United States Army
Corps of Engineers

Alaska District
PO Box 898
Anchorage, AK
99506-0898

Site Investigation Report

FORMERLY USED DEFENSE SITES
ATKA ISLAND, ALASKA

3 September, 1999

SITE INVESTIGATION REPORT
FORMERLY USED DEFENSE SITES
ATKA ISLAND, ALASKA

REPORT AND APPENDICES

UPC Code ERP 027
Work Item No. 0024HB

3 September, 1999

Prepared by
U.S. Army Corps of Engineers, Alaska District
Engineering Division, Environmental Engineering Branch
P.O. Box 898
Anchorage, Alaska 99506-0898

USACE-POA QUALITY ASSURANCE CONCURRENCE

Site Investigation Report
Formerly Used Defense Sites
Atka Island, Alaska

Project Name:	Formerly Used Defense Sites, Atka Island
UPC Code:	ERP 027
Work Item Number:	0024HB
Responsible Organization:	Environmental Engineering Branch Engineering Division, Alaska District U.S. Army Corps of Engineers Anchorage, Alaska

Concurrences:

Name: Brian D. West
Title: Section Chief, Environmental Technical Engineering Section, CEPOA-EN-EE-TE

Signature: Brian D. West Date: 3 Sept 99

Name: Patrick A. Roth
Title: Program Manager, CEPOA- PM-M

Signature: Patrick A. Roth Date: 3 Sep 99

Executive Summary

This report discusses the field investigation of the formerly used defense sites on Atka Island, which is located in the central portion of the Aleutian Arc. During the Second World War, the United States armed forces build up Atka Island for use as a possible staging area for the campaign in the Aleutians. The facilities included a 4,000-foot airstrip, a dock for ships, a 50-bed hospital, many warehouses, quarters for 1,056 personnel, an aircraft control station, a radar station, and several observation posts. The facilities on Atka Island played a secondary role to those on Adak Island during the war and by the end of 1945 the Atka Island facilities were largely abandoned.

The island residents have used the airstrip and the dock since the end of the war, however, the other facilities were neglected and quickly fell into disrepair. A contractor for the U. S. Army Corps of Engineers demolished most of the buildings in the mid-1980s. In June 1998, personnel from the Alaska District, Corps of Engineers, collected soil samples at various locations on the island. The analytical results indicated that several sites had high concentrations of several contaminants of concern.

The analytical results for the Cape Kudugnak Site indicated that the soil has high concentrations of diesel fuel, PCBs, lead, and mercury, which exceed risk-based screening and/ or ARAR/ TBC levels. The Generator Building Site has high concentrations of diesel and residual fuel, which exceed ARAR/ TBC values. Both of these sites should be investigated further to determine the magnitude and extent of remediation that may be necessary. The Hospital Site had one soil sample with a concentration of cadmium, which exceeded the risk-based screening level, but not the ARAR/ TBC value. This site should have additional investigation to determine the extent of cadmium contamination and to determine whether remediation is warranted.

The analytical results for the other sites did not have any chemicals of concern with concentrations greater than their respective risk-based screening levels or ARAR/ TBC values. Therefore, no further investigation or remediation is warranted for the Motor Pool Site or the Drainage Pathways Site (Headquarters Area).

Wind has severely eroded the caps of the three landfills causing the debris buried in them to become exposed at the surface. This could easily become a serious safety and environmental hazard. Addition investigation is needed to determine the extent of repairs needed at each of these landfills.

Island residents have reported seeing small arms ammunition in Korovin Lake. The recent investigation did not find any ammunition during a brief visit to the area. A thorough search should occur in the future to determine the amount and extent of ammunition items that might be in the lake or surrounding area.

Table of Contents

Figures

Tables

Appendices

List of Acronyms

AAC	Alaska Administrative Code
ACS	Aircraft Control Service
ADCRA	Alaska Department of Community and Regional Affairs
ADEC	Alaska Department of Environmental Conservation
AIW	Aleutian Islands Wilderness
ARAR	Applicable and/or Relevant and Appropriate Regulations
AST	Above-Ground Storage Tank
ASTM	American Society for Testing and Materials
AWQC	Ambient Water Quality Criteria
AWS	Aircraft Warning Service
B	Analyte was detected in laboratory method blank, in addition to sample.
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CBI	Chris Berg, Incorporated
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemicals of Concern
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
CWA	Clean Water Act
D	Sample was diluted to perform analysis successfully.
DERP	Defense Environmental Restoration Program
DOT	U. S. Department of Transportation
DRO	Diesel Range Organics
°F	Degree Fahrenheit
E	Reported analytical result is greater than the instrument calibration range.
EPA	U. S. Environmental Protection Agency
FUDS	Formerly Used Defense Site
GRO	Gasoline Range Organics
INPR	Inventory Project Report
J	Analyte was detected above the instrument detection limit, but below the analytical reporting limit.

