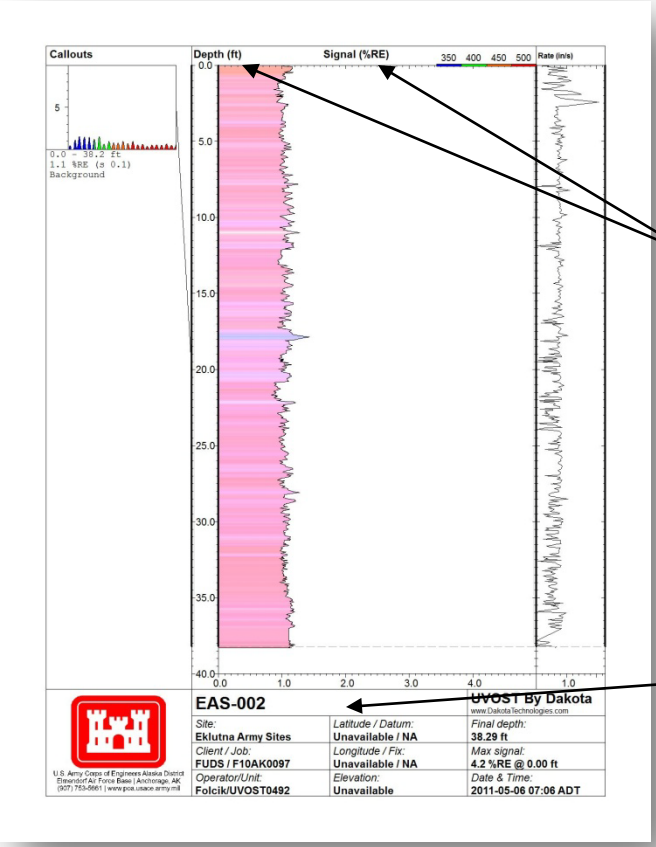
The primary objective of this SI was to delineate the vertical and horizontal extent of POL-impacted surface and subsurface soil contamination at the cleared future gravel extraction location. Initially the field technology used to accomplish this objective was laser induced fluorescence (LIF) as employed by the UVOST and a direct push, track mounted probe system.

The UVOST uses LIF to identify POL contamination in soil. Fluorescence is a property of some compounds where absorbed ultraviolet (UV) light stimulates the release of photons (light) of a longer wavelength, often in the visible range. Many aromatic hydrocarbons fluoresce. The UVOST uses this property to detect small amounts of a hydrocarbon substance within a larger matrix (e.g., gasoline in soil).

A Xenon Helium Hydrogen Chloride Eximer laser is used as the energy source in the UVOST. Ultraviolet light from the laser is transmitted through a silicon-clad optical fiber wire that exits through a sapphire window on the side of the probe tip. If petroleum hydrocarbons are present in the subsurface soil and within the vicinity of the sapphire window, the laser light excites the PAH fraction into releasing energy as fluorescence.

The intensity of the fluorescence is used as an indicator of the relative contaminant concentration. Fluorescence signals returning back through the fiber wire are relayed to a digital oscilloscope. LIF results are acquired and displayed in real time with depth.

The UVOST software package allows for analysis of the amount of fluorescence at each of the four different response wavelengths that make up the LIF reading. The amount of fluorescence at each of the four wavelengths is called the LIF signature. LIF data is displayed graphically as fluorescence versus depth in real time as the field team operates the UVOST equipment and collects LIF readings. UVOST logs display the data and are created after completing the investigation at a given probe location. Example 1 illustrates a typical UVOST log:



Depth is plotted versus fluorescence as the probe is driven through the ground. The magnitude and signature of the fluorescence is used to evaluate the presence of POL contaminants.

The various forms of POL contamination, such as gasoline, diesel, and oil, each have distinct waveform patterns. These patterns help infer the presence and type of contamination at any given depth.

The title block contains data that is specific to each probe location, such as the probe number, site location, date and time, maximum fluorescence, total depth, etc.

Example 1 – UVOST Log

The UVOST system can detect non-chlorinated, multi-ring, poly-aromatic hydrocarbons (fuel) such as gasoline, diesel fuel, kerosene, motor oil, and creosote in saturated and unsaturated soils. However, certain types of POL constituents are more readily detected by the UVOST as compared to others.

Whenever a fuel signature is detected with the UVOST, an approximate identification of fuel type (gasoline, diesel fuel, motor oil, etc.) is made from the LIF signature. The information (collected at each point) is used by the field team to determine optimal locations and depths for collection of soil samples for laboratory analysis. Laboratory results and the UVOST survey are then used to infer the vertical and horizontal extent of contamination.

Naturally occurring fluorescent minerals, such as carbonates, and organics, such as tree roots and peat, can yield false positives. Data from sampling and laboratory analysis of soil samples assists in determining if false positives have occurred. False negatives may occur in the presence of coal tars, heavy creosotes, extremely weathered fuels, and chlorinated solvents. DRO and GRO concentrations near the limit of detection for the LIF probe may also create a false negative.

Listed below are several parameters that the field team monitored while operating the system in order to assure the quality of data.

- Operate the UVOST in accordance with the UVOST-Standard Operating Procedures (SOPs).
- Monitor the wave pattern on the oscilloscope.
- Verify the reference emitter (RE) signal level and the time delay are in the proper position and within limits.
- Calibrate the UVOST with the RE prior to every push.
- Monitor the graphic output on the UVOST computer and verify information is being recorded and the system is functioning properly.
- After every push, place the RE on the probe window to visually verify that the signals are within tolerance.
- Visually inspect the probe prior to and after every push to verify it is in good working order and make any repairs/adjustments as necessary.

When system errors occurred during a UVOST/LIF probe push, the location was probed again until a useable dataset was acquired. UVOST probe holes were immediately sealed with dry bentonite granules and marked with a labeled pin flag.

2.3 Test Pit Investigation

Site geology prevented successful completion of the UVOST investigation. A revised approach that included excavating test pits and collecting analytical samples was utilized to achieve the project objectives. Test pits were excavated with a Caterpillar 320 excavator. The excavator operator would remove a two foot lift of soil with the excavator bucket. The project chemist would then collect a sample from the center of the excavator bucket in an attempt to collect soil that is representative of the target depth. The depth of each sample was estimated based on the reach of the excavator. Gradations were marked on the side of the excavator arm to aid in depth estimation. One headspace field screening sample and collocated analytical sample were collected to represent each two foot lift of soil. The target depth for each test pit was 18 feet bgs. Typically nine soil samples (each representing a 2 foot lift of soil) were collected from each test pit (0-2 feet bgs, 2-4 feet bgs, etc.) The analytical samples were analyzed for DRO.

All sample collections were performed with clean stainless steel spoons while wearing a new pair of nitrile gloves. The desired soil (0.25 inch minus) was placed into a new, large zip-closure plastic bag. The sample was homogenized by mashing and mixing, in the bag, for at least one minute. The DRO sample was collected by completely filling the applicable laboratory supplied container with soil from the homogenized zip-closure plastic bag. Visual classification of each soil sample was performed by the American Society for Testing and Materials (ASTM) D 2488 field classification method and recorded in the field log book.

A PID was used to perform the headspace soil field screening. Headspace vapors were allowed to develop in the sample bag for at least 10 minutes. The bag was then shaken/agitated for 15 seconds at the beginning and end of the headspace development period to assist volatilization. The soil was warmed before reading headspace vapors. PID readings were recorded for several seconds. The highest meter reading was recorded in the field notebook.

All excavated soil was systematically stacked on the side of the excavation. After completion of the test pit and to the extent possible the excavated soil was returned to its original location. The surface of the backfilled test pits were graded to match the surrounding ground surface. The test pit locations were clearly marked with survey lath containing the test pit number and date.

2.4 GPS Survey

UVOST probes (with exception to UVOST-004 and UVOST-006 which were estimated based on field notes) and test pit locations were surveyed using an Ashtech Mobile Mapper 100 mapping grade GPS unit. GPS data was post-processed for differential correction using reference data from a National Geodetic Survey (NGS) continuously operating reference station (CORS). The Eklutna Army Site survey data is presented in the GCS_WGS_1984 coordinate system, with datum D_WGS_1984, and units in decimal degrees. Survey data is included in Appendix B.

2.5 Investigative-Derived Waste

IDW generated during this field effort consisted of:

- Soil remaining from the sampling procedures.
- Solid waste (used sampling equipment, personal protective equipment [PPE], and garbage).

2.5.1 Leftover Sample Soil

Potentially contaminated soil remaining from sampling procedures was of minimal quantity and returned to its original location to the extent practicable.

2.5.2 Solid Waste

Field sampling equipment, PPE, and garbage generated during this SI were disposed of as a non-hazardous solid waste at the Anchorage landfill. The field sampling equipment included sampling spoons and plastic bags. Used PPE generated during this work was generally limited to disposable gloves and hearing protection. The garbage generated during the investigation included paper towels, cardboard boxes, plastic packaging, etc.

2.6 Demobilization

Field activities at the Eklutna Army Site were completed on October 19, 2011. The equipment and supplies were then transported from the project site to JBER by the USACE-AK field team.

3.0 ANALYTICAL DATA

The project's chemical data was generated using methods that conform to the *U.S. Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories, Final Version 4.2* (USDOD 2010); the *USACE Engineering and Design - Requirements for the Preparation of Sampling and Analysis Plans, EM-200-1-3* (USACE 2001); and the *ADEC Draft Field Sampling Guidance* (ADEC 2010).

3.1 Data Categories

This project generated both screening data and definitive data to meet the project data needs. Screening data was obtained by screening instrumentation and less rigorous methods of analysis that produced rapid, but less precise results compared with fixed laboratory analyses. The

UVOST/LIF technology falls under this description of screening data. While these measurements are repeatable and accurate, they lack precision and definitive correlation with absolute values for concentration units.

Definitive data were generated as a result of rigorous methodology developed with extensive evaluation and documentation. Results are quantitative with known precision and accuracy. All samples submitted to the fixed laboratory were generated as definitive data.

3.2 Sample Identification

Samples collected during this field investigation were assigned a unique sample tracking number consistent with the standard operating procedures established by USACE-AK. Each sample was assigned a ten-digit sample number (i.e. 11EAF05ASL). The ten-digit number designation is as follows:

- Digits 1 and 2 are the last two digits of the calendar year (e.g., 11).
- Digits 3 through 5 are the unique three-letter designation of the project site (e.g., EAF - Eklutna Army FUDS).
- Digits 6 and 7 correspond to the test pit number (e.g., the sample collected from test pit 5 is assigned number 05).
- Digit 8 corresponds to the depth that the sample is taken (e.g., A = 0 to 2 feet bgs, B = 2 to 4 feet bgs, etc.).
- Digits 9 and 10 correspond to the sample matrix (SL for soil samples).

3.3 Sample Packaging and Transport

Field laboratory samples were preserved, packaged, and shipped to the project laboratory using procedures outlined in the *Site Investigation Work Plan, Eklutna Army Sites, Formerly Used Defense Site F10AK0097, Eklutna, Alaska, Appendix A – Sampling and Analysis Plan.* Precautions for sample preservation, cross contamination avoidance, and environmental and physical stresses were addressed to ensure that samples reached the laboratory intact.

3.3.1 Sample Preservation

All field laboratory samples were preserved at a cool temperature by placing the sample in an insulated cooler shortly after collection. Frozen gel packs were used to establish and maintain sample temperatures of 4 ± 2 ºC.

3.3.2 Sample Packaging

Each secured container was cushioned and sealed in a plastic bag. Coolers were prepared for transport by ensuring that the cooler drain was taped closed from both sides and that an approximately 4-centimeter (cm) thick layer of bubble wrap was spread across the bottom of the cooler. Ice packs were placed around and among the sample containers to ensure that the samples remained at 4 ± 2 ºC during shipment. A temperature blank (tap water in a screw-top plastic vial) was included in each cooler to estimate sample temperature at the laboratory. Additional inert cushioning was used to take up the remaining space in the cooler. A resealable plastic bag was taped to the inside lid of the cooler to contain the chain-of-custody.

Final packaging was completed at the time of shipment. The chain-of-custody (COC) was completed and sealed inside the cooler. Clear tape was placed over the custody seals to protect them from abrasion, and a minimum of two full wraps of strapping tape was placed around the cooler in two places to secure the lid.

3.3.3 Sample Shipping and Contacts

All samples were hand delivered to SGS in Anchorage, Alaska. The laboratory completed a cooler receipt form upon sample receipt to document sampling and shipping discrepancies. The analytical laboratory emailed a copy of the cooler receipt form to receipt.cooler@usace.army.mil within 24 hours of delivery.

3.4 Quality Control Samples

Field quality control samples included field duplicates and matrix spike/matrix spike duplicates (MS/MSD). Field duplicate samples and MS/MSD samples were collected concurrently with the field laboratory samples. Field duplicate samples were analyzed at a rate of one per ten project samples. MS/MSD samples were collected at a rate of one sample per sample batch (20 samples) for each method.

Field duplicates were blind to the laboratory and contained no codes identifying them as quality control (QC) samples. Field duplicates were identified as if they were primary samples, using the next two-digit number in the sample identification sequence. Because actual collection time for primary and duplicate samples was identical, false collection times were recorded on the sample labels and COC forms for duplicate samples. The actual collection time, duplicate sample identification number, and corresponding primary sample identification number were recorded in the field sampling log book.

MS/MSD samples carried the same identification number and collection time as the corresponding primary sample number. Sample labels and chain-of-custody forms were marked to indicate that additional sample volume was submitted for MS/MSD analysis.

3.5 Chemical Laboratory Deliverables

Analytical data was supplied by the project laboratory to USACE-AK in hard copy and electronic formats. The data package included both the analytical results and sufficient information to demonstrate that the project's data quality objectives (DQOs) had been satisfied. The DQOs included the numerical measurement quality objectives for precision, accuracy, representativeness, comparability, and sensitivity.

A hard copy package was submitted as discrete definitive data package for each sample delivery group. In accordance with ADEC and DOD-QSM Version 4.2 requirements, the definitive data package was a uniquely numbered submittal that contained a cover sheet, table of contents, case narrative, analytical results, laboratory-reporting limits, sample documentation information, and internal laboratory quality assurance/quality control (QA/QC) information. The sample delivery group data package was also submitted as an electronic data deliverable in the Electronic Data Format (EDF) 1.2a format. Appendix C includes electronic copies of the laboratory data packages.

3.6 Chemical Data Assessment

After the samples were analyzed and subsequent reports were received, the raw data was subjected to a data quality review. The data review included evaluation of sample collection, holding time, sample duplicates (to assess laboratory precision), laboratory control samples (to assess accuracy), and matrix spike and surrogate recoveries (to assess matrix effects). USACE personnel prepared a Chemical Data Quality Report (CDQR) to describe the laboratory's performance.

The data quality review was performed in accordance with the requirements of the ADEC Technical Memo 06-002 and the DOD QSM. Appendix F includes a copy of the CDQR. The ADEC laboratory review checklists are included in Appendix G.

Data qualifier flags were assigned by the laboratory and by the project chemist. Data qualifiers are flags that indicate that there is some issue with the data point that impacts the data quality. Flags may be assigned for QC problems, shipping impacts, blank contamination, or laboratory non-compliance with the method or Quality Assurance Project Plan (QAPP). The basic set of flags is listed below in Table 3-1.

Table 3-1 Laboratory Flag Definitions

Qualifier	Definition
J	Analyte result is considered an estimated value because the level is below the laboratory LOQ but above the detection limit
MH, ML, MN	Analyte result is considered an estimated value biased (high, low, indeterminate) due to matrix effects
B	Analyte result is considered a high estimated value due to contamination present in the method blank
QH, QL, QN	Analyte result is considered an estimated value biased (high, low, uncertain, indeterminate) due to a quality control failure
R	Analyte result is rejected - result is not usable

3.7 Data Presentation

Results of laboratory analyses are presented in Table 4-1 and included in Appendix C. The laboratory results are compared to standard soil cleanup levels promulgated by the State of Alaska through the ADEC, as published in 18 AAC 75, Oil and Other Hazardous Substances Pollution Control. The abbreviation "LOQ" is used in the text and in the table legends for the laboratory-established limit of quantitation. The data qualifiers established through the chemical data assessment process are incorporated into the summary of analytical tables.

4.0 SITE SPECIFIC ACTIVITIES AND RESULTS

This section describes the field work, observations, and results for each of the tasks specific to the 2011 Eklutna Army Site SI.

4.1 UVOST/LIF Investigation Results

The UVOST/LIF investigation began on May 5, 2011 in the area of suspected contamination along the southwest end of the future gravel extraction area. Only eight UVOST probes were

completed at the Eklutna Army Site. All probe logs are presented in Appendix D. Probe depth during the investigation ranged between 5 feet and 38.3 feet below ground surface (bgs). With the exception of probe EAS-008, all probes were advanced to refusal. Groundwater was not encountered at any of the probe locations. The gravel pit operator indicated that a compacted layer of soil containing large cobbles is present directly above the soil/groundwater interface. It is expected that the refusal encountered at most probe locations is the result of this layer. Holes created during this investigation were immediately backfilled with dry bentonite granules and marked with labeled pin flags.

Figures 3 and 4 identify the location of the UVOST probes in relation to a 1964 aerial photograph and current site imagery, respectively. Elevated fluorescence was encountered at EAS-006 from 0 to 3 feet below ground surface. The soil at this location was an organic fill instead of the clean gravel encountered at other probe locations. The elevated fluorescence is likely the result of organics and not fuel. All other probes contained only background fluorescence. Due to the lack of detectable contamination the field crew installed UVOST probe EAS-008 at the contaminated soil location identified by AAP personnel in 2008 and verified by USACE personnel in 2010. When disturbed the soil at this location had a weathered fuel odor. The petroleum contamination at EAS-008 was below the detection limit of the UVOST. The UVOST investigation was abandoned on May 6, 2011. Site geology resulted in an elevated UVOST detection limit, extremely difficult direct push drilling conditions, and substantial damage to the UVOST tooling.

On May 10, 2011 USACE personnel returned to the Eklutna Army Site and collected two surface soil samples adjacent to UVOST probe EAS-008. The surface soil samples had a weathered diesel fuel odor that dissipated quickly after being disturbed. The soil samples were analyzed for GRO, DRO, RRO, VOCs, and SVOCs. DRO was the only detected analyte at 50 and 80 mg/kg.

4.2 Test Pit Investigation Results

After the UVOST investigation, USACE-AK personnel developed an alternate approach and work plan that included excavating test pits and collecting analytical samples. The test pit investigation included excavating forty-two test pits within and adjacent to the future gravel extraction area (Figures 3-4). The test pits were excavated in four phases and samples were analyzed on an expedited schedule. The phased approach allowed for the evaluation of the analytical results and identification of future test pit locations. Test pit depth typically ranged between 14 and 20 feet bgs. Test pits were excavated until soil sloughing prevented the collection of representative soil samples. A total of 352 soil samples (317 primary and 35 duplicates) were collected from the test pits and analyzed for DRO between September 20 and October 19, 2011. DRO was detected in twelve of the samples. Detected concentrations ranged between 7 and 317 mg/kg. The analytical results are presented in Table 4-1 and on Figure 4.

Four of the forty-two test pits excavated were not sampled. While excavating test pit 14 a concrete slab was encountered at 2 feet bgs. Figure 3 indicates that the encountered slab is the foundation for the former Bureau of Indian Affairs building. Test pits 7, 19, and 35 contained only fill material. The investigation area is being used by the gravel pit operator for overburden storage. It was assumed that the fill encountered at these test pit locations was not present during the Department of the Army's use of the site and therefore was not sampled.

One soil sample exceeded the ADEC Method 2 Migration to Groundwater Cleanup Level for DRO of 250 mg/kg (test pit 17, 0-2 feet bgs) with 317 mg/kg. The soil at this location did not display a fuel odor, was located within the road way, and did include a significant percentage of organics. The elevated DRO result could be the result of organics or potentially associated with the gravel pit equipment that utilizes the road. DRO was not detected in any adjacent test pits or from all other samples within this test pit.

Test pit 11 was excavated along the edge of the future gravel expansion area and the active gravel pit. This is just northeast of the contaminated soil location identified by AAP personnel in 2008. The test pit was excavated to 10 feet bgs. DRO was not detected in any of the samples from the test pit. The excavator was then utilized to collect soil from the base of the embankment (direct below test pit 11) between the current gravel pit and future expansion area. The soil from this area did have a fuel odor. DRO was detected at 71 and 57.6 mg/kg in the primary and duplicate soil samples, respectively. The soil samples (sand/gravel) from this pit were the only samples collected during the test pit investigation that had a fuel odor.

Headspace field screening was performed in conjunction with the analytical soil sampling. With exception to test pits 11, 38, and 39 all field screening head space samples registered 0 with the PID. Test pits 38 and 39 PID readings ranged from 0 to 40. Test pits 38 and 39 contained moist sand instead of gravel. The field chemist did not observe any fuel odors in either test pit. The elevated PID readings are likely the result of the different soil type and elevated moisture content. The field screening sample collected from the slope of test pit 11 did have a noticeable fuel odor and generated a PID reading of 11.

5.0 CONCLUSIONS/RECOMMENDATIONS

The objectives of the 2011 Eklutna Army FUDS SI were to delineate the vertical and horizontal extent of petroleum contaminated soil at the future gravel extraction area and to develop a correlation between field screening results and petroleum contaminants. The lack of POL contamination prevented the development of a field screening/analytical result correlation and the extremely difficult direct push drilling conditions prevented the characterization of soil below 18 feet bgs.

The upper 18 feet of soil at the future gravel extraction area was evaluated through the excavation of forty-two test pits and collection of 352 soil samples (317 primary and 35 duplicates). Only one soil sample exceeded the ADEC Method 2 Migration to Groundwater Cleanup Level for DRO (test pit 17, 0-2 feet bgs) with 317 mg/kg. Widespread vadose zone contamination is not present within the future gravel extraction area. Given the extremely course and highly permeable nature of the vadose zone soil it is likely that very little if any vadose zone contamination exists at the site. Any impacted soil identified during future gravel extraction will likely be easily identified due a noticeable fuel odor.

A PA will be completed during 2012 to identify all potential areas of concern at the Eklutna Army FUDS. Results from the PA will be used to develop a work plan for a RI. A full RI is tentatively scheduled for FY 2013. During the RI, the evaluation of groundwater at the future gravel extraction area is recommended. Knowing the groundwater flow direction and extent of

the dissolved phase DRO plume will help identify the location of a former sources and any associated vadose zone contamination. The RI should also include the evaluation of smear zone soil within the DRO dissolved phase plume.