MCL	Maximum Contaminant Levels
mg/kg	Milligrams per Kilogram
NHPA	National Historic Preservation Act
PA	Preliminary Assessment
PCB	Polychlorinated Biphenyl
PQL	Practical Quantitation Limit
RADAR	Radio Distance and Ranging
RBCA	Risk-Based Corrective Action
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation and Recovery Act
RRO	Residual Range Organics
SDWA	Safe Drinking Water Act
SI	Site Investigation
SSTL	Site-Specific Target Level
SVOC	Semi-Volatile Organic Compound
TBC	To Be Considered
TSCA	Toxic Substance Control Act
US	United States
UST	Underground Storage Tank
USACE	U. S. Army Corps of Engineers
USCG	U. S. Coast Guard
USFWS	U. S. Fish and Wildlife Service
UWY	University of Wyoming
VOC	Volatile Organic Compounds

1.0 Introduction

1.1 Purpose and Scope of Report

This report presents the results of a site investigation of Atka Island which personnel from the Alaska District of the U. S. Army Corps of Engineers (USACE) conducted in 1998. This project was done under the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). The site investigation included literature research, a site visit, sample collection, and sample analysis. This report presents a discussion of the investigation and conclusions on whether addition study is needed on Atka Island.

1.2 Report Organization

Section 1 of the report discusses the general characteristics of the island as a result of the literature research. Section 2 discusses general environmental considerations for investigating Atka Island and determining the potential for environment problems there. Section 3 briefly discusses the objectives, conduct, and results of the field investigation. Section 4 presents the conclusions and recommendations for further work at each site visited. Section 5 lists the references used in this report. The appendices contain the field work plan, chemical data report, field notes, photographs, and site ecological checklist.

1.3 Description of Atka Island

1.3.1 Location

Atka Island is located in the central part of the Aleutian Arc at latitude 52 degrees, 12 minutes North and longitude 174 degrees, 12 minutes West. It is 1,100 air miles from Anchorage and 90 air miles east of the former Adak Naval Station. It is the most isolated Native village on the Aleutian Island chain and is the most westerly civilian community in the United States (ADCRA, 1998). See Figure 1.

1.3.2 Geology and Physiography

The island has two distinct geographical regions. The southwestern portion is a geologically older eroded area and the northern portion is younger and rugged. Mount Kliuchef is located in the center of the northeastern area and has a double summit with two small lakes. The mountain is heavily eroded and has collapsed. Korovin Volcano is directly north of Mount Kliuchef and its slopes have numerous young volcanic features. Korovin is still active, its most recent activity occurred in 1974. All of the volcanic features rest on a large shield composed of numerous mafic flows. To the west of the volcanic area is a large rectangular landmass that is connected by a spit. This is the remnant of a much older volcanic center. Bedrock consists of basalts, andesites, and brecchias. Soils on the island are derived from the weathered byproducts of the volcanic rocks (UWY, 1998).

1.3.3 Hydrology

The bedrock and soils on Atka Island are composed of or derived from volcanic or extrusive igneous rocks. Most of the porosity and permeability of these igneous rocks are

the result of fractures, faults, and the dissolution of minerals within the rock mass. The openings in igneous rocks are volumetrically very small and as a result, rocks of this type are poor sources of groundwater. In addition, the ground water that is available will commonly drain quickly after a period of recharge by infiltration of precipitation. Also, water from these fractures is subject to contamination from the surface where these rocks crop out. A few exceptions include large lava tubes present in some flows, interflow or coarse sedimentary layers between individual flows and deposits of volcanic cinders or ash. As a result, ground water may be present throughout the island but its quantity and quality are not suitable for residential or commercial use (EPA, 1990).

On the other hand, surface water occurs in many places around the island. Lakes and ponds occur in most topographic depressions and small streams flow from the interior highlands down to the shore along the periphery of the island. Surface water is the most available source of domestic water on the island. The city obtains its water supply from a stream located northwest of the community (ADCRA, 1998).

1.3.4 Weather

Atka experiences typical Aleutian maritime climate of moderate temperatures with frequent precipitation and high winds. Temperatures range from 25 to 35 degrees Fahrenheit (°F) in January to 45 to 55 °F in August. Prevailing winds are from the west-southwest with a mean velocity of 13 knots. Severe storms may produce winds of over 120 knots. Atka averages 60 inches of precipitation, which occurs mostly as rain. Summers are usually calm with frequent fog (ADCRA, 1998 and USACE, 1998).

1.3.5 Ecological Resources

The marine environment surrounding Atka Island supports both commercial and subsistence fishing for Pollock, Atka mackerel, Pacific cod, halibut, crab, and shellfish. The extent of the harvest from Nazan Harbor and other inshore areas is unknown.

Birds of Atka Island include bald eagles, ravens, rock ptarmigans, puffins, and other seabirds. The fox population limits the nesting opportunities on Atka Island; however, Bolshoi Island in Nazan Harbor reportedly supports an abundance of nesting sites for bald eagles, the rare whiskered auklet, and other seabirds.

Reindeer were introduced on Atka Island in 1914. Several thousand reindeer now roam the island and are a source of food for the island natives. Foxes are also common throughout the island. Sea otters, sea lions, and seals occur along the coast.

Vegetation on the island includes various arctic and alpine species of mosses, bryophytes, grasses, and other low-growing plants. Trees are not native to Atka and any that exist there now have been introduced. At 1,000 feet above sea level, vegetation becomes sparse due to exposure to very high winds (USACE, 1998).

1.3.6 Inhabitants

The village of Atka is located on Nazan Harbor in the eastern portion of Atka Island. It is a typical Aleut Native settlement with a little more than 100 inhabitants. The local

economy is based on commercial fishing and seafood processing and upon subsistence hunting and fishing. Atka has a state-owned, lighted runway and seaplane base. Commercial sea-going freight service is available from May to October (ADCRA, 1998 and USACE, 1998).

The Axtam Corporation owns the land of the native village and most of the project area. The remainder of the island is part of the Alaska Maritime National Wildlife Refuge or Aleutian Island Wilderness (AIW), which is managed by the U. S. Fish and Wildlife Service (USFWS). Some of the outlying site of the project may be on USFWS lands (USACE, 1998).

1.3.7 History

The island has been inhabited for at least 2,000 years and the present native village site has been occupied since the 1860s. In June 1942, the U. S. Navy evacuated the inhabitants of the island and destroyed all the buildings to prevent their possible use by the Japanese. U. S. armed forces occupied the island in August 1942. Military facilities were constructed primarily along the Nazan Harbor north of the village site. Observation posts were established on Korovin Bay and an Aircraft Control Service (ACS) site was located on a mountainside north of the harbor. The U. S. Army constructed an airfield near the harbor and it became operational in November 1942. The primary military facilities at Atka included:

a. 4,000-foot runway constructed of steel matting with associated taxiways and hard stands,
b. dock for ships,
c. 50-bed hospital,
d. numerous warehouses,
e. quarters for 1,056 personnel,
f. an ACS station,
g. radar station, and
h. several observation posts (USACE, 1944 and USACE, 1998).

Atka was primarily an Army installation, although the Navy also performed air operations from the island. During the war, Atka became secondary in importance behind the base on Adak Island. By late 1945, the base at Atka was largely abandoned and the native Aleuts who had survived the evacuation returned to their island (ADCRA, 1998 and USACE, 1998).

2.0 Environmental Considerations

2.1 Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements (ARARs) are the regulatory requirements that provide guidance, policies, or procedures 'to be considered' (TBC) for the remediation at a site. An ARAR may be either 'applicable' or 'relevant and appropriate'. Applicable requirements are those environmental protection requirements promulgated under Federal or state law that specifically address a hazardous substance,

remedial action, or other circumstances at a site that is regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). If a requirement is applicable, it is legal and jurisdictional. All substantive portions must be followed. If a law or regulation is not applicable, it may be relevant and appropriate to the site conditions or circumstances. Relevant and appropriate requirements are those environmental protection requirements promulgated under Federal or state law that, while not legally 'applicable' to the site circumstances, address situations that are sufficiently similar to those encountered on the site such that their use would be well suited to the site. Professional judgement may determine that only compliance portions of the requirement are necessary, however, if a requirement is determined to be relevant and appropriate, it has the same weight as an applicable requirement. Non-promulgated federal or state advisors, guidance, or proposed rules (TBCs) are not legally binding and do not have the same status as an ARAR, however, they are useful in determining the necessary level of cleanup for the protection of human health and the environment where ARARs are not available (EPA, 1988).