6.0 REFERENCES

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Tables

Table 4-1 Eklutna Army Site Test Pit Sampling Results

Test Pit 01	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.6]
0-2 dup	ND [20.7]
2-4	ND [20.7]
4-6	ND [20.8]
6-8	ND [20.3]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [21]
14-16	ND [21]
16-18	ND [21.3]

Test Pit 02	
Depth (ft)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [20.6]
2-4 dup	ND [20.6]
4-6	ND [20.7]
6-8	ND [20.6]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [20.9]
14-16	ND [21]
16-18	ND [21.6]

Test Pit 03	
Depth (ft)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [20.6]
4-6	ND [20.7]
4-6 dup	ND [20.6]
6-8	ND [20.6]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [20.9]
14-16	ND [21]
16-18	ND [21.6]

Test Pit 04	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.5]
2-4	ND [20.4]
4-6	ND [20.9]
6-8	ND [20.5]
6-8 dup	ND [20.8]
8-10	ND [20.9]
10-12	ND [20.6]
12-14	ND [20.8]
14-16	ND [21.8]
16-18	ND [22.2]

Test Pit 05	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.5]
4-6	15.8 [20.5] J
6-8	ND [20.5]
8-10	ND [21.4]
8-10 dup	9.46 [21.6] J
10-12	ND [21.4]
12-14	ND [21.4]
14-16	ND [22.3]
16-18	ND [21.9]

Test Pit 06	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.3]
2-4	ND [20.3]
4-6	ND [21.2]
6-8	ND [20.5]
8-10	ND [21]
10-12	ND [21.5]
10-12 dup	ND [21.3]
12-14	ND [21.6]
14-16	ND [22]
16-18	ND [22.2]

Test Pit 07	
Depth (ft)	DRO (mg/kg)
Entire test pit was fill material. No native soil to sample.	

Test Pit 08	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.8]
2-4	ND [21]
4-6	ND [21]
6-8	ND [21.1]
8-10	ND [20.8]
10-12	ND [20.9]
12-14	ND [21.1]
12-14 dup	ND [21]
14-16	ND [21.5]
16-18	ND [20.9]

Test Pit 09	
Depth (ft)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [21.2]
4-6	ND [21.2]
6-8	ND [20.7]
8-10	ND [20.7]
10-12	ND [21]
12-14	ND [21.5]
14-16	ND [21]
14-16 dup	ND [21.4]
16-18	ND [21.4]

Test Pit 10	
Depth (ft)	DRO (mg/kg)
0-2	ND [21]
0-2 dup	ND [21.2]
2-4	ND [25.1]
4-6	ND [24.9]
6-8	ND [22.8]
8-10	ND [23.9]
10-12	ND [22.9]
12-14	ND [22.2]

Test Pit 11	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.2]
2-4	ND [21]
4-6	ND [21.1]
6-8	ND [23.6]
8-10	ND [24.7]
slope	71 [20.8]
slope dup	57.6 [20.9]

Test Pit 12	
Depth (ft)	DRO (mg/kg)
0-2	ND [27.7]
2-4	ND [27.2]
4-6	ND [20.6]
6-8	ND [20.4]
6-8 dup	ND [20.7]
8-10	ND [20.8]
10-12	ND [20.9]
12-14	ND [21]
14-16	ND [20.6]
16-18	ND [21]

Test Pit 13	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.4]
2-4	ND [20.3]
4-6	ND [20.6]
6-8	ND [20.5]
8-10	ND [20.5]
8-10 dup	ND [20.6]
10-12	ND [20.7]
12-14	ND [20.6]
14-16	ND [20.7]
16-18	ND [20.9]

Test Pit 14	
Depth (ft)	DRO (mg/kg)
Building foundation prevented sample collection.	

Test Pit 15	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	9.33 [21.3] J
12-14	ND [20.7]
14-16	ND [20.6]
16-18	ND [20.5]

Test Pit 16	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.4]
4-6	ND [20.3]
6-8	ND [20.6]
8-10	ND [20.4]
10-12	ND [20.5]
12-14	ND [20.7]
14-16	ND [20.9]
16-18	ND [21]
4-6	ND [20.4]

Test Pit 17	
Depth (ft)	DRO (mg/kg)
0-2	**317 [21.9]**
2-4	ND [22]
4-6	ND [22.1]
6-8	ND [22]
6-8 dup	ND [22]
8-10	ND [20.3]
10-12	ND [20.6]
12-14	ND [20.7]
14-16	ND [21.6]
16-18	ND [21.5]

Test Pit 18	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.4]
2-4	ND [22.1]
4-6	ND [20.1]
6-8	ND [20.7]
8-10	ND [20.8]
8-10 dup	ND [20.9]
10-12	ND [20.6]
12-14	ND [21]
14-16	ND [21.3]
16-18	ND [21.1]

Test Pit 19	
Depth (ft)	DRO (mg/kg)
Entire test pit was fill material. No native soil to sample.	

Test Pit 20	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	ND [21]
2-4 dup	ND [20.9]
4-6	ND [20.8]
6-8	ND [20.8]
8-10	ND [20.7]
10-12	ND [20.5]
12-14	ND [21]
14-16	ND [20.9]
16-18	ND [20.8]

Test Pit 21	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.9]
2-4	ND [20.6]
4-6	ND [21.1]
4-6 dup	ND [21]
6-8	ND [21.4]
8-10	ND [20.9]
10-12	ND [21.2]
12-14	ND [20.9]
14-16	ND [20.9]
16-18	ND [21.8]

Test Pit 22	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.8]
2-4	ND [22.5]
4-6	ND [20.5]
6-8	ND [20.5]
6-8 dup	ND [20.5]
8-10	ND [20.6]
10-12	ND [23]
12-14	ND [22.7]
14-16	ND [22.9]
16-18	ND [20.9]

Test Pit 23	
Depth (ft)	DRO (mg/kg)
0-2	12.4 [21.8] J
2-4	ND [22.1]
4-6	ND [21.3]
6-8	ND [21.2]
8-10	ND [20.5]
8-10 dup	ND [20.6]
10-12	ND [20.8]
12-14	ND [20.7]
14-16	ND [21]
16-18	ND [21.1]

Test Pit 24	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.5]
2-4	ND [20.8]
4-6	ND [20.7]
6-8	ND [20.7]
8-10	ND [20.7]
10-12	ND [20.8]
10-12 dup	ND [20.9]
12-14	ND [21.2]
14-16	ND [21.2]
16-18	ND [21.3]

Notes:

Bold and highlighted indicates concentrations exceeding the 230 mg/kg Method 2 DRO Cleanup Level for Migration to Groundwater in the over 40 inch zone (18 AAC 75 Table B)

ND(22) - not detected, limit of quantitation shown in parenthesis

slope - sample collected from slope between existing gravel pit and future gravel extraction area test pit

Overburden - The investigation area is being used for overburden storage. It was assumed that the fill encountered at these test pit locations is not related to DOD's use of the site and therefore was not sampled.

Data Flags:

J = Analyte result is considered an estimated value because the level is below the laboratory LOQ but above the detection limit

Table 4-1 Eklutna Army Site Test Pit Sampling Results

Test Pit 25	
Depth (ft)	DRO (mg/kg)
0-2	ND [21]
2-4	ND [22.1]
4-6	ND [20.5]
4-6 dup	ND [20.5]
6-8	ND [20.4]
8-10	ND [21]
10-12	ND [21]
12-14	ND [21.2]
14-16	ND [21]
16-18	ND [21.1]

Test Pit 26	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.7]
0-2 dup	ND [20.7]
2-4	ND [20.5]
4-6	ND [20.9]
6-8	ND [20.6]
8-10	ND [21]
10-12	ND [21.1]
12-14	ND [21]
14-16	ND [21.2]
16-18	ND [21]

Test Pit 27	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.8]
2-4	ND [21.2]
2-4 dup	ND [21.5]
4-6	ND [20.5]
6-8	ND [20.7]
8-10	ND [20.6]
10-12	ND [20.7]
12-14	ND [20.6]
14-16	ND [21]
16-18	ND [21.8]

Test Pit 28	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.9]
2-4	ND [20.5]
4-6	ND [21.7]
4-6 dup	ND [21.5]
6-8	ND [20.4]
8-10	ND [20.9]
10-12	ND [20.8]
12-14	ND [20.9]
14-16	ND [21.1]
16-18	ND [21.1]

Test Pit 29	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.2]
2-4	ND [20.6]
4-6	ND [20.4]
6-8	ND [20.4]
6-8 dup	ND [20.5]
8-10	ND [20.4]
10-12	ND [20.6]
12-14	ND [20.8]
14-16	ND [20.6]
16-18	ND [20.7]

Test Pit 30	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.6]
2-4	ND [20.9]
4-6	ND [20.7]
4-6 dup	ND [20.6]
6-8	ND [25.5]
8-10	ND [20.9]
10-12	ND [20.6]
12-14	ND [21]
14-16	ND [21.1]
16-18	ND [21]

Test Pit 31	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	Overburden
12-14	ND [21.2]
14-16	ND [21]
16-18	ND [21.2]
18-20	ND [20.7]

Test Pit 32	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	Overburden
12-14	Overburden
14-16	Overburden
16-18	24.1 [22.6]
18-20	ND [20.6]

Test Pit 33	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	ND [20.9]
6-8	ND [21.2]
8-10	ND [20.5]
8-10 dup	ND [20.2]
10-12	ND [20.9]
12-14	ND [21.2]
14-16	ND [21.6]
16-18	ND [21.3]

Test Pit 35	
Depth (ft)	DRO (mg/kg)
Entire test pit was fill material. No native soil to sample.	

Test Pit 34	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.1]
0-2 dup	ND [20.3]
2-4	ND [20.3]
4-6	ND [20.6]
6-8	ND [20.4]
8-10	ND [21.2]
10-12	ND [21.5]
12-14	ND [21]
14-16	ND [21.3]
16-18	ND [21.7]

Test Pit 36	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.6]
2-4 dup	ND [20.5]
4-6	ND [20.7]
6-8	ND [21]
8-10	ND [21.1]
10-12	ND [20.7]
12-14	ND [20.7]
14-16	ND [21.3]
16-18	ND [21.1]

Test Pit 37	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.6]
0-2 dup	7.34 [21.8] J
2-4	24.4 [20.4]
4-6	ND [20.6]
6-8	ND [20.5]
8-10	ND [20.7]
10-12	ND [20.9]
12-14	ND [21.1]
14-16	ND [20.9]
16-18	ND [21.1]

Test Pit 38	
Depth (ft)	DRO (mg/kg)
0-2	7.63 [20.5] J
2-4	ND [20.5]
4-6	ND [20.3]
6-8	ND [20.8]
6-8 dup	ND [20.8]
8-10	ND [21.1]
10-12	ND [20.9]
12-14	ND [28.9]
14-16	ND [20.9]
16-18	ND [21.4]

Test Pit 39	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	7.74 [20.9] J
4-6	ND [20.6]
6-8	ND [20.6]
8-10	ND [21]
10-12	ND [21.2]
10-12 dup	ND [21.4]
12-14	ND [20.6]
14-16	ND [21.2]
16-18	ND [21.1]

Test Pit 40	
Depth (ft)	DRO (mg/kg)
0-2	ND [22.8]
2-4	ND [20.1]
4-6	ND [20.1]
6-8	ND [20.5]
8-10	ND [20.7]
8-10 dup	ND [20.7]
10-12	ND [20.6]
12-14	ND [20.6]
14-16	ND [20.8]
16-18	ND [20.6]

Test Pit 42	
Depth (ft)	DRO (mg/kg)
0-2	ND [22]
2-4	ND [20.2]
4-6	ND [20.2]
4-6 dup	ND [20.6]
6-8	ND [20.4]
8-10	ND [20.9]
10-12	ND [20.5]
12-14	ND [21.1]
14-16	ND [21]
16-18	ND [20.6]

Test Pit 43	
Depth (ft)	DRO (mg/kg)
0-2	ND [22.9]
2-4	ND [22.2]
4-6	ND [21.7]
6-8	ND [20.8]
8-10	ND [20.8]
8-10	ND [20.9]
10-12	ND [21]
12-14	ND [20.9]
14-16	ND [20.9]
16-18	ND [21.5]

Notes:

Bold and highlighted indicates concentrations exceeding the 230 mg/kg Method 2 DRO Cleanup Level for Migration to Groundwater in the over 40 inch zone (18 AAC 75 Table B)

ND(22) - not detected, limit of quantitation shown in parenthesis

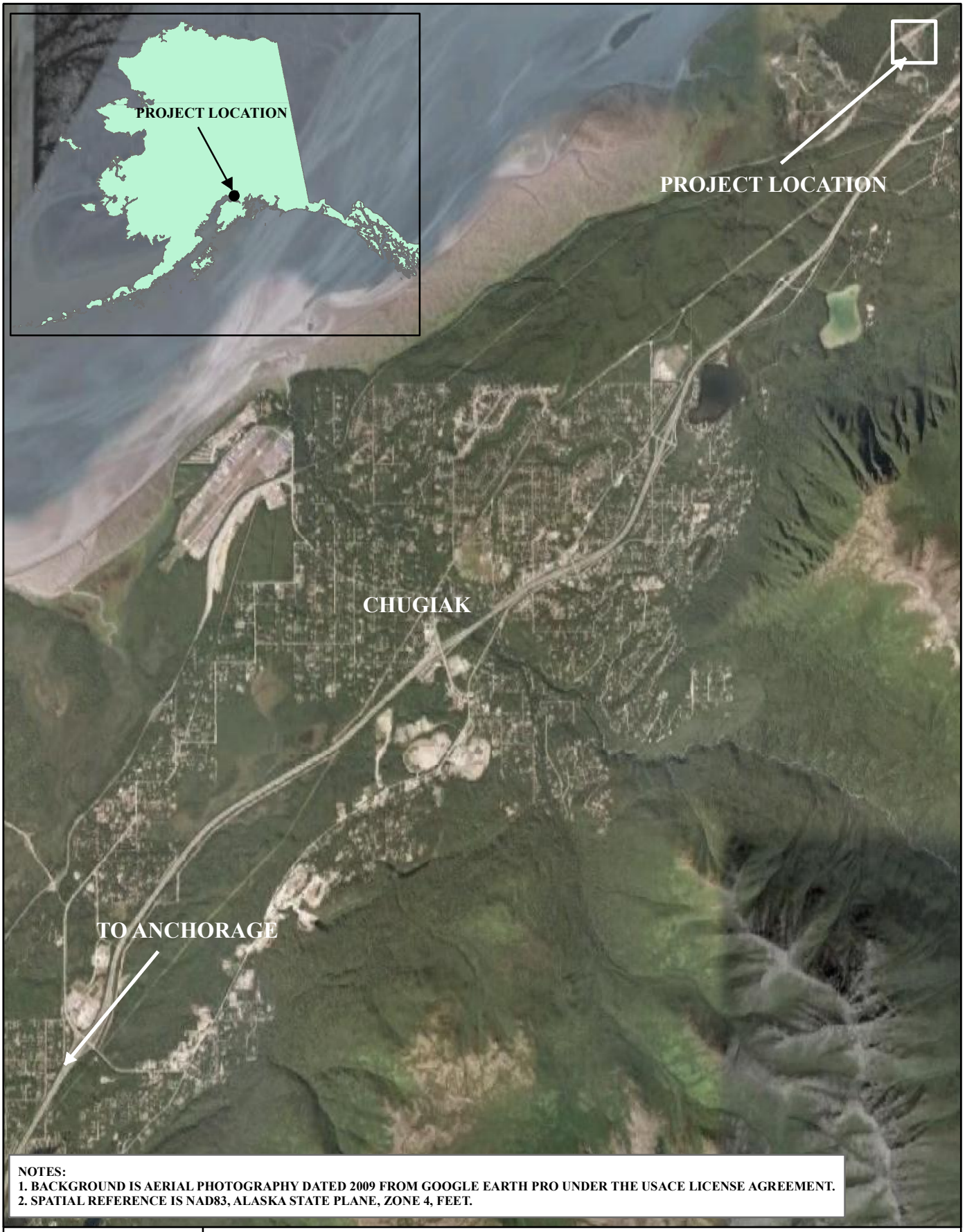
slope - sample collected from slope between existing gravel pit and future gravel extraction area test pit

Overburden - The investigation area is being used for overburden storage. It was assumed that the fill encountered at these test pit locations is not related to DOD's use of the site and therefore was not sampled.

Data Flags:

J = Analyte result is considered an estimated value because the level is below the laboratory LOQ but above the detection limit

Figures



NOTES:
1. BACKGROUND IS AERIAL PHOTOGRAPHY DATED 2009 FROM GOOGLE EARTH PRO UNDER THE USACE LICENSE AGREEMENT.
2. SPATIAL REFERENCE IS NAD83, ALASKA STATE PLANE, ZONE 4, FEET.

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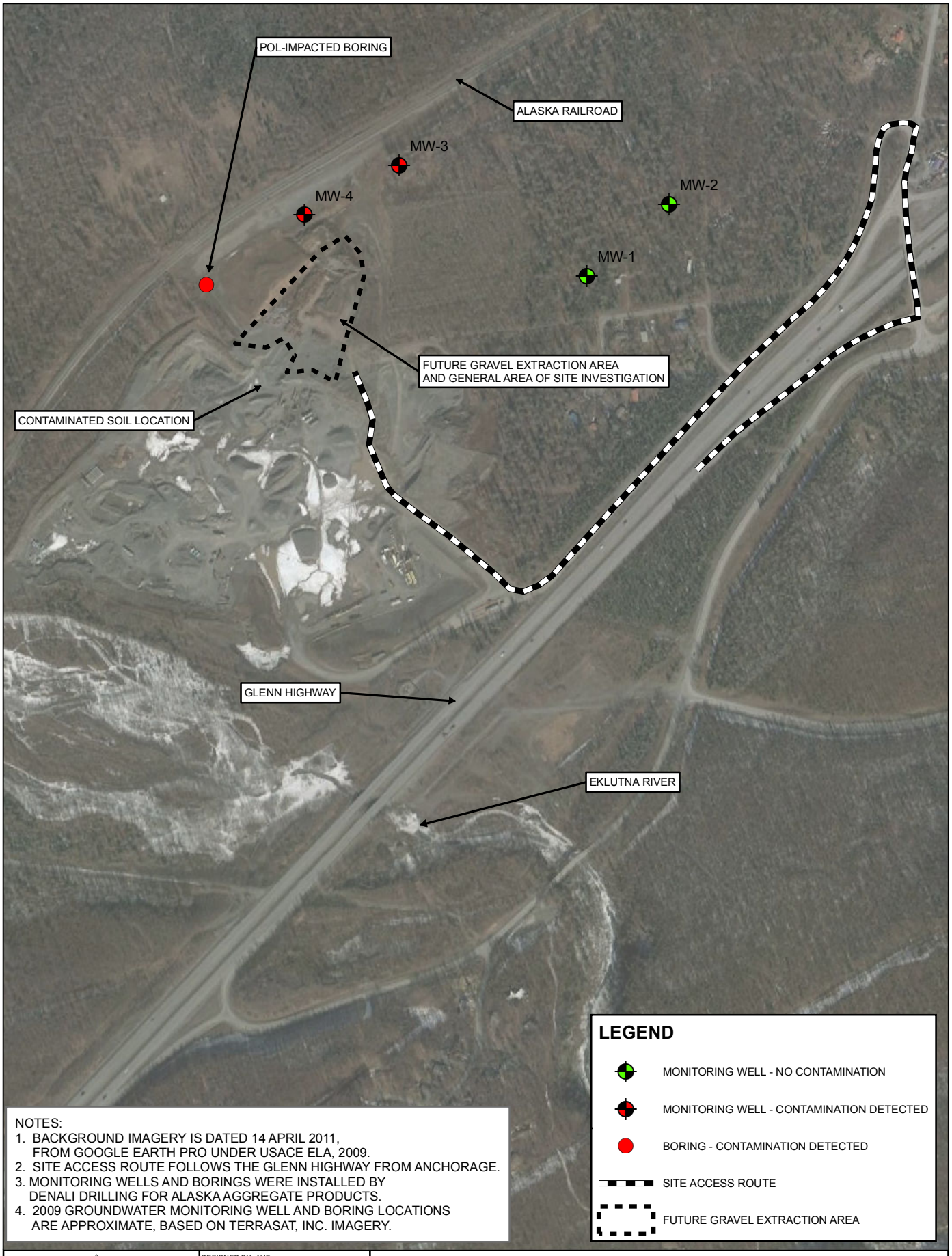
Miles

LOCATION AND VICINITY MAP

U.S. Army Corps of Engineers Alaska District

EKLUTNA ARMY FUDS - F10AK0097
EKLUTNA, ALASKA

FIGURE 1



NOTES:
1. BACKGROUND IMAGERY IS DATED 14 APRIL 2011, FROM GOOGLE EARTH PRO UNDER USACE ELA, 2009.
2. SITE ACCESS ROUTE FOLLOWS THE GLENN HIGHWAY FROM ANCHORAGE.
3. MONITORING WELLS AND BORINGS WERE INSTALLED BY DENALI DRILLING FOR ALASKA AGGREGATE PRODUCTS.
4. 2009 GROUNDWATER MONITORING WELL AND BORING LOCATIONS ARE APPROXIMATE, BASED ON TERRASAT, INC. IMAGERY.

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0 300 600

FEET

DESIGNED BY: NJF
DRAWN BY: GNO
APPROVED BY: LKG

DATE: 4 JUNE 2012

U.S. ARMY
CORPS OF ENGINEERS
ALASKA DISTRICT

SITE ACCESS MAP

EKLUTNA ARMY SITES - F10AK0097

EKLUTNA, ALASKA

FIGURE 2

FILE: Fig2_Report_Eklutna2011_r0.mxd

NOTES
1. BACKGROUND IMAGERY IS DATED 19 MAY 1964.
2. IMAGERY IS ROUGHLY GEOREFERENCED TO GOOGLE EARTH IMAGERY DATED 14 APRIL 2011 THAT WAS GEOREFERENCED USING 2011 GPS SURVEY INFORMATION.
3. MONITORING WELLS WERE INSTALLED BY DENALI DRILLING FOR ALASKA AGGREGATE PRODUCTS.

N

0 50 100

FEET

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT

DESIGNED BY: NJF
DRAWN BY: GNO
APPROVED BY: LKG

UVOST PROBE AND TEST PIT LOCATIONS EKLUTNA ARMY SITES FUDS 2011 INVESTIGATION

EKLUTNA ARMY SITES - F10AK0097

EKLUTNA, ALASKA

FIGURE 3

FILE: D:\PROJECTS\EKLUTNA_GIS\01_MXD\REPORT\Fig3_Report_Eklutna2011_r0.mxd, DATED: 04 Jun 2012

Test Pit TP-01	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.6]
0-2 dup	ND [20.7]
2-4	ND [20.7]
4-6	ND [20.8]
6-8	ND [20.3]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [21]
14-16	ND [21]
16-18	ND [21.3]

Test Pit TP-02	
Depth (feet)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [20.6]
2-4 dup	ND [20.6]
4-6	ND [20.7]
6-8	ND [20.6]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [20.9]
14-16	ND [21]
16-18	ND [21.6]

Test Pit TP-03	
Depth (feet)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [20.6]
4-6	ND [20.7]
4-6 dup	ND [20.6]
6-8	ND [20.6]
8-10	ND [20.5]
10-12	ND [20.9]
12-14	ND [20.9]
14-16	ND [21]
16-18	ND [21.6]

Test Pit TP-04	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.5]
2-4	ND [20.4]
4-6	ND [20.9]
6-8	ND [20.5]
6-8 dup	ND [20.8]
8-10	ND [20.9]
10-12	ND [20.6]
12-14	ND [20.8]
14-16	ND [21.8]
16-18	ND [22.2]

Test Pit TP-05	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.5]
4-6	15.8 [20.5] J
6-8	ND [20.5]
8-10	ND [21.4]
8-10 dup	9.46 [21.6] J
10-12	ND [21.4]
12-14	ND [21.4]
14-16	ND [22.3]
16-18	ND [21.9]

Test Pit TP-06	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.3]
2-4	ND [20.3]
4-6	ND [21.2]
6-8	ND [20.5]
8-10	ND [21]
10-12	ND [21.5]
10-12 dup	ND [21.3]
12-14	ND [21.6]
14-16	ND [22]
16-18	ND [22.2]

Test Pit TP-07
Test pit was fill. No sample.