In accordance with guidance from the U. S. Environmental Protection Agency (EPA) (EPA, 1988), the ARARs and TBCs are classified into three categories: chemical specific, action specific, and location specific. Chemical specific ARARs are health or risk-based numerical values or methodologies that establish an acceptable maximum concentration of a hazardous substance in the environment. Table 1 lists the potential chemical-specific ARARs and TBCs for the Atka Island sites. Action specific ARARs specify technology or activity-based requirements for remedial actions. Table 2 shows the potential action-specific ARARs and TBCs. Location specific ARARs place restrictions on the concentrations of hazardous substances or the conduct of activity solely because they occur at specific locations. Table 3 shows the potential location-specific ARARs and TBCs.

2.2 Tiered Approach to Risk-Based Corrective Action

A detailed and comprehensive risk assessment of a site can be very expensive. The American Society for Testing and Materials (ASTM) has developed a tiered approach to site investigations which balances the expected investigation and remediation costs. In this risk-based, corrective action (RBCA) methodology, traditional components of the corrective action programs are integrated with EPA-recommended risk and exposure assessment practices to create a process by which corrective action decisions are made in a consistent and cost-effective manner that is protective of human health and environmental resources. In order to streamline the RBCA process, it is implemented in a tiered approach, which involves increasingly sophisticated levels of data collection and analysis. After the completion of each tier, the evaluator reviews the results and recommendations, then decides whether sufficient information is available to plan the remedial action or a more site-specific analysis is required.

Under Tier 1, the site is classified according to the urgency of need for initial corrective action. This is based on information collected from historical records, a visual inspection, and minimum site assessment data. The evaluator must identify:

a. contamination sources,
b. obvious environmental impacts, if any,
c. presence of potentially impacted human and environmental resources, and
d. potentially significant pathways for contamination exposure (ASTM, 1994).

The conservative corrective action goals for Tier 1 are based on:

a. lists of non-site-specific, risk-based, screening levels (RBSLs),
b. aesthetic criteria, and
c. other appropriate standards, such as maximum contaminant levels (MCLs) for potable groundwater use.

EPA has several documents that list RBSLs for soil, water, and air for a large number of chemical constituents (EPA, 1994 and EPA, 1998). The State of Alaska has regulations which not only specify RBSLs for many chemical compounds, but also consider various climatic conditions within the State (18 AAC 75). Federal and State regulations also exist which specify maximum contaminant levels (MCLs) for surface and ground water (40 CFR 141 and 18 AAC 70).

Based on the results of the Tier-1 investigation, the evaluator may decide that:

a. any contamination at the site does not pose a human health or ecological risk and no corrective action is needed,
b. contamination on site does pose a human health and/or ecological risk and sufficient information is available to plan the corrective action, or
c. contamination on site poses a risk, but more information is needed to define the scope of the necessary corrective action.

The Tier-2 investigation enables the evaluator to determine site-specific target levels (SSTLs) and appropriate points of compliance when Tier-1 corrective action goals appear too broad and/or expensive for a site. This decision will compare the cost of achieving the Tier-1 corrective action goals with the cost of performing a Tier-2 site analysis. This decision considers the possibility that the Tier-2 analysis will be significantly less costly than meeting the Tier-1 goals. The Tier-1 and Tier-2 screening levels are based on achieving similar levels of human health and environmental resource protection, however, in going to the next higher tier, the evaluator will be able to develop more cost-effective action plans because more realistic, site specific information will replace the conservative assumptions used initially (ASTM, 1994).