Test Pit TP-24	
Depth (ft)	DRO (mg/kg)
0-2	ND [20.5]
2-4	ND [20.8]
4-6	ND [20.7]
6-8	ND [20.7]
8-10	ND [20.7]
10-12	ND [20.8]
10-12 dup	ND [20.9]
12-14	ND [21.2]
14-16	ND [21.2]
16-18	ND [21.3]

Test Pit TP-25	
Depth (feet)	DRO (mg/kg)
0-2	ND [21]
2-4	ND [22.1]
4-6	ND [20.5]
4-6 dup	ND [20.5]
6-8	ND [20.4]
8-10	ND [21]
10-12	ND [21]
12-14	ND [21.2]
14-16	ND [21]
16-18	ND [21.1]

Test Pit TP-26	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.7]
0-2 dup	ND [20.7]
2-4	ND [20.5]
4-6	ND [20.9]
6-8	ND [20.6]
8-10	ND [21]
10-12	ND [21.1]
12-14	ND [21]
14-16	ND [21.2]
16-18	ND [21]

Test Pit TP-27	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.8]
2-4	ND [21.2]
2-4 dup	ND [21.5]
4-6	ND [20.5]
6-8	ND [20.7]
8-10	ND [20.6]
10-12	ND [20.7]
12-14	ND [20.6]
14-16	ND [21]
16-18	ND [21.8]

Test Pit TP-28	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.9]
2-4	ND [20.5]
4-6	ND [21.7]
4-6 dup	ND [21.5]
6-8	ND [20.4]
8-10	ND [20.9]
10-12	ND [20.8]
12-14	ND [20.9]
14-16	ND [21.1]
16-18	ND [21.1]

Test Pit TP-08	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.8]
2-4	ND [21]
4-6	ND [21]
6-8	ND [21.1]
8-10	ND [20.8]
10-12	ND [20.9]
12-14	ND [21.1]
12-14 dup	ND [21]
14-16	ND [21.5]
16-18	ND [20.9]

Test Pit TP-09	
Depth (feet)	DRO (mg/kg)
0-2	ND [22.2]
2-4	ND [21.2]
4-6	ND [21.2]
6-8	ND [20.7]
8-10	ND [20.7]
10-12	ND [21]
12-14	ND [21.5]
14-16	ND [21]
14-16 dup	ND [21.4]
16-18	ND [21.4]

Test Pit TP-10	
Depth (feet)	DRO (mg/kg)
0-2	ND [21]
0-2 dup	ND [21.2]
2-4	ND [25.1]
4-6	ND [24.9]
6-8	ND [22.8]
8-10	ND [23.9]
10-12	ND [22.9]
12-14	ND [22.2]

Test Pit TP-11	
Depth (feet)	DRO (mg/kg)
0-2	ND [21.2]
2-4	ND [21]
4-6	ND [21.1]
6-8	ND [23.6]
8-10	ND [24.7]
slope	71 [20.8]
slope dup	57.6 [20.9]

Test Pit TP-12	
Depth (feet)	DRO (mg/kg)
0-2	ND [27.7]
2-4	ND [27.2]
4-6	ND [20.6]
6-8	ND [20.4]
6-8 dup	ND [20.7]
8-10	ND [20.8]
10-12	ND [20.9]
12-14	ND [21]
14-16	ND [20.6]
16-18	ND [21]

Test Pit TP-13	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.4]
2-4	ND [20.3]
4-6	ND [20.6]
6-8	ND [20.5]
8-10	ND [20.5]
8-10 dup	ND [20.6]
10-12	ND [20.7]
12-14	ND [20.6]
14-16	ND [20.7]
16-18	ND [20.9]

Test Pit TP-29	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.2]
2-4	ND [20.6]
4-6	ND [20.4]
6-8	ND [20.4]
6-8 dup	ND [20.5]
8-10	ND [20.4]
10-12	ND [20.6]
12-14	ND [20.8]
14-16	ND [20.6]
16-18	ND [20.7]

Test Pit TP-30	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.6]
2-4	ND [20.9]
4-6	ND [20.7]
4-6 dup	ND [20.6]
6-8	ND [25.5]
8-10	ND [20.9]
10-12	ND [20.6]
12-14	ND [21]
14-16	ND [21.1]
16-18	ND [21]

Test Pit TP-31	
Depth (feet)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	Overburden
12-14	ND [21.2]
14-16	ND [21]
16-18	ND [21.2]
18-20	ND [20.7]

Test Pit TP-32	
Depth (feet)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	Overburden
12-14	Overburden
14-16	Overburden
16-18	24.1 [22.6]
18-20	ND [20.6]

Test Pit TP-15	
Depth (feet)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	Overburden
6-8	Overburden
8-10	Overburden
10-12	9.33 [21.3] J
12-14	ND [20.7]
14-16	ND [20.6]
16-18	ND [20.5]

Test Pit TP-16	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.4]
4-6	ND [20.3]
6-8	ND [20.6]
8-10	ND [20.4]
10-12	ND [20.5]
12-14	ND [20.7]
14-16	ND [20.9]
16-18	ND [21]
4-6	ND [20.4]

Test Pit TP-14
Building foundation prevented sample collection.

Test Pit TP-33	
Depth (feet)	DRO (mg/kg)
0-2	Overburden
2-4	Overburden
4-6	ND [20.9]
6-8	ND [21.2]
8-10	ND [20.5]
8-10 dup	ND [20.2]
10-12	ND [20.9]
12-14	ND [21.2]
14-16	ND [21.6]
16-18	ND [21.3]

Test Pit TP-34	
Depth (feet)	DRO (mg/kg)
0-2	ND [21.1]
0-2 dup	ND [20.3]
2-4	ND [20.3]
4-6	ND [20.6]
6-8	ND [20.4]
8-10	ND [21.2]
10-12	ND [21.5]
12-14	ND [21]
14-16	ND [21.3]
16-18	ND [21.7]

Test Pit TP-36	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.7]
2-4	ND [20.6]
2-4 dup	ND [20.5]
4-6	ND [20.7]
6-8	ND [21]
8-10	ND [21.1]
10-12	ND [20.7]
12-14	ND [20.7]
14-16	ND [21.3]
16-18	ND [21.1]

Test Pit TP-37	
Depth (feet)	DRO (mg/kg)
0-2	ND [21.6]
0-2 dup	7.34 [21.8] J
2-4	24.4 [20.4]
4-6	ND [20.6]
6-8	ND [20.5]
8-10	ND [20.7]
10-12	ND [20.9]
12-14	ND [21.1]
14-16	ND [20.9]
16-18	ND [21.1]

Test Pit TP-17	
Depth (feet)	DRO (mg/kg)
0-2	**317 [21.9]**
2-4	ND [22]
4-6	ND [22.1]
6-8	ND [22]
6-8 dup	ND [22]
8-10	ND [20.3]
10-12	ND [20.6]
12-14	ND [20.7]
14-16	ND [21.6]
16-18	ND [21.5]

Test Pit TP-18	
Depth (feet)	DRO (mg/kg)
0-2	ND [20.4]
2-4	ND [22.1]
4-6	ND [20.1]
6-8	ND [20.7]
8-10	ND [20.8]
8-10 dup	ND [20.9]
10-12	ND [20.6]
12-14	ND [21]
14-16	ND [21.3]
16-18	ND [21.1]

Test Pit TP-38	
Depth (feet)	DRO (mg/kg)
0-2	7.63 [20.5] J
2-4	ND [20.5]
4-6	ND [20.3]
6-8	ND [20.8]
6-8 dup	ND [20.8]
8-10	ND [21.1]
10-12	ND [20.9]
12-14	ND [28.9]
14-16	ND [20.9]
16-18	ND [21.4]

Test Pit TP-39	
Depth (feet)	DRO (mg/kg)
0-2	Overburden
2-4	7.74 [20.9] J
4-6	ND [20.6]
6-8	ND [20.6]
8-10	ND [21]
10-12	ND [21.2]
10-12 dup	ND [21.4]
12-14	ND [20.6]
14-16	ND [21.2]
16-18	ND [21.1]

Test Pit TP-40	
Depth (feet)	DRO (mg/kg)
0-2	ND [22.8]
2-4	ND [20.1]
4-6	ND [20.1]
6-8	ND [20.5]
8-10	ND [20.7]
8-10 dup	ND [20.7]
10-12	ND [20.6]
12-14	ND [20.6]
14-16	ND [20.8]
16-18	ND [20.6]

Test Pit TP-19
Test pit was fill. No sample collected.

Test Pit TP-35
Test pit was fill. No sample collected.

Test Pit TP-20	
Depth (ft)	DRO (mg/kg)
0-2	Overburden
2-4	ND [21]
2-4 dup	ND [20.9]
4-6	ND [20.8]
6-8	ND [20.8]
8-10	ND [20.7]
10-12	ND [20.5]
12-14	ND [21]
14-16	ND [20.9]
16-18	ND [20.8]

Test Pit TP-21	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.9]
2-4	ND [20.6]
4-6	ND [21.1]
4-6 dup	ND [21]
6-8	ND [21.4]
8-10	ND [20.9]
10-12	ND [21.2]
12-14	ND [20.9]
14-16	ND [20.9]
16-18	ND [21.8]

Test Pit TP-22	
Depth (ft)	DRO (mg/kg)
0-2	ND [21.8]
2-4	ND [22.5]
4-6	ND [20.5]
6-8	ND [20.5]
6-8 dup	ND [20.5]
8-10	ND [20.6]
10-12	ND [23]
12-14	ND [22.7]
14-16	ND [22.9]
16-18	ND [20.9]

Test Pit TP-23	
Depth (ft)	DRO (mg/kg)
0-2	12.4 [21.8] J
2-4	ND [22.1]
4-6	ND [21.3]
6-8	ND [21.2]
8-10	ND [20.5]
8-10 dup	ND [20.6]
10-12	ND [20.8]
12-14	ND [20.7]
14-16	ND [21]
16-18	ND [21.1]

Test Pit TP-42	
Depth (feet)	DRO (mg/kg)
0-2	ND [22]
2-4	ND [20.2]
4-6	ND [20.2]
4-6 dup	ND [20.6]
6-8	ND [20.4]
8-10	ND [20.9]
10-12	ND [20.5]
12-14	ND [21.1]
14-16	ND [21]
16-18	ND [20.6]

Test Pit TP-43	
Depth (feet)	DRO (mg/kg)
0-2	ND [22.9]
2-4	ND [22.2]
4-6	ND [21.7]
6-8	ND [20.8]
8-10	ND [20.8]
8-10 dup	ND [20.9]
10-12	ND [21]
12-14	ND [20.9]
14-16	ND [20.9]
16-18	ND [21.5]

MW-4
TP-43
TP-20
TP-16
TP-15
TP-21
TP-19
TP-31
TP-39
TP-14
TP-25
TP-22
TP-37
TP-13
TP-30
TP-23
TP-42
TP-38
TP-32
TP-24
TP-29
TP-28
TP-36
TP-03
TP-18
TP-33
TP-12
TP-40
TP-27
TP-04
TP-17
TP-34
UVOST-001
TP-01
TP-02
UVOST-002
TP-08
UVOST-003
UVOST-005
TP-05
TP-09
UVOST-004
UVOST-006
TP-35
TP-10
UVOST-007
TP-06
TP-07
UVOST-008
TP-11
TP-26

LEGEND
- TEST PIT
- UVOST PROBE
- MONITORING WELL - NO CONTAMINATION
- MONITORING WELL - CONTAMINATED
- RESULT > ADEC CLEANUP LEVEL

NOTES
1. BACKGROUND IMAGERY IS DATED 14 APRIL 2011 FROM GOOGLE EARTH PRO UNDER THE USACE ENTERPRISE LICENSE AGREEMENT, 2009.
2. DEPTHS ARE FEET BELOW GROUND SURFACE AT THE TIME OF EXCAVATION. GROUND SURFACE ELEVATIONS HAVE CHANGED SINCE THE SAMPLING WAS CONDUCTED.
3. BOLD RESULTS IN RED BOX EXCEED THE ADEC METHOD 2 SOIL CLEANUP LEVEL.
4. TEST PIT TP-41 WAS SKIPPED IN THE TEST PIT SEQUENCE.
5. UVOST-008 WAS LOCATED AT TP-11, HOWEVER IT IS SHOWN IMMEDIATELY ADJACENT IN THIS FIGURE.
6. OVERBURDEN - THE INVESTIGATION AREA IS BEIND USED FOR OVERBURDEN STORAGE. IT WAS ASSUMED THAT THE FILL ENCOUNTERED AT THESE TEST PIT LOCATIONS IS NOT RELATED TO DOD'S USE OF THE SITE AND THEREFORE WAS NOT SAMPLED.

ACRONYMS AND ABBREVIATIONS
MG/KG = MILLIGRAMS PER KILOGRAM
MW = MONITORING WELL
ND[LOQ] = NOT DETECTED (LIMIT OF QUANTITATION)
TP = TEST PIT
UVOST = ULTRAVIOLET OPTICAL SCREENING TOOL

N
0 50 100
FEET

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT

DESIGNED BY: NJF
DRAWN BY: GNO
APPROVED BY: LKG

UVOST PROBE AND TEST PIT RESULTS EKLUTNA ARMY SITES FUDS 2011 INVESTIGATION

EKLUTNA ARMY SITES - F10AK0097
EKLUTNA, ALASKA

FIGURE 4

FILE: O:\EN\Public\Engineer\Projects\FUDS\EKLUTNA_GIS\01_MXD\REPORT\Fig4_Report_Eklutna2011_r0.mxd, DATE: 04 Jun 2012

APPENDIX A
Select Site Photographs

Photo 1. Excavating test pit 01 (looking north)

Photo 2. Test pit depth estimated based on scale on excavator arm (red dots)

Photo 3. Sample 11EAF05ASL (test pit 05 0-2 feet bgs)

Photo 4. Sample 11EAF05BSL (test pit 05 2-4 feet bgs)

Photo 5. Sample 11EAF05CSL (test pit 05 4-6 feet bgs)

Photo 6. Sample 11EAF05DSL (test pit 05 6-8 feet bgs)

Photo 7. Sample 11EAF05ESL (test pit 05 8-10 feet bgs)

Photo 8. Sample 11EAF05FSL (test pit 05 10-12 feet bgs)

Photo 9. Sample 11EAF05GSL (test pit 05 12-14 feet bgs)

Photo 10. Sample 11EAF05HSL (test pit 05 14-16 feet bgs)

Photo 11. Sample 11EAF05ISL (test pit 05 16-18 feet bgs)

Photo 12. Test Pit 05

Photo 13. Backfilled test pit 02 (looking south)

Photo 14. Backfilled test pit 03 (looking northeast)

Photo 15. Backfilled test pit 05 (looking north)

Photo 16. Backfilled test pit 06 (looking west)

Photo 17. Backfilled test pit 09 (looking northwest)

Photo 18. Backfilled test pit 11 (looking southeast)

Photo 19. Concrete foundation encountered at test pit 14

Photo 20. Moving overburden to access test pit 23 (looking north)

Photo 21. Moving debris to access test pit 25 (looking northeast)

Photo 22. Excavating test pit 26 (looking west)

Photo 23. Backfilled test pit 27 (looking southeast)

Photo 24. Excavating test pit 31 (fill material) looking north

Photo 25. Excavating test pit 34 (looking east)

Photo 26. Backfilled test pit 38 (looking southeast)

Photo 27. Test Pit 39 (looking northwest)

Photo 28. Recording location of test pits with GPS

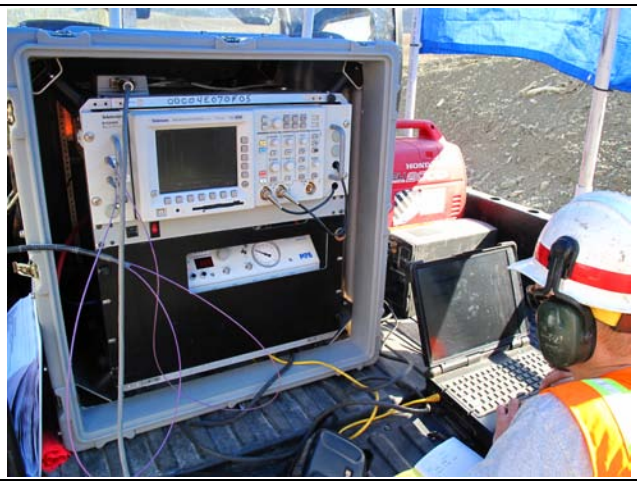

Photo 29. Operating UVOST at Eklutna FUDS

Photo 30. UVOST investigation at Eklutna FUDS (looking south)

APPENDIX B
Survey Data

Location	Lattitude	Longitude
Test Pit 01	61.456347	-149.377661
Test Pit 02	61.456318	-149.378072
Test Pit 03	61.456516	-149.377668
Test Pit 04	61.456402	-149.377303
Test Pit 05	61.456228	-149.377108
Test Pit 06	61.455992	-149.376908
Test Pit 07	61.455978	-149.376411
Test Pit 08	61.456256	-149.376681
Test Pit 09	61.456208	-149.376159
Test Pit 10	61.456005	-149.378031
Test Pit 11	61.455951	-149.377604
Test Pit 12	61.456484	-149.378592
Test Pit 13	61.456898	-149.377302
Test Pit 14	61.457109	-149.376988
Test Pit 15	61.457480	-149.376574
Test Pit 16	61.457647	-149.376045
Test Pit 17	61.456396	-149.375724
Test Pit 18	61.456508	-149.376524
Test Pit 19	61.457304	-149.376186
Test Pit 20	61.457936	-149.376303
Test Pit 21	61.457509	-149.375612
Test Pit 22	61.457085	-149.375274
Test Pit 23	61.456907	-149.375621
Test Pit 24	61.456775	-149.375509
Test Pit 25	61.457084	-149.376451
Test Pit 26	61.455935	-149.377256
Test Pit 27	61.456425	-149.376875
Test Pit 28	61.456630	-149.377037
Test Pit 29	61.456690	-149.376674
Test Pit 30	61.456894	-149.376739
Test Pit 31	61.457172	-149.375888
Test Pit 32	61.456795	-149.376148
Test Pit 33	61.456514	-149.376127
Test Pit 34	61.456350	-149.375362
Test Pit 35	61.456034	-149.375849
Test Pit 36	61.456568	-149.377939
Test Pit 37	61.456973	-149.379342
Test Pit 38	61.456810	-149.378920

Location	Lattitude	Longitude
Test Pit 39	61.457135	-149.378890
Test Pit 40	61.456444	-149.379044
Test Pit 42	61.456834	-149.379696
Test Pit 43	61.457849	-149.376688
UVOST 001	61.456375	-149.378396
UVOST 002	61.456268	-149.378161
UVOST 003	61.456224	-149.377876
UVOST 004*	-	-
UVOST 005	61.456209	-149.377502
UVOST 006*	-	-
UVOST 007	61.456005	-149.376991
UVOST 008	61.455951	-149.377604

Horizontal

System: GCS_WGS_1984

Datum: D_WGS_1984

Units: Decimal Degrees

* No GPS data was collected. Location was estimated based on field notes.

** This GPS data was collected using an Ashtech Mobile Mapper 100 running ArcPad Version 10 software. Tracklog data was not collected, therefore PDOP and the number of satellites acquired are not known. The GPS data was post-processed for differential correction using reference data from CORS stations ATW2 (in Palmer, Alaska) and ZAN1 (in Anchorage, Alaska) using Mobile Mapper Office Version 2.0 software.

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APPENDIX C
Laboratory Data Package

(included on Report CD)

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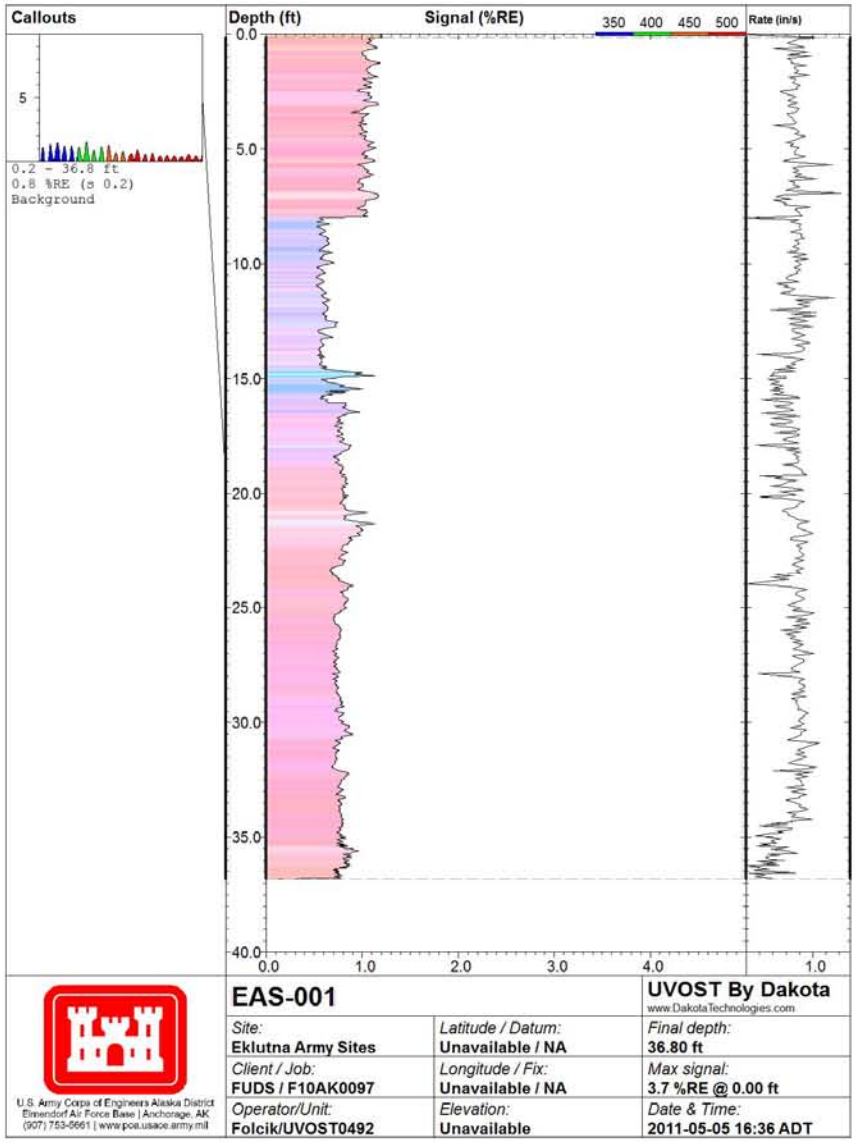
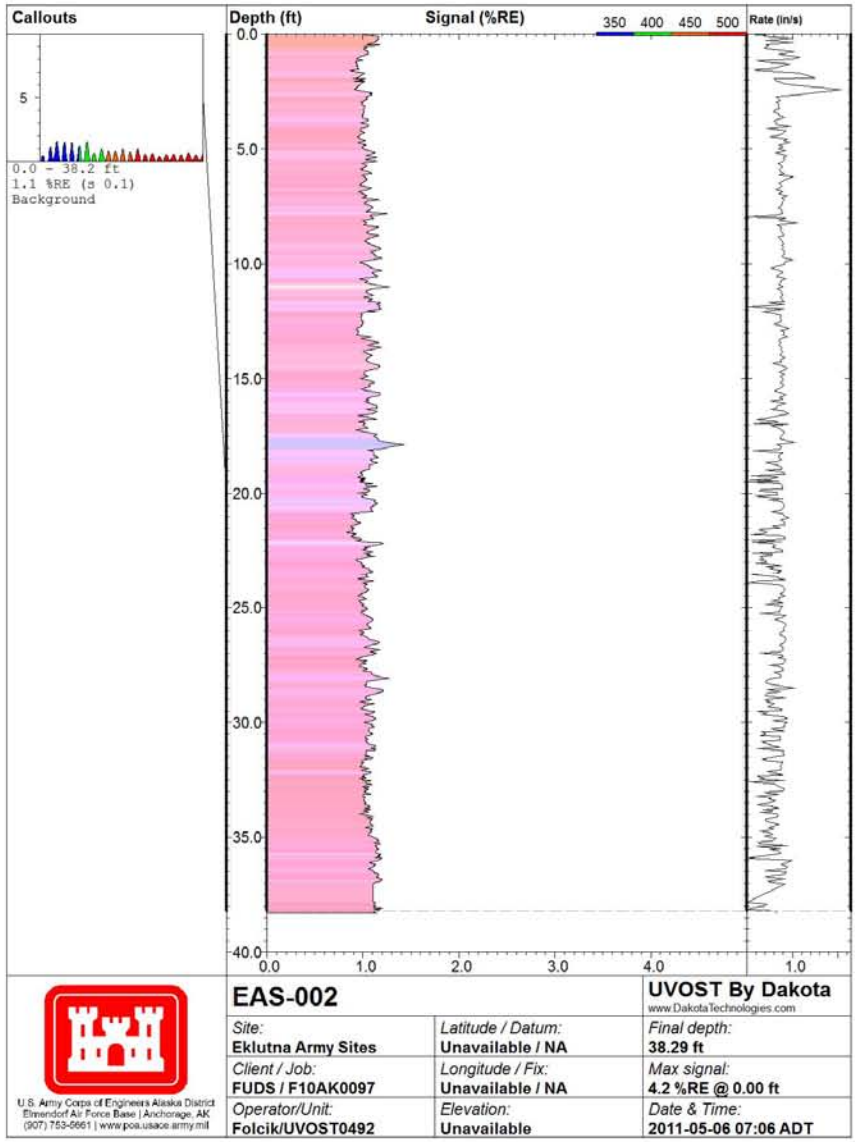
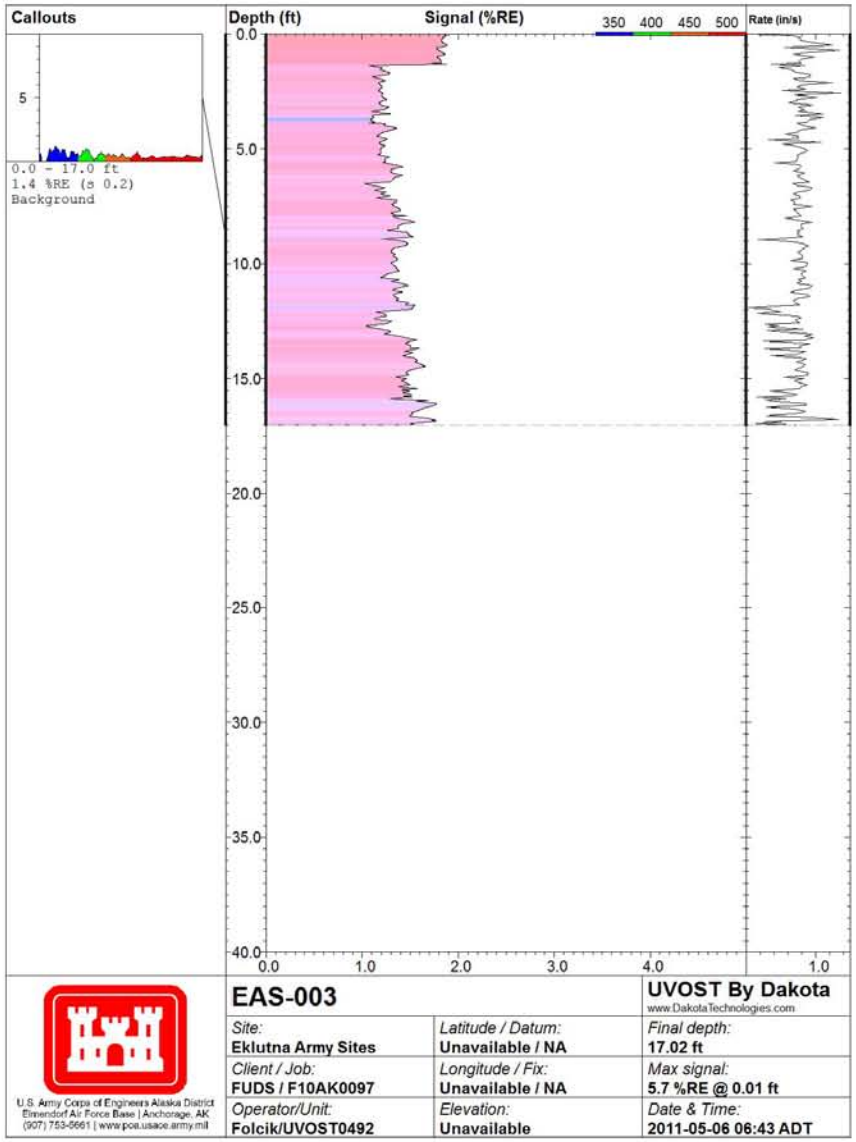
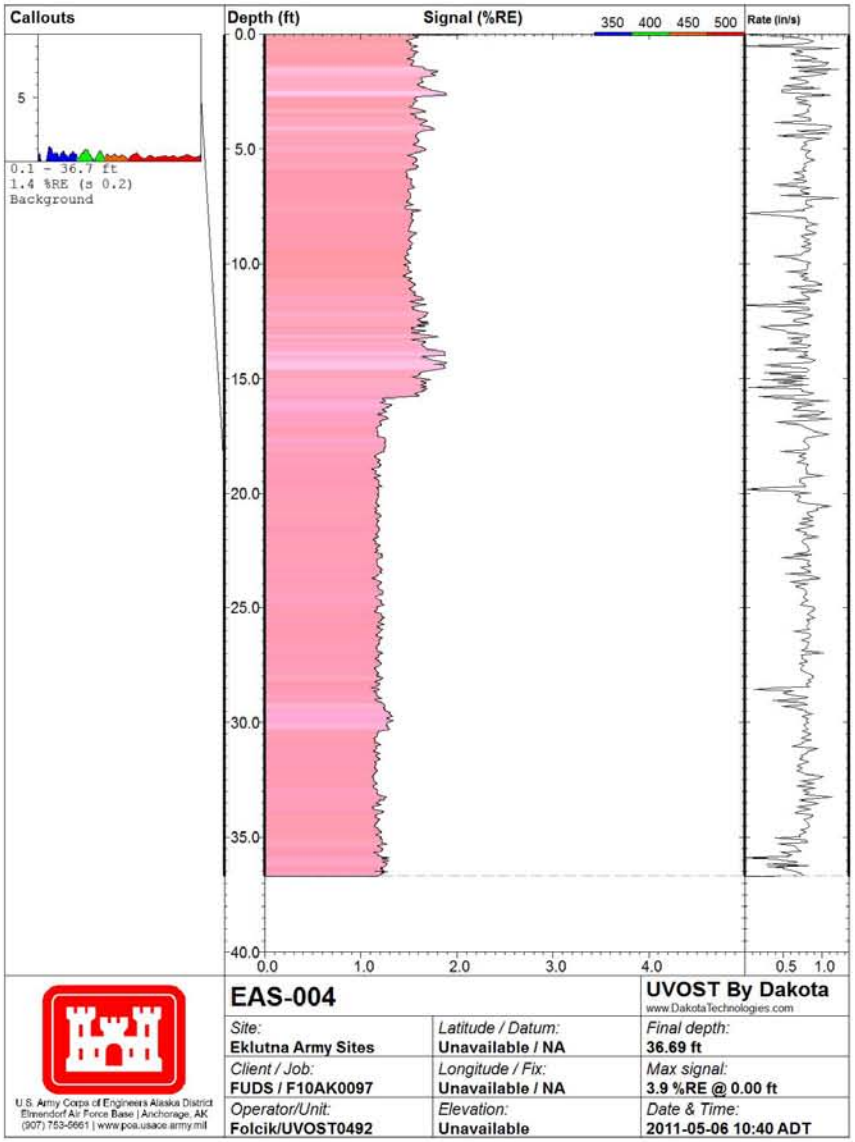
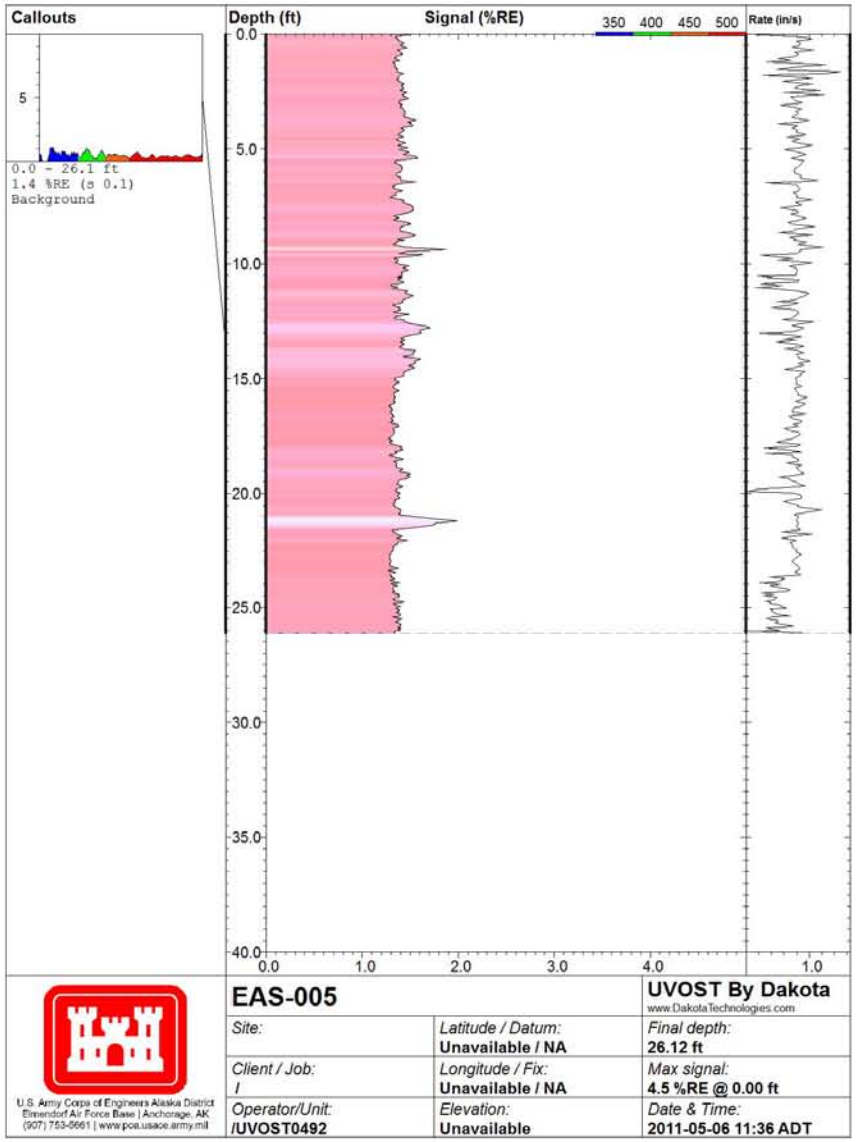
APPENDIX D
UVOST/LIF Probe Logs

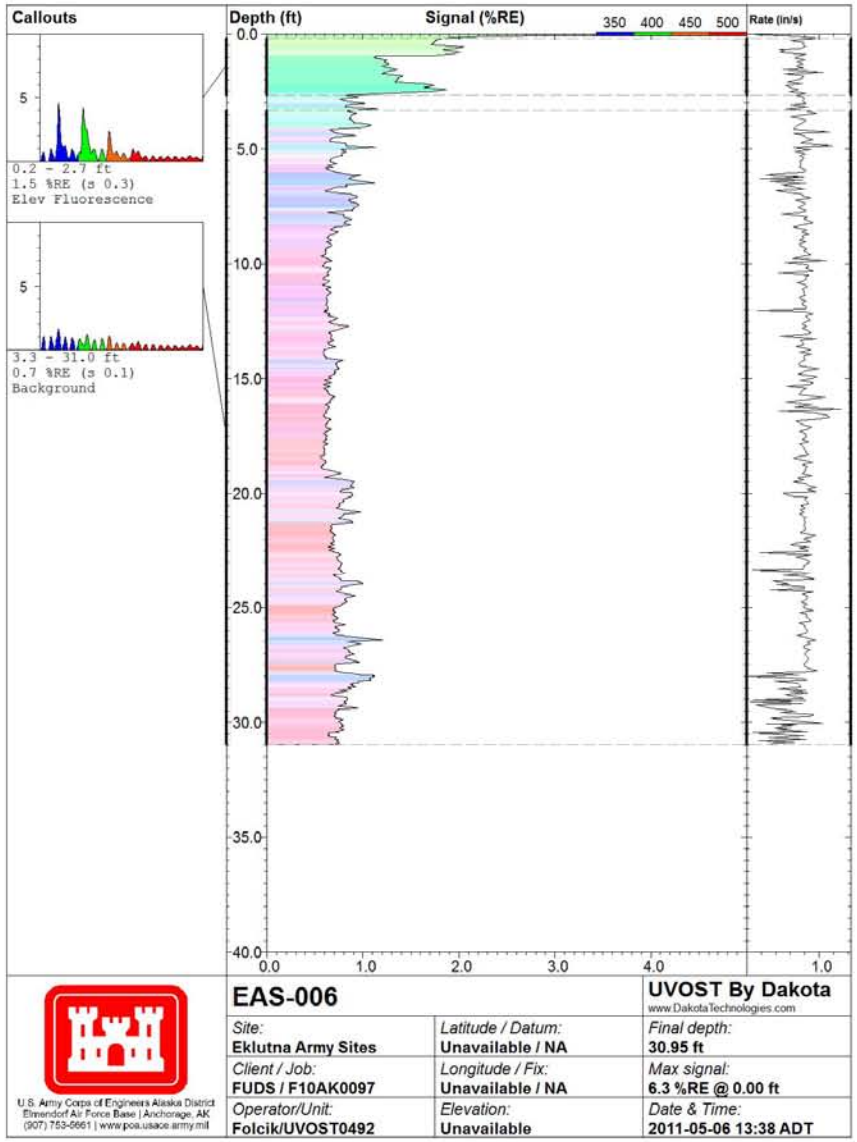

Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.2 - 36.8 ft
0.8 %RE (s 0.2)
Background
EAS-001
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 36.80 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 3.7 %RE @ 0.00 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-05 16:36 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil

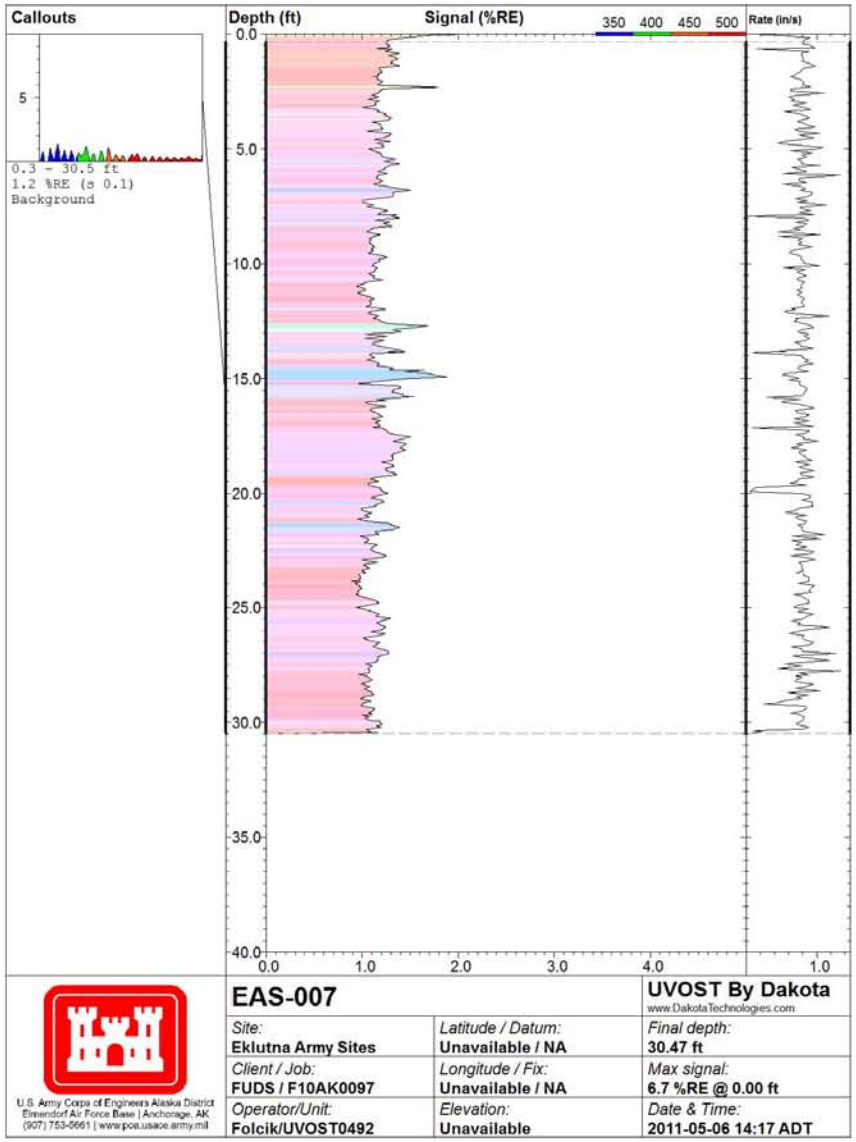

Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.0 - 38.2 ft
1.1 %RE (s 0.1)
Background
EAS-002
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 38.29 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 4.2 %RE @ 0.00 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-06 07:06 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil

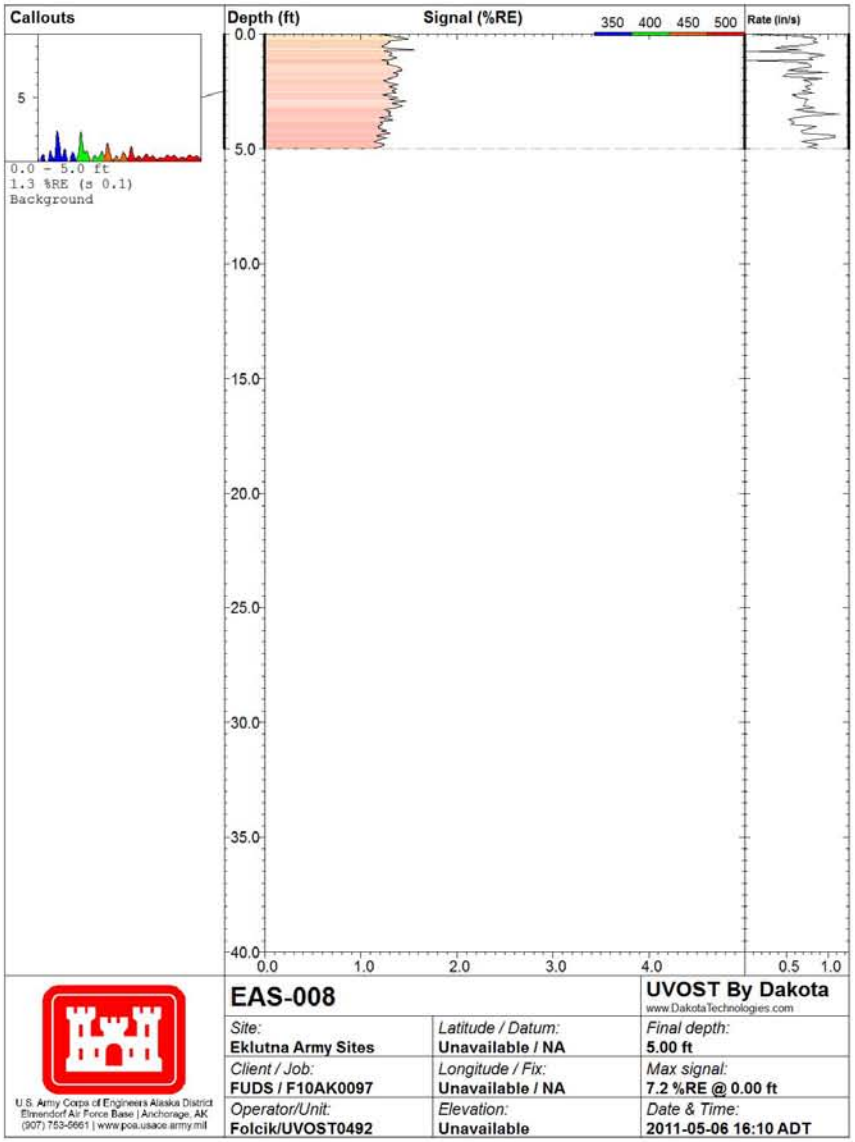

Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.0 - 17.0 ft
1.4 %RE (s 0.2)
Background
EAS-003
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 17.02 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 5.7 %RE @ 0.01 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-06 06:43 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil


Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.1 - 36.7 ft
1.4 %RE (s 0.2)
Background
EAS-004
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 36.69 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 3.9 %RE @ 0.00 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-06 10:40 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil


Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.0 - 26.1 ft
1.4 %RE (s 0.1)
Background
EAS-005
UVOST By Dakota
www.DakotaTechnologies.com
Site:
Latitude / Datum:
Unavailable / NA
Final depth:
26.12 ft
Client / Job:
/
Longitude / Fix:
Unavailable / NA
Max signal:
4.5 %RE @ 0.00 ft
Operator/Unit:
/UVOST0492
Elevation:
Unavailable
Date & Time:
2011-05-06 11:36 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil


Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.2 - 2.7 ft
1.5 %RE (s 0.3)
Elev Fluorescence
3.3 - 31.0 ft
0.7 %RE (s 0.1)
Background
EAS-006
UVOST By Dakota
www.DakotaTechnologies.com
Site:
Eklutna Army Sites
Latitude / Datum:
Unavailable / NA
Final depth:
30.95 ft
Client / Job:
FUDS / F10AK0097
Longitude / Fix:
Unavailable / NA
Max signal:
6.3 %RE @ 0.00 ft
Operator/Unit:
Folcik/UVOST0492
Elevation:
Unavailable
Date & Time:
2011-05-06 13:38 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil


Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.3 - 30.5 ft
1.2 %RE (s 0.1)
Background
EAS-007
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 30.47 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 6.7 %RE @ 0.00 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-06 14:17 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil


Callouts
Depth (ft)
Signal (%RE)
350 400 450 500
Rate (in/s)
0.0 - 5.0 ft
1.3 %RE (s 0.1)
Background
EAS-008
UVOST By Dakota
www.DakotaTechnologies.com
Site: Eklutna Army Sites
Latitude / Datum: Unavailable / NA
Final depth: 5.00 ft
Client / Job: FUDS / F10AK0097
Longitude / Fix: Unavailable / NA
Max signal: 7.2 %RE @ 0.00 ft
Operator/Unit: Folcik/UVOST0492
Elevation: Unavailable
Date & Time: 2011-05-06 16:10 ADT
U.S. Army Corps of Engineers Alaska District
Elmendorf Air Force Base | Anchorage, AK
(907) 753-5661 | www.poa.usace.army.mil

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APPENDIX E
Field Log Books

Eklutna Army Sites

"Rite in the Rain"®

ALL-WEATHER

LEVEL

No. 311

5.5

08:30 Travel to Ekiwaa gravel pit for onsite safety training

- 10:00 - 12:00 - Repair trailer brake on Truck. New truck was not wired correctly. 12v + brake wires were crossed.