The Tier-3 investigation provides the evaluator with an option for determining SSTLs and very specific points of compliance when the Tier-2 corrective-action goals appear to be too general and/or costly. As with the decision to go from Tier-1 to Tier-2, the decision is based on an analysis of the expected costs of meeting corrective action goals for Tier-2 versus performing the Tier-3 investigation. The major distinction of the Tier-3 analyses is that it requires a substantially greater effort compared to that done for Tier-1 or Tier-2. The Tier-3 analysis is much more complex and may include a detailed

assessment, probabilistic evaluations, and sophisticated chemical fate and transport modeling. The result of the Tier-3 investigation, though, is a very thorough corrective action, which is directed at very specific sources of contamination and/or contaminated media. The expectation is that pursuing very detailed corrective actions at a few very contaminated points will be much less expensive than doing less thorough corrective actions over a much larger area or even the entire site as a result of the Tier-1 or Tier-2 analyses (ASTM, 1994).

This site investigation report presents the results of the Tier-1 analysis of Atka Island. The following sections provide information about the investigation conducted at various locations on the island, discuss the results of the laboratory analyses, and recommend whether a more detailed Tier-2 investigation is warranted for any of the sites on the island.

2.3 Potential Contamination

For approximately three years during World War Two, several military facilities existed on Atka Island. The largest facility was the airbase, which included the airfield operations, maintenance shops, fuel storage tanks, warehouses, living quarters, and other miscellaneous operations. Potential contamination caused by these facilities would have included gasoline, diesel, lubricating oils, antifreeze, hydraulic oil, solvents, battery acid, and lead. In addition, an aircraft control system and at least one radar site were also on the island. These smaller facilities would have included electronic equipment, fuel storage tanks, and several buildings for operations and living quarters. Potential contamination from these facilities would have included gasoline, diesel fuel, PCBs, solvents, and insecticides.

2.4 Conceptual Site Model

The first step in analyzing the sources, nature, and extent of contamination is to develop a conceptual site model (CSM). The CSM provides a framework for characterizing the chemicals of potential concern (COPCs) at a site and is useful for analyzing the basic information relevant to site exposure assessment. It is a visual representation of the site characteristics and presents hypotheses regarding the COPCs, their routes of migration, and their potential impact on sensitive receptors (whether human or ecologically significant). Figure 2 shows the general CSM for the sites on Atka Island. The following paragraphs briefly discuss the various aspects of the Atka Island CSM.

2.4.1 Potential Sources

The most significant potential sources of contamination are the present and former USTs and ASTs with their associated piping. These would have been used to store and transport gasoline and/or diesel fuel for aircraft, vehicles, generators, and heaters. The principle fuel contaminants would also include fuel components such as benzene, toluene, ethylbenzene, and xylene (BTEX), volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs).

Potential sources for lead are leaded gasoline and lead-based paint. For many years, tetra-ethyl lead was added to gasoline as an anti-knock compound. Thus, leaks and spills of leaded gasoline are potential sources of lead. Also, the buildings were probably painted with lead-based paint. In time, it cracked, peeled, and fell to the ground. In addition, practically all of the former buildings were demolished and the debris was buried in several landfills on the island. Thus, the debris from the demolition could also be a potential source of lead.

Potential sources for polychlorinated biphenyls (PCBs) are electrical equipment such as transformers, capacitors, and wire insulation. Because of their desirable thermal properties, PCBs were added to the cooling oil of large transformers and to wire insulation. When the transformers are broken or overturned the PCB-laden oil will leak out to the surrounding soil. No definitive record exists of what electrical equipment was disposed of in past clean up efforts, but it is likely that it was present at various sites and was buried along with the other building debris in the landfills.

Asbestos was used in insulation, gaskets, and heat shields for engines, heaters, and generators. Thus, it would have been present in aircraft, vehicles, buildings, and radio/radar sites. Not much is known about the fate of the aircraft and vehicles, however, asbestos could have been buried in the landfills with the building debris.

Explosive items such as bombs, flares, and small arms ammunition were commonly carried on aircraft. Dynamite will become unstable in a matter of months as the nitroglycerine seeps out of the inert filler material. If not contained, nitroglycerine can seep through wooden boxes and eventually migrate to the surrounding soil. Mercury fulminate was used as a primer material for small arms and explosives. It becomes very sensitive as it ages. The U. S. Army Air Corps established an auxiliary airfield on Atka Island, however, no information exists concerning the amount of supplies that were stored there, including explosives. Many explosives are still present on other islands in the Aleutians and they could also exist on Atka.