12:00 - lunch

12:30 mob to Ekluti Kaa

13:30 ~~mob~~ check in at Job trailer + stage equipment:
- unload bentonite
- repair trailer door
- Organize trailer

photo1 - equipment staging area looking east

Photo 2 - equipment staging looking north.

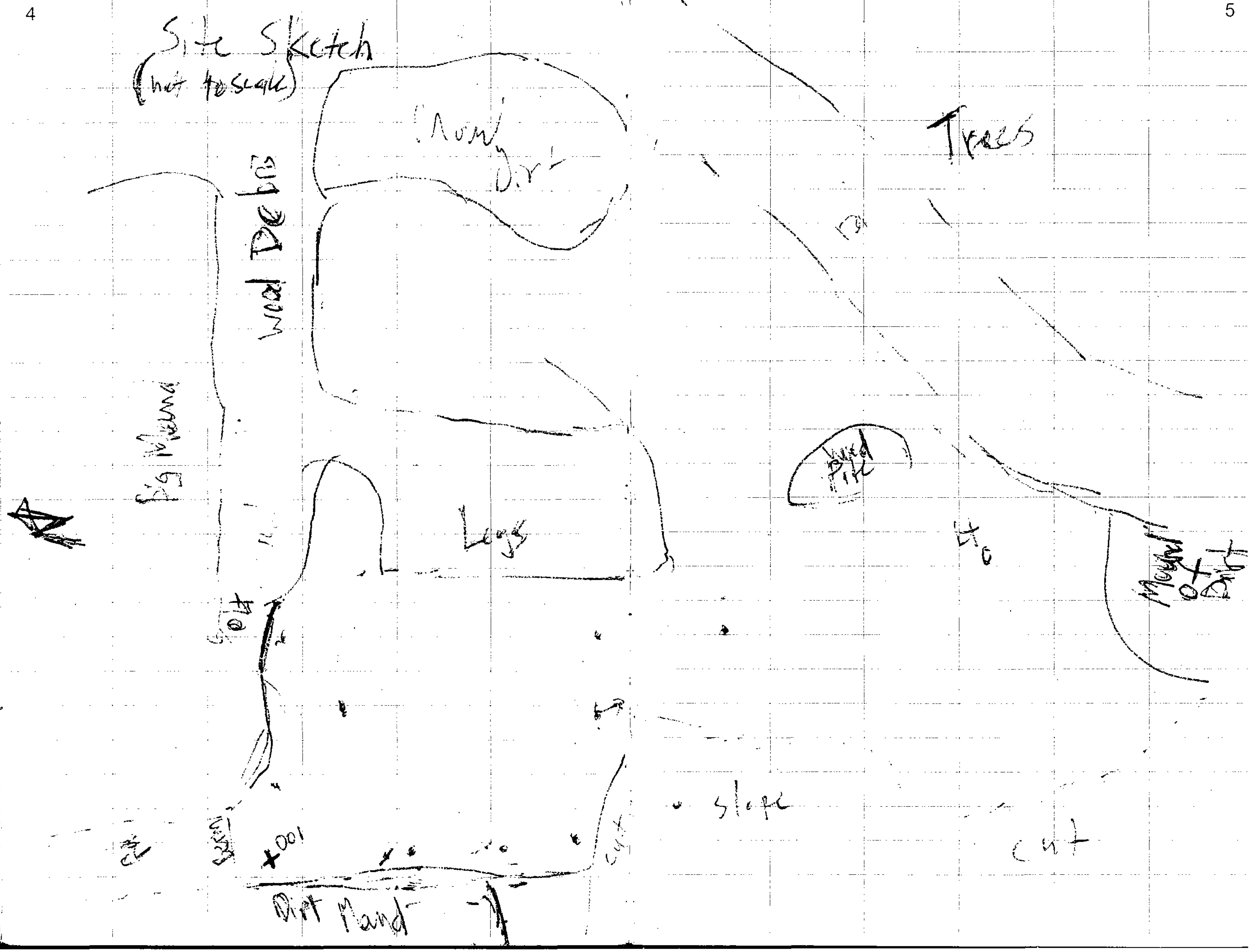
Photo 3 - Investigation area looking north

Photo 4 - Investigation area looking east.

15:30 layout 5! preliminary probe points. Site access is limited at 2 locations due to soil/timber piles.

16:30 E EKS-001
RE=13k
~~refusal~~
TD= 36.8' refusal
Notes: - Damper broke at 20'
- rods were NOT vertical.
- hard pushing at 34'
- potential fuel at 15'
- ~~mirro~~ window damaged + first rod bent.

18:15 - off site


Site Sketch
(not to scale)
Trees
Wood Debris
Big Wetland
Logs
Wood Pile
Mound of Dirt
slope
cut
cut
Dirt Mound
100

6-6-11

0540 Purchase 10 gal diesel fuel from Fred Meyer

0600 onsite. check in at gate + sign safety orientation form

0630 fuel / maintain drilling + generator

0700 Jesse onsite. Perform safety orientation.

EAS-002
start: 0733 stop: 0757
RE = 40,000
TD = 38.29 refusal
Notes: 6 bent rods, 1 bent union, 1 cracked window

EAS-003
start: 0919 stop: 0931
RE: 10K
TD = 17.92 refusal
Notes: 2 bent rods, 1 bent union, 1 cracked window

photo 5 - replacing cracked window at EAS-003

photo 6 - replacing bent rods at EAS-003 looking south

1020 switch computer. Computer would not keep correct time & timed out.

EAS 004
start 1044 stop 1105
RE = 10K
TD = 36.50 refusal
Notes: clean.

EAS 005
start: ~~1128~~ 1139 stop ~~1132~~ 1156
RE = ~~10K~~ 10K
TD = ~~7.23~~ 26.12 refusal
Notes: Potential fuel at 21' bgs
- 3 rods bent, 1 union bent, window cracke

lunch Break 12:15 - 12:45

EAS 006
Start 1343 Stop 1357
RE: 13K
TD: 30.95 refusal
Notes:

EAS 007
start 1418 stop: 1436
RE 9K
TD: 30.47 refusal
Notes.
2.3' potential fuel
6.7' "
12.5' "
14.3' "
Spoc broke off @ TD. Moved into pit
~~EAS 008~~ 1 rod, 1 union, & fiber
~~start~~ wire ~~damaged~~ ~~stop~~ during push.
~~[illegible]~~
~~[illegible]~~
~~[illegible]~~
15:00 - I am concerned that the lack of fines is resulting in

a high detection limit. We will test this theory by installing a probe at the base of the pit in an area of known contamination. ~~The~~ Soil from the impacted area has a weathered diesel ~~odor~~. This is the same location that was identified by the landowner and inspected by USACE in 2010.

EAS 008
start 1614 stop:
RE = 11K
TD = 5.0'
Notes:

Quest log only contained background flourescence. The Quest investigation will be abandoned due to the difficult drilling conditions & lack of detectable contamination.

10-May-2011 44°F, sunny

0630 calibrated PID w/ 100 ppm isobutylene
PID serial = SK 106-003300

0841 arrived on site;
Sean Benjamin
Neil Folcik
- Safety briefing
- we are going to hand dig two holes for samples for chemical analysis. A hand shovel will be used. Decon will consist of wiping the shovel off with a rag. Extra soil will go back in to the hole from whence it came.

Time	depth	PID	
0850	0.5-1'	0/0	cobbles, gravel, sand
11-EKL-01		†	
	1x 4oz	AK101, VOC, 124.53y, 65.5y, VWS-4-13	
	1x 4oz	DRO, RRO, PAH	
	- had diesel-like odor, quickly dissipating		
0900	0.5-1'	0/	cobbles, gravel, sand
11-EKL-02	1x 4oz	AK101, VOC, 124.31, 65.7y, VWS-4-13	
	1x 4oz	DRO, RRO, PAH	
	- had diesel-like odor quickly dissipating		

SPB

Eklutna Army Sites

Fuds F10AK0097

Project 01

"Rite in the Rain"®

ALL-WEATHER

LEVEL

No. 311

20-Sep- 2011 →

Book 1 of 3

20-Sep-2011

Samples will be labeled in the following manner:

11EAF XX Y SL
11 = Year (fiscal)
EAF = Eklutna Army Fuds
XX = Test pit #
Y = Sample depth
- 0-2' = A
- 2-4 = B
- 4-6 = C
- 6-8 = D
- 8-10 = E
- 10-12 = F
- 12-14 = G
- 14-16 = H
- 16-18 = I

SL = Soil sample

0608 - PID calibrated, entry RAE PGM-3000 SN # 180-904815
100 ppm isobutylene, Lot 84997

TP-01 20-Sep-2011 Dark, partly cloudy 48

0655 Arrived on site & checked in

ESS bottles used
2 oz lots 022394
100794 x2
041596

4 oz lots 040208

0737 met up with heavy equipment operator Rex Lewis
-safety briefing, pits, heavy equipment

0757 Sample 01-A no odor
MS/MSD Dupe 01-J
PID=0 20% gravel, 80% sand

0801 Sample 01-B no odor
PID=0 20% gravel, 80% sand

0809 Sample 01-C no odor
PID=0 20% gravel, 80% sand

0815 Sample 01-D no odor
PID=0 20% gravel, 80% sand

0816 Sample 01-E no odor
PID=0 20% gravel, 80% sand

TP-01 20-Sep-2011

0819 Sample 01-F no odor
PID=0 20% gravel, 80% sand
0827 Sample 01-G no odor
PID=0 15% gravel, 85% sand
0836 Sample 01-H no odor
PID=0 20% gravel, 75% sand, <5% fines
0839 Sample 01-I no odor
PID=0 20% gravel, 78% sand, <2% fines

TP-01 20-Sep-2011

photos: 2863 - excavator
2864 - " @ 6'
2865 - red dot depth markings
2866 - TP-01, soil

TP-02 20-Sep-11 overcast 52°F

0902 Sample 02-A photo 2867 no odor
PID = 0 10% gravel, 90% sand

0906 Sample 02-B no odor
Dupe 02-J "
PID = 0 5% gravel, 95% sand

* a pipe was noticed in the test pit
- photos 2868 & 2869

0912 Sample 02-C photo 2870 no odor
PID = 0 10% gravel, 90% sand

0916 Sample 02-D 2871 No odor
PID = 0 5% gravel, 95% sand

* other half of pipe seen - photo 2872

0920 02-E 2873 no odor
PID = 0 10% gravel, 90% sand

0925 02-F 2874 no odor
PID = 0 15% gravel, 85% sand

0929 02-G 2875 no odor
PID = 0 10% gravel, 90% sand

0934 02-H 1876 no odor
PID = 0 15% gravel, 85% sand

0937 02-I 60% gravel, 35% sand, 5% fines
PID = 0 1877 no odor
- noticable difference in gravel, sand content & some fines showing up

photo 2578 - backfilling TP-02
2579 - TP-02 backfilled.
2867 sample 02A
2868 pipe in hole
2869 pipe in hole
2870 Sample 02C
2871 Sample 02D
2872 ends of pipe in TP
2873 Sample 02E
2874 Sample 02F
2875 Sample 02G
2876 Sample 02H
2877 Sample 02I

TP-03 20-Sep-11 hazy - light rain 52°F

1007	03-A	2880	no odor
	PID = 0		10% gravel, 90% sand
1010	03-B	2881	no odor
	PID = 0		10% gravel, 90% sand
1014	03-C	2882	5% gravel, 95% sand
MS/MSD	PID = 0		no odor
	Dupe 03J		
1018	03-D	2883	no odor
	PID = 0		10% gravel, 90% sand
1023	03-E	2884	no odor
	PID = 0		20% gravel, 80% sand
1029	03-F	2885	no odor
	PID = 0		15% gravel, 85% sand
1033	03-G	2886	no odor
	PID = 0		15% gravel, 85% sand
1037	03-H	2887	no odor
	PID = 0		~~30%~~ SIB 60% gravel, 35% sand, 5% fines
	noticeable		difference in composition
1041	03-I	2888	no odor
	PID = 0		60% gravel, 35% sand, 5% fines

20-Sep-11

Photo 2884 - TP-03 after digging

2880	Sample 03	A
2881	"	B
2882	"	C
2883	"	D
2884	"	E
2885	"	F
2886	"	G
2887	"	H
2888	"	I

TP-04 20-Sep-11 Partly sunny 52°F

1115	04-A	2890	no odor
	PID=0	20% gravel, 80% sand	
1118	04-B		
	PID=0	2891	no odor
		10% gravel, 90% sand	
1122	04-C	2892	no odor
	PID=0	15% gravel, 85% sand	
1125	04-D	2893	no odor
	PID=0	10% gravel, 90% sand	
	Dupe 04-J		
1128	04-E	2894	no odor
	PID=0	15% gravel 80% sand, 5% fines	
1133	04-F	no odor 2890	
	PID=0	40% gravel, 55% sand, 5% fines	
1137	04-G	2895	no odor
	PID=0	50% sand, 45% gravel, 5% fines	
1143	04-H	2896	no odor
	PID=0	50% gravel, 45% sand, 5% fines	
1147	04-I	2898	no odor
	PID=0	40% gravel 57% sand, 8% fines	

Photo	2890 thru 2898 =	TP04	Sample A
	2891		" B
	2892		" C
	2893		" D
	2894		" E
	2895		" F
	2896		" G
	2897		" H
	2898		" I
	2905	TP-04, looking	NW

TP-05 20-Sep-11 overcast, sprinkling

1210	05-A	2899	no odor
	PID=0	10% gravel, 90% sand	
1213	05-B	2900	no odor
	PID=0	10% gravel, 90% sand	
1217	05-C	2901	no odor
	PID=0	10% gravel 90% sand	
1221	05-D		
	PID=0	2902	no odor
		15% gravel, 85% sand	
1226	05-E MS/MSD	2903	no odor.
Dup=5	PID=0	15% gravel, 85% sand	
1230	05-F	2904	no odor
	PID=0	20% gravel, 80% sand	
1234	05-G	2905	no odor
	PID=0	25% gravel, 75% sand	
1239	05-H	2906	no odor
	PID=0	50% gravel, 45% sand, 5% fines	
1246	05-I	2907	no odor
	PID=0	50% gravel, 45% sand, 5% fines	

Photo	~~2907~~ SPB ~~2910~~ SPB	TP-05	
	2899	Sample	05A
	2900	"	B
	2901	"	C
	2902	"	D
	2903	"	E
	2904	"	F
	2905	"	G
	2906	"	H
	2907	"	I
	2910	TP-05, looking	NW

TP-06 20-sep-11 partly sunny 54°F

1300	06-A	2909	no odor
	PID = 0	20% gravel,	80% sand
1305	06-B	2911	no odor
	PID = 0	5% gravel,	95% sand
1309	06-C	2912	no odor
	PID = 0	10% gravel,	90% sand
1313	06-D	5% gravel,	95% sand (coarse)
	PID = 0	2913	no odor
1320	06-E	2914	no odor
	PID - 0	15% gravel,	85% sand
1325	06-F	no photo ~~2915~~ SPB	no odor
	PID = 0	15% gravel,	85% sand
Dupe	06-J		
1329	06-G	~~2916~~ 2915 SPB	no odor
	PID = 0	20% gravel,	80% sand
1333	06-H	2916	no odor
	PID = 0	60% gravel,	40% sand
1339	06-I	2917	no odor
	PID = 0	50% gravel,	50% sand

Picture wrong here on this boring - check
06-H :) correct

Picture 2918 - TP-06

2909	Sample	06 A
2911	"	B
2912	"	C
2913	"	D
2914	"	E
2915	"	G
2916	"	H
2917	"	I

TP-07 20-Sep-11 hazy, 54°F

1355 07-A 2919 no odor

PID- 5% gravel - 95% sand - organics

1403 07-B 2920 - no odor

- This is non-native material. It looks like fill - unwanted gravel - digging down to 20' - still not native - Canceling Test-pit

photo 2921 - on-gravel pit-like dirt in bucket

photo 2922 - backfilling TP

- Samples A & B will be discarded - moving on to TP-08

photo 2921 - excavating TP-07 (S)

2922 - " " "

2919 Sample 07A

2920 " B

TP-08 20-Sep-11

1426	08A	2923	no odor
	PID = 0	10% gravel,	90% sand
1432	08B	2924	no odor
	PID = 0	95% sand	5% gravel
1435	08C	2925	no odor
	PID = 0	20% gravel,	80% sand
1439	08-D	2926	no odor
	PID: 0	15% gravel,	85% sand
1444	08-E	2927	no odor
	PID = 0	25% gravel,	75% sand
1448	08-F	2928	no odor
	PID = 0	10% gravel,	90% sand
1454	08-G	2929	no odor
MS/MSD	PID = 0	10% gravel,	90% sand
Dupe	08J		
1459	08-H	2930	no odor
	PID = 0	20% gravel,	80% sand
1503	08I	2931	no odor
	PID = 0	25% gravel,	75% sand

Photos	2923	Sample	08 A
	2924	"	B
	2925	"	C
	2926	"	D
	2927	"	E
	2928	"	F
	2929	"	G
	2930	"	H
	2931	"	I

TP-09 20-Sep-10

1521	09-A	2932	no odor
	PID = 0	5% gravel,	95% sand & fine sand
1524	09-B	2933	no odor
	PID = 0	10% gravel,	90% sand
1529	09-C	2934	no odor
	PID = 0	10% gravel,	90% sand
1532	09-D	2935	no odor
	PID = 0	15% gravel,	85% sand
1538	09-E	2936	no odor
	PID = 0	5% gravel,	95% coarse sand
1545	09-F	2937	no odor
	PID = 0	10% gravel,	90% sand
1551	09-G	2938	no odor
	PID = 0	5% gravel,	95% sand
1557	09-H	2939	no odor
	PID = 0	80% gravel,	20% coarse sand
	DUP ~~09F~~ SPB 09J		
1601	09-I	2940	no odor
	PID=0	80% gravel,	20% coarse sand

Photo 2941 – T.P-09, looking NW

2932	Sample	09 A
2933	"	B
2934	"	C
2935	"	D
2931	"	E
2937	"	F
2938	"	G
2939	"	H
2940	"	I

27-Sep-11

0700 on site. Met up with Rex Lewis.
Calibrated PID - received flow error - changed filter and recalibrated.

glassware lots used (ESS brand)
2oz 022394
2x 041596

4oz 040208

TP-10 27-Sep-11 Partly cloudy 35°F

Time	Sample # / PID	Picture #	Description
0757	10A	NA	30% gravel, 70% sand
	PID = 0		no odor
	MS/MSD		
	Dupe * 10 H		Time = 0835
0801	10B	2942	silty sands
	PID = 0		no odor
0806	10C	2944	silty sands → sand
	PID = 0		no odor
0811	10D	2945	damp 10% gravel, 90% sand
	PID = 0		no odor
0817	10E	2946	damp 15% gravel, 85% sand
	PID = 0		no odor
0825	10F	2947	Damp 15% gravel, 85% sand
	PID = 0		no odor
0830	10G	2948	Damp 20% gravel, 80% sand
	PID = 0		no odor
	- called off the boring here,		

picture	2942	Sample	10B
	2943	TP-10,	looking N
	2944	Sample	10C
	2945	"	D
	2946	"	E
	2947	"	F
	2948	"	G
	2949	Filling in	TP-10, looking N

TP-11 27-Sep-11

Time	Sample ID/ PID	Picture #	Description
0840	11A	2951	20% gravel, 80% sand
	PID = 0		no odor
0846	11B	2952	25% gravel, 75% sand
	PID = 0		no odor
	Dupe = 11		
0854	11C	2953	40% gravel, 60% sand
	PID = 0		no odor
0900	11D	2954	fines layer again
	PID = 0		sands & silty sands - no odor
0905	11E	2955	fines & sands & gravels
	PID = 0		5% gravel, 95% sands
0912	11F	2957	15% gravel 85% sand
	PID = ~~0~~ spb 11 ppm		Diesel odor
	Dupe to replace earlier dupe 11G		

- stopped @ 10' - no odor in the fines
- went to the discolored slope and sampled there
- Took dupe here because of odor.
  - Time = 0917

photo	2950	TP-11, looking SE
	2951	Sample 11A
	2952	" B
	2953	" C
	2954	" D
	2955	" E
	2956	TP-11, slope E
	2957	Sample 11F
	2958	scoop where sample 11F taken, E

TP-12 27-Sep-11 Sunny 45°F

Time	Sample ID/ PID	Picture #	Description
0939	12A	2960	10% gravel, 90% sand
	PID: 0		no odor
0946	12B	2962	15% gravel, 85% sand
	PID: 0		no odor
0953	12C	2963	10% gravel, 90% sand
	PID: 0		no odor
0958	12D	2964	15% gravel, 85% sand
	MS/MSD		no odor
	PID: 0		
	Pipe 12J		Time: 1026
1002	12E	2965	20% gravel, 80% sand
	PID: 0		no odor
1028	12F	2966	10% gravel, 90% sand
	PID: 0		no odor
1012	12G	2967	15% gravel, 85% sand
	PID: 0		no odor
1017	12H	2968	30% gravel, 70% coarse sand
	PID: 0		no odor
1022	12I	2970	15% gravel, 85% sand
	PID: 0		no odor

photo	2959	TP-12,	looking	West
	2960	Sample	12A	
	2961	TP-12,	0-2' deg,	SW
	2962	Sample	12B	
	2963	"	C	
	2964	"	D	
	2965	"	E	
	2966	"	F	
	2967	"	G	
	2968	"	H	
	2969	TP-12,	looking into pit	
	2970	Sample	I	

TP-13 27-Sep-11 Sunny 58°F

Time	Sample ID/ Picture # PID		Description
1107	13-A	2974	Dirt-native 10% gravel,
	PID = 0		90% sand - no odor
1114	13-B	2975	lot of gravel - no odor
	PID = 0		60% gravel, 40% sand
1119	13-C	2977	80% sand, 20% gravel
	PID = 0		no odor
1126	13-D	2978	15% gravel, 85% sand
	PID = 0		no odor
1131	13 E	2979	10% gravel, 90% sand
	PID = 0		no odor
	Dupe 13-5		Time = 1153
1135	13-F	2980	10% gravel, 90% sand
	PID = 0		no odor
1140	13-G	2981	no cobbles in bucket, 20%
	PID = 0		gravel, 80% sand, no odor
1144	13 H	2982	15% gravel, 85% sand
	PID = 0		no odor
1148	13 I	2983	10% gravel, 90% sand
	PID = 0		no odor

Photo	2971	mobing to TP-13, W
	2972	looking E down path to TP-13
	2973	Rex Lewis, looking W
	2974	Sample 13A
	2975	Sample 13B
	2976	TP-13, 4' deep, SW
	2977	Sample 13C
	2978	" D
	2979	" E
	2980	" F
	2981	" G
	2982	" H
	2983	" I

TP-14

Time	Sample ID / PID	picture #	Description
			– hit what looks to be a foundation - excavated 2' depth, 15' wide, and ~ 60' length
			– another small test pit ~ 20' to the East and the foundation was still there
			– moving to TP-15

photo	2984	TP-14, concrete slab
	2985	" , 40' of slab
	2986	Edge of slab
	2987	Side of slab
	2988	Edge of slab
	2989	Rex & Crystal Knox (site manager)
	2990	Crystal Taking photo
	2991	Crystal " "

Sunny
54° F

TP-15 27-Sep-11

Time	Sample ID/ PID	Picture *	Description
	– moved to a TP on an over burden pile – need to remove ~ 10' feet to ~~get~~ to native dirt – musty dirt odor		
1310 *	15-F PID = 0	2993	5% gravel, 95% sand – slight odor from above, not fuels
1314	15-G PID: 0	2995	10% gravel, 90% sand no odor
1318	15-H PID: 0	2996	15% gravel, 85% sand no odor
1322	15-I PID: 0	2997	10% gravel, 90% sand mostly coarse sand no odor

* Dupe was taken @ 15-F, labeled 15-J Time = 1528

photo	2992	TP-15, looking N
	2993	Sample 15 F
	2994	TP-15, 12' deep
	2995	Sample 15 G
	2996	" H
	2997	" I

Sunny
56°F

TP-16 27-Sep-11

Time	Sample #/ PID	Photo #	Descr.pt.on
1350	16-A	2998	no odor - bucket had roots
	PID = 0		5% gravel, 95% sand
1354	16-B	2999	10% gravel, 90% sand
	PID = 0		no odor
1402	16-C	3000	15% gravel, 85% sand
	MS/MSD PID = 0		no odor
	Dupe = 16J	Time = 1440 no photo taken	
1407	16-D	~~3001~~ SPB	10% gravel, 90% sand
	PID = 0		no odor
1411	16-E	3001	15% gravel, 85% coarse sand
	PID = 0		no odor
1417	16-F	3002	15% gravel, 85% sand
	PID = 0		no odor
1426	16-G	3003	20% gravel, 80% sand
	PID = 0		no odor
1432	16-H	3004	15% gravel, 85% sand
	PID = 0		no odor
1436	16-I	~~3005~~ SPB no photo	20% gravel, 80% sand
	PID = 0		no odor

photo		Sample
	2998	16-A
	2999	" B
	3000	TP-16, 4' deep
	3001	Sample 16-E
	3002	" F
	3003	" G
	3004	" H

Sunny
54°F

TP-17 27-Sep-2011

Time	sample # PID	picture #	description
1447	17A	3006	organics, 10% gravel, 90% sand
	PID = 0		no odor
1450	17B	3007	10% gravel, 90% sand
	PID = 0		no odor
1454	17-C	3005	Sands & fine sands
	PID = 0		no odor
1459	17D	no photo	10% gravel, 90% sand & fines
	PID 0		no odor
	17J Dupe - Time = 1525		
1504	17E	3009	10% gravel, 90% sand
	PID = 0		no odor
1508	17-F	3015	20% gravel, 80% sand
	PID = 0		no odor
1515	17G	3016	~~50% gravel, 50% sand~~ 5/B 20% gravel, 80% sand, no odor
	PID = 0		
1515	17H	3017	50% gravel, 50% sand
	PID = 0		no odor
1521	17-I	3018	15% gravel, 85% sand
	PID = 0		no odor

~~3~~		
Photo	3005	TP 17-, looking NNE
	3006	Sample 17A
	3007	" B
	3008	" C
	~~3010~~	" D not taken
	3009	" E
	3010	TP-17, 10' deep
	3013	TP-17, side wall
	3012	", roots @ 10'
	3013	", roots closeup
	3014	" zoom & light of roots
	3015	Sample 17F
	3016	" G
	3017	" H
	3018	" I

TP-18 27-Sep-11 Sunny 50°F

Time	Sample # PID	Photo #	Description
1535	18A	3019	10% gravel, 90% sand
	PID = 0		no odor
1539	18-B	3020	25% gravel, 75% sand
	PID = 0		no odor
1545	18-C	no photo	20% gravel, 80% sand
	PID = 0		no odor
1549	18-D	3021	98% sand, 2% gravel
	PID = 0		no odor
1554	18E	3022	Sand, 100%
	PID = 0		no odor
	MS/MSD		
	Dupe 18-J - Time = 1622		
1558	18F	3023	10% gravel, 90% sand
	PID = 0		no odor
1601	18G	3024	15% gravel, 85% sand
	PID = 0		no odor
1607	18H	3025	3% gravel, 97% sand
	PID = 0		
1616	18I	3026	10% gravel, 90% Sand
	PID = 0		no odor

Photo	Sample
3019	18A
3020	B
3021	D
3022	E
3023	F
3024	G
3025	H

Eklutna Army Sites
FUDS F10AK0097
PROJECT 01

"Rite in the Rain"®
ALL-WEATHER
LEVEL
No. 311

Book 2 of 3

0700 on site
calibrated PID to 100 ppm
met up with equipment
operator Rex Lewis.

20z glassware Lot #s
041596 x2
022394

4oz glassware lot #
040208

TP-19 04-OCT-11 cloudy 45°F

Time	Sample # ID	Picture #	Description

looks to be all fill material - no native gravel > cobbles - - calling hole

no sample taken

photo	3026	TP-19 - fill material in hole
	3027	TP-19 - " " " "
	3028	Hoe operator Rex Lewis, looking SE
	3029	" , looking SSW

TP-20 04-Oct-11

Time	Sample #	PID #	Description
0838			Rex said he put 3' of fill back in this corner so we skipped the "A" sample
	20B MS/MSD	3030	15% gravel, 85% sand
	PID = 0		
	Dupe 20J taken - Time of 0925 given		
0854	20C	3033	10% gravel 90% sand
	PID = 0		
0857	20D	3034	20% gravel, 80% sand
	PID = 0		
0902	20E	3035	30% gravel, 70% sand
	PID = 0		
0906	20F	3036	20% gravel, 80% coarse sand
	PID = 0		
0911	20G	3037	15% gravel, 85% sand
	PID = 0		
0916	20H	~~30~~ no photo taken	15% gravel, 85% sand
	PID = 0		
0922	20I	3038	20% gravel, 80% sand
	PID = 0		

photo	3030	Sample 20B
	3031	TP-20, 0-2' deep
	3032	" , 0-4' deep, looking NW
	3033	Sample 20C
	3034	" D
	3035	" E
	3036	" F
	3037	" G
	3038	" I
	3039	TP-20, 0-15' deep

TP-21 04-oct-11

Time	Sample # PID	Photo #	Desc
0931	21A	3041	5% gravel, 95% sand, organics
	PID: 0		no odor
0934	21B	3042	10% gravel, 90% sand
	PID: 0		no odor
0940	21C	3043	20% gravel, 80% sand
	21 Duplicate		no odor
	PID: 0		Given time of 1017
0943	21D	3044	100% sand
	PID: 0		no odor
0947	21E	3045	10% gravel, 90% sand
	PID: 0		no odor
0958	21F	3046	5% gravel, 95% sand
	PID: 0		no odor
1002	21G	3047	15% gravel, 85% sand
	PID: 0		no odor
1006	21H	3078	20% gravel, 80% sand
	PID: 0		no odor
1011	21I	3079	5% gravel, 90% sand
	PID: 0		5% silt no odor

Photo	3040	TP-21, 0-2' deep, looking N
	3041	Sample 21A
	3042	" B
	3043	" C
	3044	" D
	3045	" E
	3046	" F
	3047	" G
	3048	" H
	3049	" I
	3050	TP-21, 0-18' deep, looking SW

TP-22 04-Oct-11

Time	sample # PID	Photo #	Description
1028	22A	3053	5% gravel, 95% sand & organics no odor
	PID = 0		
1031	22B	3054	100% sand & fine sand
	PID = 0		no odor
1039	22C	3055	10% gravel, 90% sand
	PID = 0		no odor
1043	22D	3056	20% gravel, 80% sand
	MS/MSD	Dupe 22F	no odor → given time of 1112
	PID = 0		
1048	22E	3057	15% gravel, 85% sand
	PID = 0		no odor
1055	22F	3058	95% sand & silty sand, 5% gravel
	PID = 0		no odor
1100	22G	3059 3060	95% sand, 5% gravel
	PID = 0		no odor
1103	22H	3061	100% sand
	PID = 0		no odor
1107	22I	3063	20% gravel, 80% sand
	PID = 0		no odor

photo	3052	TP-22, 0-2' deep, looking NW
	3053	Sample 22A
	3054	" B
	3055	" C
	3056	" D
	3057	" E
	3058	" F
	3059	" G
	3060	" G; re take
	3061	" H
	3062	TP-22, 0-16' deep

TP 23 04-OCT-11

Time	Sample # PID	photo #	Description
1157	23A	3066	15% gravel, 85% sand
	PID: 0		no odor
1200	23B	~~3066~~ 3067	10% gravel, 90% sand
	PID: 0		no odor
1203	23C	no photo	10% gravel, 90% sand
	PID: 0		no odor
1207	23D	3068	15% gravel, 85% sand & fine sand
	PID: 0		no odor
1212	23E	3069	30% gravel, 70% sand
	Pipe 235		no odor
	PID: 0	→ given time of 1229	
1215	23F	3070	25% gravel, 75% sand
	PID: 0		no odor
1219	23G	3071	20% gravel, 80% sand
	PID: 0		no odor
1223	23H	3072	20% gravel, 80% sand
	PID: 0		no odor
1226	23I	3073	20% gravel, 80% sand
	PID: 0		no odor

photo	3063	moving dirt to grade, NNW
	3064	" " " "
	3065	starting TP-23, N
	3066	Sample 23A
	3067	" B
	3068	" D
	3069	" E
	3070	" F
	3071	" G
	3072	" H
	3073	" I
	3074	TP-23, backfilled, looking N

TP-24 04-Oct-11

Time	Sample # PID	Photo #	Description
1235	24A	3075	20% gravel, 80% sand
	PID: 0		no odor
1238	24B	3076	10% gravel, 90% sand
	PID: 0		no odor
1242	24C	3077	10% gravel 80% sand, 10% fines, no odor
	PID: 0		
1245	24D	3078	20% gravel, 80% sand
	PID: 0		no odor
1249	24E	3079	20% gravel, 80% sand
	PID: 0		no odor
1253	24F	3080	15% gravel, 85% sand
	MS/MSD	24J	Dupe collected - Time: 1312
	PID: 0		no odor
1258	24G	3081	25% gravel, 75% sand
	PID: 0		no odor
1301	24H	3082	15% gravel, 85% Sand
	PID: 0		no odor
1307	24I	3084	15% gravel, 85% coarse sand
	PID: 0		no odor

TP-25 04-oct-11

Time	Sample # PID	photo #	Description
1327	25A	3087	10% gravel, 90% Sand/dirt
	PID = 0		no odor
1334	25B	3088	5% gravel, 95% sand & fine
	PID: 0		Sands, organics(roots)
1338	25C	3089	
	25J Dupe	Taken → Time = 1412	10% gravel, 90% sand
	PID: 0		no odor
1342	25D	3092	5% gravel, 95% sand
	PID: 0		no odor
1346	25E	3093	15% gravel, 85% sand
	PID: 0		no odor
1350	25F	3094	10% gravel, 90% sand
	PID: 0		no odor
1353	25G	3095	15% gravel, 85% sand
	PID: 0		no odor
1402	25H	3096	50% gravel, 50% sand
	PID: 0		no odor
1406	25I	3097	25% gravel, 75% sand
	PID: 0		no odor

15-Oct-11 foggy, 40°F

0700 on site. Signed in and met up w/ Rex. He had some hoe maintenance to do.

Calibrated PID to 99 ppm Isobutylene (std was 100 ppm)

TP-26 15-Oct-11

Time	depth/PID	Picture #	Description
0850	26A	3172	20% gravel, 80% sand
	PID=	0	no odor
	MS/MSD & Duplicate 26J Taken		
0854	26B	3173	25% gravel, 75% sand
	PID=	0	no odor
0902	26C	~~3174~~ SPB No Photo	25% gravel, 75% sand
	PID=	0	no odor
0906	26D	3174	30% gravel, 70% sand
	PID=	0	no odor
0910	26E	3176	60% gravel, 40% sand
	PID=	0	no odor
0913	26F	~~3175~~ 3177	40% gravel, 60% sand
	PID=	0	no odor
0917	26G	3178	25% gravel, 75% sand
	PID=	0	no odor
0922	26H	3179	30% gravel, 70% sand
	PID=	0	no odor
0927	26I	3180	20% gravel, 80% sand
	PID=	0	no odor

TP-27 18-Oct-11 partly sunny

Time	Sample	Picture	Description
0946	27A	3182	25% gravel, 75% sand, some
	PID: 0		organics, no odor
0952	27B	3184	5% gravel, 95% sand
	PID: 0		no odor
~~0955~~	27J	Duplicate taken	
0955	27C	~~3183~~ 3188 no photo	25% gravel, 75% sand
	PID: 0		no odor
0957	27D	3185	15% gravel, 85% sand
	PID: 0		no odor
1002	27E	3186	15% gravel, 85% sand
	PID: 0		no odor
1006	27F	3187	20% gravel, 80% coarse sand
	PID: 0		no odor
1010	27G	3188	15% gravel, 85% sand
	PID: 0		no odor
1017	27H	3189	15% gravel, 85% sand
	PID: 0		no odor
1027	27I	3190	35% gravel, 65% sand
	PID: 0		no odor

TP-28 18-oct-11 partly sunny

Time	Sample	photo	Description
1036	28A	3191	10% gravel, 90% sand
	PID: 0		no odor
1039	28B	3192	10% gravel, 90% sand
	PID: 0		no odor
1044	28C	3193	100% sand
	PID: 0		no odor
	MS/MSD + Dupe		28J
1049	28D	3194	10% gravel, 90% sand
	PID: 0		no odor
1052	28E	3194	35% gravel, 65% sand
	PID: 0		no odor
1056	28F	3195	20% gravel, 80% sand
	PID: 0		no odor
1100	28G	3196	10% gravel, 90% sand
	PID: 0		no odor
1103	28H	3197	20% gravel, 80% sand
	PID: 0		no odor
1107	28I	3198	15% gravel, 85% sand
	PID: 0		no odor

TP-29 18-Oct-11 partly cloudy

Time	Sample	Photo	Description
1118	29A	3202	35% gravel, 65% sand
	PID: 0		no odor
1135	29B	3203	25% gravel, 75% sand
	PID: 0		no odor
1139	29C	0	no odor
	PID = 0	3204	10% gravel, 90% sand
1143	29D	3205	10% gravel, 90% Sand
	PID = 0		no odor
	Duplicate	29J	Taken
1147	29E	3206	35% gravel, 65% sand
	PID: 0		no odor
1156	29F	3207	30% gravel, 70% sand
	PID = 0		no odor
1201	29G	~~3210~~ 3208 GPS	45% gravel, 55% sand
	PID =		no odor
1204	29H	3209	20% gravel, 80% sand
	PID:		no odor
1209	29I	3210	10% gravel, 90% sand
	PID:		no odor

TP-30 18-Oct-11 Sunny

Time	Sample	Photo	Description
1221	30A	3211	10% gravel, 90% sand
	PID: 0		no odor
1225	30B	3212	15% gravel, 85% sand
	PID: 0		no odor
1234	30C	3213	40% gravel, 60% sand
	PID: 0		no odor
	MS/MSD & Duplicate taken 30J		
1316	30D	3214	50% gravel, 50% sand
	PID: 0		no odor
1320	30E	3215	15% gravel, 85% coarse sand
	PID = 0		no odor
1323	30F	3216	25% gravel, 75% sand
	PID = 0		no odor
1327	30G	3217&18	15% gravel, 85% coarse sand
	PID = 0		no odor
1331	30H	~~23~~ 32 19	80% gravel, 20% coarse sand
	PID: 0		no odor
1335	30I	3221	25% gravel, 75% sand
	PID 0		no odor

TP-43 18-Oct-11 Sunny

Time	Sample	photo	Description
1355	43A	~~3223~~	Sands w/ <5% fines
	PID = 0		no odor
1359	43B	3225	5% gravel, 95% sand
	PID = 0		no odor
1403	43C	3226	5% gravel, 95% sand,
	PID = 0		5% fines, no odor
1409	43D	3227	30% gravel, 70% sand
	PID = 0		Rex thought he smelt
			something while swinging the
			bucket. But nothing upon
			inspection
1412	43E	3229	10% gravel, 90% sand
	PID = 0		no odor
	Duplicate taken here, 43J		
1416	43F	3230	15% gravel, 85% sand
	PID = 0		no odor
1419	43G	3231	20% gravel, 80% sand
	PID = 0		no odor
1422	43H	3232	10% gravel, 90% sand
	PID = 0		no odor
1426	43I	3233	20% gravel, 80% sand
	PID = 0		no odor

TP-31 18-Oct-11 Sunny

We are on a fill pile. We will dig down until we come to native dirt and start sampling there

- Odor of decomposing vegetation (anaerobic) as we dig the fill up

1440	31G	3238	10% gravel, 90% sand
	PID = 0		no diesel odor
1443	31H	3239	30% gravel, 70% sand
	PID = 0		no diesel odor
1447	31I	3240	10% gravel, 90% sand
	PID: 0		no diesel odor
1451	31J	3241	50% gravel, 50% sand
	PID - 0		no diesel odor

TP-32 18-Oct-11 Sunny

Time	Sample	Photo	description
	- same as TP-31, we have to dig through the fill first		
	- stinky like TP-31		
1514	32 I	3248	15% gravel, 85% sand
	PID: 0		no diesel odor
1518	32 J	3249	10% gravel, 90% sand
	PID = 0		no diesel odor

TP-33 18-Oct-11 Sunny

Time	Sample	photo	Description
	- same as other (last) 2 - dug through overburden first		
↑	33C	3251	10% gravel, 90% sand
1532	PID:	0	no odor
1536	33D	~~3253~~ no photo	15% gravel, 85% sand
	PID:	0	no odor
1541	33E	3252	60% gravel, 40% sand
	PID =	0	no odor
	MS/MSD & Dupe (335)		Taken here
1544	33F	3253	15% gravel, 85% sand
	PID =	0	no odor
1550	33G	3254	25% gravel, 75% sand
	PID =	0	no odor
1557	33H	3255	10% gravel, ~90% sand,
	PID:	0	clumps of sand & fines
			no odor
1602	33I	3256	10% gravel, 90% Sand
	PID =		no odor

Eklutna

11-061

"Rite in the Rain"®

ALL-WEATHER

LEVEL

No. 311

Book 3 of 3

TP-34 19-Oct-11 Overcast 38°F

Time	Sample	photo	Description
0855	34A	no photo	15% gravel, 85% sand, organics
	PID= 0		no odor
0902	34B	3257	25% gravel, 75% sand
	PID 0		no odor
	Dupe 34J taken		
0906	34C	3258	50% gravel, 50% sand
	PID= 0		no odor
0909	34D	3259	5% gravel, 95% sand
	PID= 0		no odor
0913	34E	3260	10% gravel, 90% sand
	PID= 0		no odor
0916	34F	3261	5% gravel, 95% sand
	PID= 0		no odor
0920	34G	3262	20% gravel, 80% sand
	PID= 0		no odor
0924	34H	3263	40% gravel, 60% sand
	PID= 0		no odor
0928	34I	3264	20% gravel, 80% sand
	PID= 0		no odor

TP 35 19-OCT-11

Time	Sample	Photo	description
0941	35A	no photo	30% gravel, 70% sand
	PID = 0		no odor - may be fill -
0946	35B	3267	10% gravel, fines & organics
	PID = 0		- determined to be fill -

digging deeper
- caving hole - dug to 14'
Still fill
- Discarding Samples collected

TP36 19-Oct-11

Time	Sample	Photo	Description
1005	36A	no photo	15% gravel, 85% sand
	PID = 0		no odor
1010	36B	3270	30% gravel, 70% sand
	PID = 0		no odor
1015	36C	3271	25% gravel, 75% sand
	PID = 0		
	MS/MSD 2 Dupe 36J		Taken
1020	36D	3272	10% gravel, 90% coarse sand
	PID = 0		no odor
1023	36E	3273	20% gravel, 80% sand
	PID = 0		no odor
1027	36F	3274	50% gravel, 50% sand
	PID = 0		no odor
1030	36G	3275	15% gravel, 85% sand
	PID = 0		no odor
1034	36H	~~3276~~ no photo SPB	20% gravel, 80% sand
	PID = 0		no odor
1037	36I	~~3277~~ no photo SPB	15% gravel, 85% sand
	PID = 0		no odor

TP-37 19-Oct-11

Time	Sample	Photo	Description
1054	37A	3276	5% gravel, 95% sand & fine
	PID =	40	no odor
	- when digging from 2-4', came across a steel & terracotta pipe (photos 3277 & 78)		
1102	37B	3279	20% gravel, 80% sand
	PID =	10	no odor
1108	37C	3280	10% gravel, 90% sand
	PID =	17	no odor
1017	37D	3281	15% gravel, 85% sand
	PID =	27	no odor
1016	37E	3no photo	10% gravel, 90% sand
	PID =	26	no odor
1120	27F	3282	35% gravel, 65% sand
	PID =	18	no odor
1125	27G	3283	20% gravel, 80% sand
	PID =	17	no odor
1129	27H	3284	20% gravel, 80% sand
	PID =	31	no odor
1135	27I	3286	50% gravel, 50% sand
	PID =	33	no odor
	*27J Duplicate - taken from 37A because of the elevated PID but		

SP-38 19-Oct-11

Time	Sample	PhoTo	Description
1159	38A	3287	15% gravel, 85% sand
	PID= 0		no odor
1202	38B	3288	20% gravel, 80% coarse sand
	PID= 0		no odor
1206	38C	~~3290 no photo~~ 3289	25% gravel, 75% sand
	PID = 0		
	MS/MSD ~~Dup 38J Taken~~ *		
1210	38D	3288	100% sand
	PID= 9		no odor
1213	38E	3290	10% gravel, 90% sand
	PID= 4		no odor
1217	38F	3291	70% gravel, 30% coarse sand
	PID= 1		no odor
1224	38G	3292	15% gravel, 85% sand
	PID= 5		no odor
1228	38H	3293	20% gravel, 80% Sand
	PID= 1		no odor
1231	38I	3294	20% gravel, 80% sand
	PID= 3		no odor

* because of the elevated PID hit @ 38D, a duplicate was taken from this bag.