2.4.2 Potentially Affected Media

The potentially affected media on Atka Island includes air, soil, surface water, and ground water. Vapors from the containers of liquid contaminants and from contaminated soil may disperse through the air. This would occur especially with the lighter fractions of gasoline and to a smaller extent, diesel. Winds can pick up dust from contaminated surface soil and asbestos fibers. Liquid contaminants spilled onto or buried in the soil can disperse through the soil at the surface and at depth. Rainwater falling on the ground surface can become contaminated as it passes over contaminated soil and flows into local lakes and streams. Rainwater that soaks into the ground can percolate downward through contaminated soils and carry contamination to the local ground water. Shallow ground water containing contamination can also lead to surface waters and contribute to their contamination.

2.4.3 Potential Exposure Pathways

The potential exposure pathways are inhalation, ingestion, and dermal (skin) contact. Vapors from volatile contaminants may be inhaled by and contact the skin of both human and ecological receptors. Contaminated soil may reach receptors by dermal contact and ingestion. This would especially affect people living a subsistence lifestyle, plants, and burrowing animals. Dust from contaminated soils can be inhaled and contact the skin of receptors. Contaminated surface and ground water can transport contaminants to receptors by dermal contact through such activities as showering, swimming, and fishing. Receptors can ingest contaminants from water by drinking the water directly, cooking, and brushing the teeth. Contaminant vapors may emanate from water and reach receptors by inhalation.

2.4.4 Potential Receptors

Potential human receptors include the inhabitants of Atka and incidental visitors to the island. The residents of the island depend on local plants, animals, and sea creatures for food and livelihood. For example, the men of the community hunt reindeer on the island for food. This necessitates travelling throughout the island in search of game. Women and children collect berries and plants for food and medicinal uses. Children play in and around the community. In each of these activities, the inhabitants could be exposed to contaminants.

Potential ecological receptors include terrestrial and marine species. Potentially exposed biological components in the wetlands or upland communities on the island include terrestrial vegetation, small mammals, upland birds, and raptors. Potential biological components of the marine ecosystem adjacent to the island are fish, shellfish, shorebirds, and marine mammals.

2.4.5 Potentially Complete Pathways

The following direct pathways are considered potentially complete and significant as a result of onsite exposure. Atka Island can be very windy most of the time. As such, vapors released to the atmosphere are readily dispersed and probably do not constitute a major pathway. Blowing dust may be a significant pathway due to the frequent winds and the sparse vegetation covering the ground. Ingestion and dermal contact for the island residents are significant pathways due to the people's subsistence lifestyle. Residents may be exposed to contaminants in surface water by dermal contact, ingestion, and inhalation because the inhabitants use surface water for their domestic needs. Contact with ground water is insignificant because the inhabitants do not use ground water.

Dermal contact, ingestion, and inhalation by birds and animals may be significant pathways for airborne contaminated dust. Animals that burrow into the ground or graze on vegetation in contaminated areas may be affected by dermal contact and ingestion of soil and by inhalation of vapors. Direct contact and ingestion may be significant pathways for aquatic wildlife in surface waters on the island and near shore oceanic environments. Leaching or percolation of ground water into surface water is a potential exposure pathway because shallow ground water probably discharges to surface water in low areas of the site and/or along the coast of the island. A secondary release mechanism includes consumption of marine plants and animals. Ground water discharge or storm water runoff by direct

discharge to the ocean is a potential exposure pathway to aquatic (marine) species and for secondary consumers of affected species.

2.5 Past Investigations and/ or Removals

No significant environmental investigations have occurred on Atka Island, although an extensive debris disposal project occurred in 1986. A USACE contractor demolished the abandoned military buildings and buried the debris in three large areas. Debris from hundreds of buildings, thousands of steel drums, and over 400,000 square feet of steel runway matting were buried in these disposal pits. This demolition was done as a construction project and not an environmental restoration. As a result, the contractor was not concerned with sampling or gathering information about contamination. The closeout report for this project implies that all materials, including the drums, were buried in the landfills and the daily reports do not mention off-site transportation or disposal of any materials (CBI, 1986 and USACE, 1998).

3.0 1998 Field Investigation

In June of 1998, three personnel from the Alaska District, U. S. Army Corps of Engineers, performed a Tier-1, field investigation at several sites on Atka Island. Appendix A to this report contains the work plan. Appendix B is the Chemical Data Report, which also includes the laboratory analytical data and the chemical data validation report. Appendix C contains the field notes for the investigation. Appendix D shows typical photographs of the sites. Appendix E is the site ecological checklist.