SP-39 19-Oct-11 overcast

- had to remove 3' of fill to start

Time	Sample	Photo	Description
1245	39B	3297	10% gravel, 90% sand, organics
	PID: 0		no odor
1255	39C	3298	15% gravel, 85% sand
	PID: 0		no odor
1300	39D	3300	10% gravel, 90% Sand -
	PID: 0		some fines no odor
1303	39E	3301	20% gravel, 80% sand
	PID: 0		no odor
1313	39F	3302	15% gravel, 85% sand
	PID: 0		no odor
	Duplicate 39J taken		
1317	39G	3303	10% gravel, 90% sand
	PID: 0		no odor
1322	39H	3304	30% gravel, 70% sand
	PID:		no odor
1324	39I	3305	40% gravel, 60% sand
	PID:		no odor

TP-40 19-oct-11

Time	Sample	Photo	Description
1346	40A	3306	100% Sand & fine Sand
	PID: 0		no odor
1350	40B	3307	15% gravel, 85% sand
	PID: 0		no odor
1354	40C	3308	10% gravel, 90% sand
	PID:		no odor
1358	40D	3309	15% gravel, 85% sand
	PID:		no odor
1403	40E	3310	20% gravel, 80% sand
	PID:		no odor
	40J duplicate taken		
1407	40F	3311	20% gravel, 80% sand
	PID:		no odor
1411	40G	3312	10% gravel, 90% sand
	PID:		no odor
1415	40H	3313	40% gravel, 60% sand
	PID:		no odor
1419	40I	3314	10% gravel 90% sand
	PID:		no odor

TP 42 19-oct-11

Time	Sample	Photo	description	
1427	42A	3315	5% gravel, sand & fine sands	
	PID=		organics, no odor	
1432	42B	3316	10% gravel, 90% sand	
	PID=		no odor	
1436	42C	3317	20% gravel, 80% sand	
	PFD			
	MS/MSD + Dupe		42J taken	
1439	42D	3318	10% gravel	90% sand
	PID=		no odor	
1443	42E	3319	20% gravel,	80% sand
	PID=		no odor	
1448	42F	3320	20% gravel,	80% sand
	PID=		no odor	
1451	42G	~~3321~~ no photo spls	20% gravel,	80% sand
	PID=		no odor	
1456	42H	3321	25% gravel,	75% sand
	PID=		no odor	
1500	42I	3322	30% gravel,	70% sand
	PID=		no odor	

APPENDIX F
Chemical Data Quality Review Checklist

CEPOA-EN-ES-M (200-1d) 23 February 2012

MEMORANDUM FOR CEPOA-PM-ESP (Baez)

SUBJECT: Chemical Data Quality Review, Eklutna FUDS Investigation (11-061).

1. Reference Email, CEPOA-PM-ESP (Baez), 30 March, 2011, Subject: Chemists assigned to projects.

2. Attached is the Chemical Data Quality Review for this project. This report will be included as an appendix to the complete Eklutna FUDS Site Investigation Report.

3. Questions should be directed to Sean Benjamin, ext. 5514.

JAMES W. PEKAR, P.E.
Chief, Geotechnical Services

United States Army
Corps of Engineers

Alaska District
P.O. Box 6868
JBER, AK
99506-6898

Chemical Data Quality Review

Eklutna FUDS Investigation (11-061)
Eklutna, Alaska

Chemistry and Industrial Hygiene Section
Geotechnical and Engineering Services Branch

February 2012

1. Introduction

1.1. The U.S. Army Corps of Engineers Alaska District ((USACE-AK), Engineering Division, Geotechnical and Engineering Services Branch, Chemistry and Industrial Hygiene Section (CEPOA-EN-GES-CIH) prepared this data review at the request of the USACE Environmental and Special Projects (CEPOA-ESP) branch. This report presents a review of the results from the Eklutna FUDS Site Investigation (SI) conducted by USACE-AK personnel at the Eklutna FUDS Site located in Eklutna, Alaska. (11-061).

2. Project Description:

2.1. See Sections 1.1 through 1.3 of the Eklutna FUDS Site Investigation Report for a complete site description and history. The purpose of this sampling event was to delineate the vertical and horizontal extent of fuel impacted surface and subsurface soil associated with historical releases. The results of the chemical analyses were screened against State of Alaska soil cleanup levels under 18 AAC 75, Oil and Hazardous Substances Pollution Control (ref 10.2). The most stringent Method Two cleanup levels for the Under 40 Inch Zone were used as evaluation criteria.

2.2. To that end, 317 soil samples and 35 duplicates were collected during the time period 20 September through 19 October 2011 to determine the horizontal and vertical extents of fuel contamination at the Eklutna FUDS project location. Project chemist Sean Benjamin (CEPOA-EN-GES-CIH) collected the chemical samples from the specified locations and depths using an excavator operated by Alaska Aggregate employee Rex Lewis.

2.3. A total of 352 soil samples (including 35 duplicates) were submitted in five Sample Delivery Groups (SDGs) (ref. 10.4, 10.5, 10.6, 10.7, and 10.8) to SGS Laboratories of Anchorage, Alaska with proper custody procedures. This lab is approved by ADEC through the Underground Storage Tank (UST) Program and is approved by the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) for all analytical methods utilized under this project.

2.4. AK102 (DRO) was the only analytical method utilized for this project. Table 1, located in Appendix C presents the field identification of collected samples, the laboratory assigned identification, and the analyses performed at the laboratory. Table 2, also located in Appendix C, presents a comprehensive data tabulation with data qualifiers as detailed herein.

2.5. The project data was reviewed for deviations to the requirements presented in the Sampling and Analysis Plan, the DOD-QSM (Version 4.2) (ref. 10.3), and the Alaska Department of Environmental Conservation (ADEC) Technical Memorandum 06-002 (dated March 2009) (ref. 10.1) in the following areas – precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Elements reviewed include sample handling, holding times, method and trip blanks, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and relative percent differences (RPDs), matrix

spikes and matrix spike duplicates (MS/MSD) recoveries and RPDs, surrogate recovery, and field duplicate comparability. Calibration curves and continuing calibration standard recoveries were not specifically reviewed; however, laboratories are required to document such failures in the appropriate case narratives. These narratives were reviewed for each sample delivery group.

2.6. The laboratory electronic data format (EDF) for this project was used to generate this report. When discrepancies between the hardcopy data and the EDF are found, the EDF has been modified to reflect values from the hardcopy, unless the hardcopy is found to be in error. Results used to generate this report are deemed to be accurate.

2.7. The following qualifiers, listed below in order of increasing severity, are used in the data tables to indicate quality control deficiencies. With the exception of J and B which provide additional usability information, the most severe flag will be utilized when quality issues indicate the use of more than one qualifier.

Qualifier	Definition
J	Analyte result is considered an estimated value because the level is below the laboratory PQL but above the MDL
MH, ML, MN	Analyte result is considered an estimated value (bias high, low, indeterminate) due to matrix effects
B	Analyte result is considered a high estimated value due to contamination present in the method or trip blank.
QH, QL, QN	Analyte result is considered an estimated value (biased high, low, indeterminate) due to a quality control failure
R	Analyte result is rejected - result is not usable.

2.8. Details of the data review are presented by SDG below:

3. SDG 1114573

3.1. Collection and Preservation: Seventy-two primary and 8 duplicate soil samples were hand delivered to the SGS Laboratory office in Anchorage, Alaska in cooler "1". The temperature blank in cooler "1" was recorded at 5.4°C. This temperature is within the acceptable range. There were no issues with collection or preservation that affected data quality.

3.2. Holding times: This SDG required a 48 hour turnaround time and all samples were extracted and analyzed within required hold time.

3.3. Method blanks were analyzed at the required frequency. Target analytes were not detected in any blank.

3.4. LCS/LCSDs were analyzed at the required frequency. Recoveries were within the QSM acceptance limits for all analytes.

3.5. LCS precision**:** LCS/LCSD samples were run at the required frequency. All LCS/LCSD precision criteria were met in all samples.

3.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits.

3.7. MS/MSD samples were analyzed at the required frequency for all analyses. Recoveries for all samples were within QSM acceptance limits.

3.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality in any sample.

3.9. There were 72 primary samples and 8 duplicates submitted in this SDG, thus meeting the 10% frequency requirement. In addition, the 10% frequency requirement was met for the entire project. The following samples are duplicate pairs: -01JSL and -01ASL; -02JSL and -02BSL; -03JSL and -03CSL; -04JSL and -04DSL; -05JSL and -05ESL; -06JSL and -06FSL; -08JSL and -08ESL; and -09JSL and -09HSL and were submitted to the laboratory in this SDG. All results are compliant with the criteria specified in ADEC Tech Memo 06-002 except as noted below:

- One DRO sample pair (05ESL and -05JSL) had an undetermined RPD because DRO was found in low concentrations in one half of the pair and not in the other. Data is not affected and is not flagged.

4. SDG 1114707

4.1. Collection and Preservation: Sixty-two primary and 7 duplicate soil samples were hand delivered to the SGS laboratory office in Anchorage, Alaska in cooler "TAL-AK". The temperature blank in cooler "TAL-AK" was recorded at 2.4°C. This temperature is within the acceptable range. There were no issues with collection or preservation that affected data quality.

4.2. Holding times: This SDG required a 48 hour turnaround time and all samples were extracted and analyzed within required hold time.

4.3. Method blanks were analyzed at the required frequency. Target analytes were not detected in any blank.

4.4. LCS/LCSDs were analyzed at the required frequency. Recoveries were within the QSM acceptance limits for all analytes.

4.5. LCS precision**:** LCS/LCSD samples were run at the required frequency. All LCS/LCSD precision criteria were met in all samples.

4.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits.

4.7. MS/MSD samples were analyzed at the required frequency for all analyses. Recoveries for all samples were within QSM acceptance limits.

4.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality in any sample.

4.9. There were 62 primary samples and 7 duplicates submitted in this SDG, thus meeting the 10% frequency requirement. In addition, the 10% frequency requirement was met for the entire project. The following samples are duplicate pairs: -10JSL is a duplicate of sample -10ASL. Sample -11GSL is a duplicate of sample -11FSL. Sample -12JSL is a duplicate of sample -12DSL. Sample -13JSL is a duplicate of sample -13ESL. Sample -16JSL is a duplicate of sample -16CSL. Sample -17JSL is a duplicate of sample -17DSL. Sample -18JSL is a duplicate of sample -18ESL. All results are compliant with the criteria specified in ADEC Tech Memo 06-002.

5. SDG 1114876

5.1. Collection and Preservation: Fifty-three primary and 6 duplicate soil samples were hand delivered to the SGS Laboratory office in Anchorage, Alaska in cooler "SGS". The temperature blank in cooler "SGS" was recorded at 10.0°C. This temperature is above the acceptable range. The samples were kept in a cooler with 8 ice packs overnight from the day of collection. The next day, the samples were inspected and it was noticed that the temperature blank was not included with the samples. As no temperature blank was in the refrigerator, a new one had to be made up. The temperature blank only had about an hour to cool before being delivered to the laboratory. As the DRO is a semi-volatile, the time between sample collection and delivery was minimal for outgassing to occur. There were no other issues with collection or preservation that affected data quality.

5.2. Holding times: This SDG required a seven day turnaround time and all samples were extracted and analyzed within required hold time.

5.3. Method blanks were analyzed at the required frequency. Target analytes were not detected in any blank.

5.4. LCS/LCSDs were analyzed at the required frequency. Recoveries were within the QSM acceptance limits for all analytes.

5.5. LCS precision**:** LCS/LCSD samples were run at the required frequency. All LCS/LCSD precision criteria were met in all samples.

5.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits.

5.7. MS/MSD samples were analyzed at the required frequency for all analyses. Recoveries for all samples were within QSM acceptance limits.

5.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality in any sample.

5.9. There were 53 primary samples and 6 duplicates submitted in this SDG, thus meeting the 10% frequency requirement. In addition, the 10% frequency requirement was met for the entire project. The following samples are duplicate pairs: Sample -20JSL is a duplicate of sample -20BSL. Sample -21JSL is a duplicate of sample -21CSL. Sample -22JSL is a duplicate of sample -22DSL. Sample -23JSL is a duplicate of sample -23ESL. Sample -24JSL is a duplicate of

sample -24FSL. Sample -25JSL is a duplicate of sample -25CSL. All results are compliant with the criteria specified in ADEC Tech Memo 06-002.

6. SDG 1115182

6.1. Collection and Preservation: Sixty-four primary and 8 duplicate soil samples were hand delivered to the SGS Laboratory office in Anchorage, Alaska in cooler "TA". The temperature blank in cooler "TA" was recorded at 5.2°C. This temperature is within the acceptable range. Two sample jars in this SDG were labeled with the same ID number. The lab was instructed to use the number on the lid of the jar. Data quality was not impacted as another means of sample identification was available. There were no other issues with collection or preservation that affected data quality.

6.2. Holding times: This SDG required a 30 day turnaround time and all samples were extracted and analyzed within required hold times.

6.3. Method blanks were analyzed at the required frequency. Target analytes were not detected in any blank.

6.4. LCS/LCSDs were analyzed at the required frequency. Recoveries were within the QSM acceptance limits for all analytes.

6.5. LCS precision**:** LCS/LCSD samples were run at the required frequency. All LCS/LCSD precision criteria were met in all samples.

6.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits.

6.7. MS/MSD samples were analyzed at the required frequency for all analyses. Recoveries for all samples were within QSM acceptance limits.

6.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality in any sample.

6.9. There were 64 primary samples and 8 duplicates submitted in this SDG, thus meeting the 10% frequency requirement. In addition, the 10% frequency requirement was met for the entire project. The following samples are duplicate pairs: Sample -33JSL is a duplicate of sample -33ESL. Sample -34JSL is a duplicate of sample -34ASL. Sample -36JSL is a duplicate of sample -36BSL. Sample -37JSL is a duplicate of sample -37ASL. Sample -38JSL is a duplicate of sample -38DSL. Sample -39JSL is a duplicate of sample -39FSL. Sample -40JSL is a duplicate of sample -40ESL. Sample -42JSL is a duplicate of sample -42CSL. Sample -43JSL is a duplicate of sample -43ESL. The extra duplicate here makes up for the one short in lab report #1115183. All results are compliant with the criteria specified in ADEC Tech Memo 06-002 except as noted below:

- Duplicate pair -37A and -37J had an incalculable RPD because a low detection was found in one of the pairs while the other was non-detect. Data is not affected and is not flagged.

7. SDG 1115183

7.1. Collection and Preservation: Sixty-six primary and 6 duplicate soil samples were hand delivered to the SGS Laboratory office in Anchorage, Alaska in cooler "coleman". The temperature blank in cooler "coleman" was recorded at 5.0°C. This temperature is within the acceptable range. There were no issues with collection or preservation that affected data quality.

7.2. Holding times: This SDG required a 30 day turnaround time and all samples were extracted and analyzed within required hold time.

7.3. Method blanks were analyzed at the required frequency. Target analytes were not detected in any blank.

7.4. LCS/LCSDs were analyzed at the required frequency. Recoveries were within the QSM acceptance limits for all analytes.

7.5. LCS precision**:** LCS/LCSD samples were run at the required frequency. All LCS/LCSD precision criteria were met in all samples.

7.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits.

7.7. MS/MSD samples were analyzed at the required frequency for all analyses. Recoveries for all samples were within QSM acceptance limits.

7.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality in any sample.

7.9. There were 66 primary samples and 6 duplicates submitted in this SDG, thus falling just short of meeting the 10% frequency requirement. Due to an extra duplicate pair in SDG 1115182, the 10% frequency requirement was met for the entire project. The following samples are duplicate pairs: Sample -26J is a duplicate of sample -26ASL. Sample -27JSL is a duplicate of sample -27BSL. Sample -28JSL is a duplicate of sample -28CSL. Sample -29JSL is a duplicate of sample -29DSL. Sample -30JSL is a duplicate of sample -30CSL. Sample -43JSL is a duplicate of sample -43ESL. All results are compliant with the criteria specified in ADEC Tech Memo 06-002.

8. Reporting Limits:

The laboratory reporting limits meet or exceed ADEC regulatory requirements for all compounds.

9. Overall Assessment:

All results for this project are usable as reported and flagged. The overall completeness goal of 95% was met.

10. References:

10.1. Alaska Department of Environmental Conservation, Technical Memorandum 06-002, Environmental Laboratory Data and Quality Assurance Requirements, March 2009.

10.2. Alaska Department of Environmental Conservation (ADEC), 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, October 2008.

10.3. Department of Defense, Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 2010.

10.4. SGS Laboratory Data Report SDG # 1114573, Laboratory Analytical Report: Eklutna FUDS, September, 2011.

10.5. SGS Laboratory Data Report SDG # 1114707, Laboratory Analytical Report: Eklutna FUDS, October, 2011.

10.6. SGS Laboratory Data Report SDG # 1114876, Laboratory Analytical Report: Eklutna FUDS, October, 2011.

10.7. SGS Laboratory Data Report SDG # 1115182, Laboratory Analytical Report: Eklutna FUDS, November, 2011.

10.8. SGS Laboratory Data Report SDG # 1115183, Laboratory Analytical Report: Eklutna FUDS, November, 2011.

APPENDIX G
ADEC Laboratory Data Review Checklist

Laboratory Data Review Checklist

Completed by: Sean Benjamin

Title: Chemist Date: 12/05/2011

CS Report Name: Eklutna FUDS Report Date: 09/29/2011

Consultant Firm: US Army Corps of Engineers

Laboratory Name: SGS Laboratory Report Number: 1114573

ADEC File Number: ADEC RecKey Number:

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

      Yes, SGS of Anchorage, Alaska received all samples. This lab is ADEC and DoD ELAP certified for all analyses.

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

      No samples were transferred.

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

      Yes.

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

      Yes.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      Yes. Samples were hand delivered in one cooler. The temperature blank temperature was 5.4 ° C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
      Yes No ■NA (Please explain.) Comments:

      No preservation except for cooling was needed for the analyses requested.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
■Yes No NA (Please explain.) Comments:

There were no discrepancies noted.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
Yes No ■NA (Please explain.) Comments:

All discrepancies were noted in the case narrative and the sample receipt form.

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

Data quality is not affected.

4. Case Narrative
a. Present and understandable?
■Yes No NA (Please explain.) Comments:

Yes.

b. Discrepancies, errors or QC failures identified by the lab?
Yes No ■NA (Please explain.) Comments:

There were no QC failures with this batch of samples.

c. Were all corrective actions documented?
Yes No ■NA (Please explain.) Comments:

No corrective actions needed to be initiated.

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

All data is usable as flagged.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
■Yes No NA (Please explain.) Comments:

Yes.

b. All applicable holding times met?
■Yes No NA (Please explain.) Comments:

Yes, all samples were on a RUSH basis.

c. All soils reported on a dry weight basis?

■Yes No NA (Please explain.) Comments:

Yes.

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

■Yes No NA (Please explain.) Comments:

Yes.

e. Data quality or usability affected?

Comments:

All data is usable.

6. QC Samples

a. Method Blank

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

■Yes No NA (Please explain.) Comments:

Yes.

ii. All method blank results less than PQL?

■Yes No NA (Please explain.) Comments:

Yes.

iii. If above PQL, what samples are affected?

Comments:

N/A

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

Yes No ■NA (Please explain.) Comments:

No samples were blank contaminated.

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

Comments:

Data is usable as flagged.

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

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

■Yes No NA (Please explain.) Comments:

Yes.

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

Yes No ■NA (Please explain.) Comments:

None of these analyses were requested.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

■Yes No NA (Please explain.) Comments:

Yes.

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

■Yes No NA (Please explain.) Comments:

Yes, all RPDs were less than 20%.

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

Comments:

N/A - there are no affected samples.

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

Yes No NA (Please explain.) Comments:

N/A - there are no affected samples.

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

Comments:

N/A, all LCS/LCSDs were within acceptance criteria.

c. Surrogates – Organics Only

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

■Yes No NA (Please explain.) Comments:

Yes. All surrogates and MS/MSDs were within acceptable criteria.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

■Yes No NA (Please explain.) Comments:

All surrogate and MS/MSD recoveries were within acceptable criteria.

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

Yes No ■NA (Please explain.) Comments:

No sample results failed.

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

Comments:

Data is usable.

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

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

Yes No ■NA (Please explain.) Comments:

No volatile analyses were requested, trip blank not necessary.

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

Yes ■ No NA (Please explain.) Comments:

Only one cooler was used to transport all of the samples to the laboratory.

iii. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

N/A – no trip blank necessary.

iv. If above PQL, what samples are affected?

Comments:

N/A

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

Comments:

N/A

e. Field Duplicate

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

■Yes No NA (Please explain.) Comments:

Yes. There were 72 primary samples and 8 duplicates. Sample -01J is a duplicate of sample -01A. Sample -02J is a duplicate of sample -02B. Sample -03J is a duplicate of sample -03C. Sample -04J is a duplicate of sample -04D. Sample -05J is a duplicate of sample -05E. Sample -06J is a duplicate of sample -06F. Sample -08J is a duplicate of sample -08G. Sample -09J is a duplicate of sample -09H.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

Yes.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

■Yes No NA (Please explain.) Comments:

One DRO sample pair (05ESL and -05JSL) had an RPD undetermined amount because DRO was found in low concentrations in one half of the pair and not in the other half of the pair.

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

Comments:

Data is usable as the affected sample results are far below screening criteria.

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

Yes No ■NA (Please explain.) Comments:

Disposable equipment was used for sampling.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Not applicable.

Comments:

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

Comments:

Not applicable.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      ■Yes No NA (Please explain.) Comments:

The only data qualification flag used in this data set was the "J" flag.

Laboratory Data Review Checklist

Completed by: Sean Benjamin

Title: Chemist Date: 12/06/2011

CS Report Name: Eklutna FUDS Report Date: 10/04/2011

Consultant Firm: US Army Corps of Engineers

Laboratory Name: SGS Laboratory Report Number: 1114707

ADEC File Number: ADEC RecKey Number:

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

      Yes, SGS of Anchorage, Alaska received all samples. This lab is ADEC and DoD ELAP certified for all analyses.

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

      No samples were transferred.

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

      Yes.

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

      Yes.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      Yes. Samples were hand delivered in one cooler. The temperature blank temperature was 2.4 ° C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
      Yes No ■NA (Please explain.) Comments:

      No preservation except for cooling was needed for the analyses requested.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
■Yes No NA (Please explain.) Comments:

There were no discrepancies noted.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
Yes No ■NA (Please explain.) Comments:

All discrepancies were noted in the case narrative and the sample receipt form.

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

Data quality is not affected.

4. Case Narrative
a. Present and understandable?
■Yes No NA (Please explain.) Comments:

Yes.

b. Discrepancies, errors or QC failures identified by the lab?
Yes No ■NA (Please explain.) Comments:

There were no QC failures with this batch of samples.

c. Were all corrective actions documented?
Yes No ■NA (Please explain.) Comments:

No corrective actions needed to be initiated.

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

All data is usable as flagged.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
■Yes No NA (Please explain.) Comments:

Yes.

b. All applicable holding times met?
■Yes No NA (Please explain.) Comments:

Yes, all samples were on a RUSH basis.

c. All soils reported on a dry weight basis?
■Yes No NA (Please explain.) Comments:

Yes.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
■Yes No NA (Please explain.) Comments:

Yes.

e. Data quality or usability affected?
Comments:

All data is usable.

6. QC Samples
a. Method Blank
i. One method blank reported per matrix, analysis and 20 samples?
■Yes No NA (Please explain.) Comments:

Yes.

ii. All method blank results less than PQL?
■Yes No NA (Please explain.) Comments:

Yes.

iii. If above PQL, what samples are affected?
Comments:

N/A

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
Yes No ■NA (Please explain.) Comments:

No samples were blank contaminated.

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

Data is usable.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)
■Yes No NA (Please explain.) Comments:

Yes.

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

Yes No ■NA (Please explain.) Comments:

None of these analyses were requested.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

■Yes No NA (Please explain.) Comments:

Yes.

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

■Yes No NA (Please explain.) Comments:

Yes, all RPDs were less than 20%.

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

Comments:

N/A - there are no affected samples.

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

Yes No ■NA (Please explain.) Comments:

N/A - there are no affected samples.

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

Comments:

N/A, all LCS/LCSDs were within acceptance criteria.

c. Surrogates – Organics Only

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

■Yes No NA (Please explain.) Comments:

Yes. All surrogates and MS/MSDs were within acceptable criteria.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

■Yes No NA (Please explain.) Comments:

All surrogate and MS/MSD recoveries were within acceptable criteria.

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

Yes No ■NA (Please explain.) Comments:

No sample results failed.

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

Comments:

Data is usable.

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

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

Yes No ■NA (Please explain.) Comments:

No volatile analyses were requested, trip blank not necessary.

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

Yes ■ No NA (Please explain.) Comments:

Only one cooler was used to transport all of the samples to the laboratory.

iii. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

N/A – no trip blank necessary.

iv. If above PQL, what samples are affected?

Comments:

N/A

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

Comments:

N/A

e. Field Duplicate

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

■Yes No NA (Please explain.) Comments:

Yes. There were 62 primary samples and 7 duplicates. Sample -10J is a duplicate of sample -10A. Sample -11G is a duplicate of sample -11F. Sample -12J is a duplicate of sample -12D. Sample -13J is a duplicate of sample -13E. Sample -16J is a duplicate of sample -16C. Sample -17J is a duplicate of sample -17D. Sample -18J is a duplicate of sample -18E.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

Yes.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

■Yes No NA (Please explain.) Comments:

Yes.

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

Comments:

Data is usable.

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

Yes No ■NA (Please explain.) Comments:

Disposable equipment was used for sampling.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Comments:

Not applicable.

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

Comments:

Not applicable.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      ■Yes No NA (Please explain.) Comments:

Yes.

Laboratory Data Review Checklist

Completed by: Sean Benjamin

Title: Chemist Date: 12/06/2011

CS Report Name: Eklutna FUDS Report Date: 10/22/2011

Consultant Firm: US Army Corps of Engineers

Laboratory Name: SGS Laboratory Report Number: 1114876

ADEC File Number: ADEC RecKey Number:

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

      Yes, SGS of Anchorage, Alaska received all samples. This lab is ADEC and DoD ELAP certified for all analyses.

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

      No samples were transferred.

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

      Yes.

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

      Yes.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      □Yes ■ No □NA (Please explain.) Comments:

      No. Samples were hand delivered in one cooler. The temperature blank temperature was 10.0 ° C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
      □Yes □ No ■NA (Please explain.) Comments:

      No preservation except for cooling was needed for the analyses requested.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
■Yes □ No □NA (Please explain.) Comments:

There were no discrepancies noted.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
■Yes □ No □NA (Please explain.) Comments:

The COC and the sample receipt form had the incoming sample temperature written on it.

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

Samples were kept in a cooler with 8 ice packs overnight from the day of collection. The next day, the samples were inspected and it was noticed that the temperature blank was not included with the samples. As no temperature blank was in the refrigerator, a new one had to be made up. The temperature blank only had about an hour to cool before being delivered to the laboratory. As the DRO is a semi-volatile, the time between sample collection and delivery was minimal for outgassing to occur. Data usability is not affected.

4. Case Narrative
a. Present and understandable?
■Yes □ No □NA (Please explain.) Comments:

Yes.

b. Discrepancies, errors or QC failures identified by the lab?
■Yes □ No □NA (Please explain.) Comments:

Surrogate recovery errors in the LCS and method blanks were listed here.

c. Were all corrective actions documented?
■Yes □ No □NA (Please explain.) Comments:

No corrective actions needed because sample surrogate recoveries were within parameters.

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

All data is usable as flagged.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
■Yes □ No □NA (Please explain.) Comments:

Yes.

b. All applicable holding times met?

■Yes □ No □NA (Please explain.) Comments:

Yes.

c. All soils reported on a dry weight basis?

■Yes □ No □NA (Please explain.) Comments:

Yes.

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

Yes, all samples were on a RUSH basis.

■Yes □ No □NA (Please explain.) Comments:

e. Data quality or usability affected?

Comments:

All data is usable.

6. QC Samples

a. Method Blank

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

■Yes □ No □NA (Please explain.) Comments:

Yes.

ii. All method blank results less than PQL?

■Yes □ No □NA (Please explain.) Comments:

Yes.

iii. If above PQL, what samples are affected?

Comments:

N/A

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

□Yes □ No ■NA (Please explain.) Comments:

No samples were blank contaminated.

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

Comments:

Data is usable.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)
■Yes □ No □NA (Please explain.) Comments:

Yes.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
□Yes □ No ■NA (Please explain.) Comments:

None of these analyses were requested.

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

Yes.

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

Yes, all RPDs were less than 20%.

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

N/A - there are no affected samples.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
□Yes □ No ■NA (Please explain.) Comments:

N/A - there are no affected samples.

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

N/A, all LCS/LCSDs were within acceptance criteria.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
■Yes □ No □NA (Please explain.) Comments:

Yes. All surrogates and MS/MSDs were within acceptable criteria.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

■Yes □ No □NA (Please explain.) Comments:

All surrogate and MS/MSD recoveries were within acceptable criteria for customer samples. Surrogate recoveries for one each of: method blank, LCS, and LCSD failed.

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

□Yes □ No ■NA (Please explain.) Comments:

No sample results failed.

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

Comments:

Data is usable.

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

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

□Yes □ No ■NA (Please explain.) Comments:

No volatile analyses were requested, trip blank not necessary.

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

□Yes ■ No □NA (Please explain.) Comments:

Only one cooler was used to transport all of the samples to the laboratory.

iii. All results less than PQL?

□Yes □ No ■NA (Please explain.) Comments:

N/A – no trip blank necessary.

iv. If above PQL, what samples are affected?

Comments:

N/A

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

Comments:

N/A

e. Field Duplicate

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

■Yes □ No □NA (Please explain.) Comments:

Yes. There were 53 primary samples and 6 duplicates. Sample -20J is a duplicate of sample -20B. Sample -21J is a duplicate of sample -21C. Sample -22J is a duplicate of sample -22D. Sample -23J is a duplicate of sample -23E. Sample -24J is a duplicate of sample -24F. Sample -25J is a duplicate of sample -25C.

ii. Submitted blind to lab?

■Yes □ No □NA (Please explain.) Comments:

Yes.

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 □NA (Please explain.) Comments:

Yes.

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

Comments:

Data is usable.

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

□Yes □ No ■NA (Please explain.) Comments:

Disposable equipment was used for sampling.

i. All results less than PQL?

□Yes □ No ■NA (Please explain.) Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Comments:

Not applicable.

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

Comments:

Not applicable.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      ■Yes □ No □NA (Please explain.) Comments:

Yes.

Laboratory Data Review Checklist

Completed by: Sean Benjamin

Title: Chemist Date: 12/06/2011

CS Report Name: Eklutna FUDS Report Date: 11/14/2011

Consultant Firm: US Army Corps of Engineers

Laboratory Name: SGS Laboratory Report Number: 1115182

ADEC File Number: ADEC RecKey Number:

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

      Yes, SGS of Anchorage, Alaska received all samples. This lab is ADEC and DoD ELAP certified for all analyses.

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

      No samples were transferred.

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

      Yes.

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

      Yes.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      Yes. Samples were hand delivered in one cooler. The temperature blank temperature was 5.2 ° C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
      Yes No ■NA (Please explain.) Comments:

      No preservation except for cooling was needed for the analyses requested.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
■Yes No NA (Please explain.) Comments:

There were no discrepancies noted.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
Yes No ■NA (Please explain.) Comments:

Two sample jars were labeled with the same ID number. The lab was instructed to use the number on the lid of the jar. One of these samples did not match the chain of custody.

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

Data quality is not affected as another means if identification was available.

4. Case Narrative
a. Present and understandable?
■Yes No NA (Please explain.) Comments:

Yes.

b. Discrepancies, errors or QC failures identified by the lab?
Yes No ■NA (Please explain.) Comments:

There were no QC failures with this batch of samples.

c. Were all corrective actions documented?
Yes No ■NA (Please explain.) Comments:

No corrective actions needed to be initiated.

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

All data is usable as flagged.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
■Yes No NA (Please explain.) Comments:

Yes.

b. All applicable holding times met?

Yes, all samples met holding times.

■Yes No NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?
■Yes No NA (Please explain.) Comments:

Yes.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
■Yes No NA (Please explain.) Comments:

Yes.

e. Data quality or usability affected?
Comments:

All data is usable.

6. QC Samples
a. Method Blank
i. One method blank reported per matrix, analysis and 20 samples?
■Yes No NA (Please explain.) Comments:

Yes.

ii. All method blank results less than PQL?
■Yes No NA (Please explain.) Comments:

Yes.

iii. If above PQL, what samples are affected?
Comments:

N/A

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
Yes No ■NA (Please explain.) Comments:

No samples were blank contaminated.

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

Data is usable.

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

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

■Yes No NA (Please explain.) Comments:

Yes.

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

Yes No ■NA (Please explain.) Comments:

None of these analyses were requested.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

■Yes No NA (Please explain.) Comments:

Yes.

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

■Yes No NA (Please explain.) Comments:

Yes, all RPDs were less than 20%.

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

Comments:

N/A - there are no affected samples.

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

Yes No ■NA (Please explain.) Comments:

N/A - there are no affected samples.

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

Comments:

N/A, all LCS/LCSDs were within acceptance criteria.

c. Surrogates – Organics Only

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

■Yes No NA (Please explain.) Comments:

Yes. All surrogates and MS/MSDs were within acceptable criteria.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

■Yes No NA (Please explain.) Comments:

All surrogate and MS/MSD recoveries were within acceptable criteria.

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

Yes No ■NA (Please explain.) Comments:

No sample results failed.

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

Comments:

Data is usable.

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

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

Yes No ■NA (Please explain.) Comments:

No volatile analyses were requested, trip blank not necessary.

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

Yes ■ No NA (Please explain.) Comments:

Only one cooler was used to transport all of the samples to the laboratory.

iii. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

N/A – no trip blank necessary.

iv. If above PQL, what samples are affected?

Comments:

N/A

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

Comments:

N/A

e. Field Duplicate

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

■Yes No NA (Please explain.) Comments:

Yes. There were 64 primary samples and 8 duplicates. Sample -33J is a duplicate of sample -33E. Sample -34J is a duplicate of sample -34A. Sample -36J is a duplicate of sample -36B. Sample -37J is a duplicate of sample -37A. Sample -38J is a duplicate of sample -38D. Sample -39J is a duplicate of sample -39F. Sample -40J is a duplicate of sample -40E. Sample -42J is a duplicate of sample -42C. Sample -43J is a duplicate of sample -43E. The extra duplicate here makes up for the one short in lab report #1115183.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

Yes.

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes ■ No NA (Please explain.) Comments:

No. Duplicate pair -37A and -37J had an incalculable RPD because a low detection was found in one of the pairs while the other was non-detect.

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

Comments:

Data is usable because the results are well below screening criteria.

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

Yes No ■NA (Please explain.) Comments:

Disposable equipment was used for sampling.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Not applicable.

Comments:

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

Comments:

Not applicable.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      ■Yes No NA (Please explain.) Comments:

Yes.

Laboratory Data Review Checklist

Completed by: Sean Benjamin

Title: Chemist Date: 12/06/2011

CS Report Name: Eklutna FUDS Report Date: 11/22/2011

Consultant Firm: US Army Corps of Engineers

Laboratory Name: SGS Laboratory Report Number: 1115183

ADEC File Number: ADEC RecKey Number:

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

      Yes, SGS of Anchorage, Alaska received all samples. This lab is ADEC and DoD ELAP certified for all analyses.

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

      No samples were transferred.

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

      Yes.

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

      Yes.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      Yes. Samples were hand delivered in one cooler. The temperature blank temperature was 5.0 ° C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
      Yes No ■NA (Please explain.) Comments:

      No preservation except for cooling was needed for the analyses requested.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
■Yes No NA (Please explain.) Comments:

There were no discrepancies noted.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
Yes No ■NA (Please explain.) Comments:

There were no discrepancies noted.

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

Data quality is not affected.

4. Case Narrative
a. Present and understandable?
■Yes No NA (Please explain.) Comments:

Yes.

b. Discrepancies, errors or QC failures identified by the lab?
Yes No ■NA (Please explain.) Comments:

There were no QC failures with this batch of samples.

c. Were all corrective actions documented?
Yes No ■NA (Please explain.) Comments:

No corrective actions needed to be initiated.

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

All data is usable as flagged.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
■Yes No NA (Please explain.) Comments:

Yes.

b. All applicable holding times met?
■Yes No NA (Please explain.) Comments:

Yes, all samples met holding times.

c. All soils reported on a dry weight basis?
■Yes No NA (Please explain.) Comments:

Yes.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
■Yes No NA (Please explain.) Comments:

Yes.

e. Data quality or usability affected?
Comments:

All data is usable.

6. QC Samples
a. Method Blank
i. One method blank reported per matrix, analysis and 20 samples?
■Yes No NA (Please explain.) Comments:

Yes.

ii. All method blank results less than PQL?
■Yes No NA (Please explain.) Comments:

Yes.

iii. If above PQL, what samples are affected?
Comments:

N/A

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
Yes No ■NA (Please explain.) Comments:

No samples were blank contaminated.

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

Data is usable.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)
■Yes No NA (Please explain.) Comments:

Yes.

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

Yes No ■NA (Please explain.) Comments:

None of these analyses were requested.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

■Yes No NA (Please explain.) Comments:

Yes.

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

■Yes No NA (Please explain.) Comments:

Yes, all RPDs were less than 20%.

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

Comments:

N/A - there are no affected samples.

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

Yes No ■NA (Please explain.) Comments:

N/A - there are no affected samples.

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

Comments:

N/A, all LCS/LCSDs were within acceptance criteria.

c. Surrogates – Organics Only

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

■Yes No NA (Please explain.) Comments:

Yes. All surrogates and MS/MSDs were within acceptable criteria.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

■Yes No NA (Please explain.) Comments:

All surrogate and MS/MSD recoveries were within acceptable criteria.

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

Yes No ■NA (Please explain.) Comments:

No sample results failed.

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

Comments:

Data is usable.

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

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

Yes No ■NA (Please explain.) Comments:

No volatile analyses were requested, trip blank not necessary.

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

Yes ■ No NA (Please explain.) Comments:

Only one cooler was used to transport all of the samples to the laboratory.

iii. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

N/A – no trip blank necessary.

iv. If above PQL, what samples are affected?

Comments:

N/A

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

Comments:

N/A

e. Field Duplicate

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

Yes ■No NA (Please explain.) Comments:

No. There were 66 primary samples and 6 duplicates. Sample -26J is a duplicate of sample -26A. Sample -27J is a duplicate of sample -27B. Sample -28J is a duplicate of sample -28C. Sample -29J is a duplicate of sample -29D. Sample -30J is a duplicate of sample -30C. Sample -43J is a duplicate of sample -43E. However, there were two coolers brought in at the same time. The two coolers contained 130 primary samples and 14 duplicates. The laboratory split the coolers into two batches because there were over 80 samples (the limit of the lab glassware). The other batch has 8 duplicates, which makes up for the 6 here.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

Yes.

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

■Yes No NA (Please explain.) Comments:

Yes.

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

Comments:

Data is usable because of the total number of duplicates brought in.

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

Yes No ■NA (Please explain.) Comments:

Disposable equipment was used for sampling.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Not applicable.

Comments:

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

Comments:

Not applicable.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      ■Yes No NA (Please explain.) Comments:

Yes.

APPENDIX H
Review Comment Log

REVIEW COMMENTS

PROJECT: Eklutna Army Sites, Project 01

DOCUMENT: Site Investigation Report, Draft June 2012

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 7/31/2012 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1		Please provide an explanation of how the samples for SDG 1114876 were managed from collection on October 4,2011 until they were received above temperature at the laboratory on the afternoon of October 5, 2011.	A	The samples were kept in a cooler with 8 ice packs overnight on the 4th. On the 5th, the samples were inspected. Upon inspection, it was noticed that a temperature blank was not in with the samples. The ice packs were still frozen. A new temperature blank had to be made, as there were none in the refrigerator. The temperature blank only had about an hour to cool in the cooler before being transported to the laboratory. The CDQR and ADEC check sheet have been updated to document the sample management.	

APPENDIX I
Personnel Qualifications

Qualified Personnel Form
CEPOA-ESP-EE
P.O. Box 6898
Elmendorf AFB AK 99506-6898

QUALIFIED PERSONNEL

- The personnel listed below are "qualified" as defined in 18 AAC 78 and 18 AAC 75. A "qualified person" is a person who actively practices environmental science or engineering, geology, physical science, hydrology, or a related field and meets the following minimum requirements:

- A bachelor's degree or equivalent from an accredited postsecondary institution in environmental science or engineering, geology, hydrology, physical science, or a related field; "equivalent" means that the person earned at least 128 semester hours, 168 trimester hours, or 192 quarter hours, at an accredited postsecondary institution, of which at least 24 semester credits (or at least 18 percent of credits) were in the science major and at least 16 semester credits (or at least 13 percent of credits) were in upper division level courses; and (B) at least one year of professional experience in environmental science or engineering, geology, physical science, or a related field, completed after the degree described in (A) was obtained.

The list below includes names of qualified personnel who were involved in collecting, interpreting, and reporting the 2011 Eklutna Site Investigation data:

Scott D. Kendall

Environmental Engineering Supervisor

Area of Expertise

Environmental Engineer

Quality Assurance /Quality Control

Site Investigation

Site Remediation

Mr. Kendall has worked in the Environmental Remediation field since 1991. He reviewed, supervised and managed Army, Air Force and FUDS projects from conception to completion. His field of expertise encompasses Preliminary Assessments/ Site Inspections (PA/SI), Remedial Investigations/Feasibility Studies (RI/FS), Proposed Plan/Decision Documents (PP/DD), Remedial Designs (RD), Remedial Actions, and Project Closeout (PCO). His duties extends to developing scopes of work and independent government cost estimates; and evaluating contractor proposals to ensure project scope and required federal and state regulations are met. Mr. Kendall has worked as supervisor; project manager and project engineer on many DoD contaminated site programs and is familiar with the standards and procedures for compliance with the federal and state agencies.

Education

M.S., 1990, Geological Engineering, University of Idaho, Moscow, ID
B.S., 1988, Geology, Campbell University, Buies Creek, NC

Years of experience (19)

Neil J. Folcik

UVOST Program Lead

Area of Expertise

Environmental Engineer

Site Investigation

Site Remediation

Mr. Folcik has over 8 years of Environmental Engineering experience, including 6 years experience as a ROST/UVOST operator. His expertise encompasses site investigations, site remediation, cost estimating, and project management. Mr. Folcik has worked as project manager or lead technical engineer on many DoD contaminated sites and is familiar with the standards and procedures for compliance with the federal and state agencies. Mr. Folcik is a Dakota Technologies Inc. certified UVOST operator.

Education

B.S., 2002, Chemical Engineering, Michigan Technological University, Houghton, MI

Years of experience (8)

William F. Mangano

UVOST Investigation Field Officer

Area of Expertise

Civil Engineer

Site Investigation

Site Remediation

Mr. Mangano has over 2 years of Environmental Engineering experience, including work in environmental remediation projects. His expertise encompasses site investigation, groundwater monitoring, and remedial technology selecting and implementation. Mr. Mangano specializes currently serves as the project engineer for several Formerly Used Defense Sites (FUDS) projects and is familiar with the standards and procedures for compliance with the federal and state agencies.

Education

B.S., 2008, Civil Engineering, University of Alaska Fairbanks, Fairbanks, AK

Years of experience (2)

Jake Sweet

Project Chemist

Area of Expertise

- Materials/Environmental Chemist
- Quality Assurance /Quality Control
- Site Investigation

Mr. Sweet has over 5 years of Environmental Quality and Chemical Laboratory experience. His expertise encompasses environmental quality, groundwater chemistry, site investigation, and chemical laboratory methods and qualifications. Mr. Sweet has worked as chemist in many DoD contaminated site programs and is familiar with the standards and procedures for compliance with the federal and state agencies.

Education

B.S., 2003, Natural Sciences, University of Alaska

Years of experience (6)

Sean P. Benjamin

Project Chemist

Area of Expertise

- Materials/Environmental Chemist
- Quality Assurance /Quality Control
- Site Investigation

Mr. Benjamin has over 7 years of Environmental Quality and 7 years of Chemical Laboratory experience. His expertise encompasses environmental quality, groundwater chemistry, UST removal, and expert on chemical laboratory methods and qualifications. Mr. Benjamin has worked as chemist in many DoD contaminated site programs and is familiar with the standards and procedures for compliance with the federal and state agencies.

Education

M.S., 2007, Materials Engineering, Northeastern University, Boston, MA
B.S.E.T., 2003, Northeastern University, Boston, MA
A.E., 2003, Northeastern University, Boston, MA
B.S., 2000, Chemistry, Minor in Mathematics, Salem State College, Salem, MA
A.A.S., 1996, Environmental Technology, Paul Smith's College, Paul Smiths, NY
A.A.S., 1995, Pre-Professional Forestry, Paul Smith's College, Paul Smiths, NY

Years of experience (14)