The remainder of this section will provide only a brief discussion of the investigation and a recapitulation of the analytical data. The appendices contain the detailed information on the investigation.

3.1 Objectives

The objectives of the field investigation were to:

a. Investigate representative sites of the former military facilities for evidence of chemical contamination of the environment,

b. Investigate reports of drums and attempt to determine if they are of military or civilian origin,

c. Investigate reports of military structures remaining after the 1986 removal action,

d. Collect samples of contaminated surface soil or sediment for chemical analysis,

e. Inspect and document the current condition of the three 1986 disposal sites, collect samples of soil or sediment if contamination is suspected at, or leaching from, the disposal sites,

f. Interview local citizens for information on potential FUDS chemical contamination, and

g. Obtain information necessary to fill out an Alaska Department of Environmental Conservation (ADEC) Ecological Checklist (USACE, 1998).

3.2 Site Descriptions

Prior to visiting Atka Island, project personnel did an extensive archival search on the military activities that occurred there during and after the Second World War. In 1986, an Army Corps of Engineers contractor took down and buried many old military structures. The landfills created by this debris are described below as disposal sites. They were created in, and covered with, the local soil which is composed of volcanic ash. The archival records search and on-site interviews determined that seven areas merited investigation. See Figures 3 and 4. The sites are:

3.2.1 Generator Building Site

This was the site of the former Building T-241 that was located near the roadway west of the airfield. See Figure 5a. According to original site plans, this building was designated as the location of a generator for the facility. As such, fuel, PCBs, antifreeze, and engine oil would have been stored and used.

3.2.2 Motor Pool Building Site

This was the site of the former Building T-43 that had been a maintenance shop for vehicles. See Figure 5b. A variety of fluids would have been used here, including solvents, battery acid, engine oil, hydraulic fluid, brake fluid, antifreeze, gasoline, diesel fuel, paint, paint thinner, so forth.

3.2.3 Hospital and Disposal Site 'A'

The former Naval Hospital was located near the southern end of Korovin Lake, midway between Korovin Bay and Nazan Bay. See Figure 6. In 1986, the hospital was demolished and buried in a landfill that was designated Disposal Site 'A'. Possible contaminants at this site could include asbestos, lead, PCBs, and pesticides. The cap on this landfill is severely wind eroded, with metal debris exposed above the ground surface. The contaminants may be impacting groundwater by seeping through the volcanic-ash soil.

3.2.4 Disposal Sites 'B' and 'C'

Disposal Site 'B' is located between the airport hangar and the Atka School Building. See Figure 3. Disposal Site C is located east of the airfield. See Figure 4. Both of these sites were used during the 1986 cleanup to dispose of structural debris. Possible contaminants could be asbestos, PCBs, lead, and pesticides. The caps on these landfills are severely eroded by the wind. The contaminants may be impacting the groundwater by seeping through the volcanic-ash soil.

3.2.5 Cape Kudugnak Site

The investigation team was not aware of this site until the team arrived on Atka Island. Local inhabitants informed the team about the site and the team members added it to their itinerary. It is a radio communications site that is located approximately 5 miles northeast of the airfield at the northern end of Nazan Bay. See Figures 7 and 8. No cleanup had occurred here, so dilapidated buildings and piles of debris were abundant. Possible contamination may include: PCBs, asbestos, and fuel.

3.2.6 Drainage Pathways (Headquarters Area Site)

The site of the former 'Headquarters Area' is located west of the airfield. See Figure 4. It was selected as being representative of the World-War-Two-era construction areas. Possible contaminants may include fuels, pesticides, and asbestos.

3.2.7 Korovin Lake

A local resident informed the investigation team that military personnel had disposed of much small arms ammunition (50 caliber or smaller) in Korovin Lake. Local resident claimed that they occasionally snagged the ammunition while fishing in the lake. Possible contamination may include phosphorous and lead.

3.3 Analytical Results

3.3.1 Recapitulation of Data

The investigation team collected twenty soil samples plus two duplicate samples and one trip blank. Table 4 shows the results of the analyses. Chemicals of Concern (COC) which had negative results are not listed in this table. The columns in Table 4 are as follows:

a. Column 1 is the name of the COC. Shaded cells indicate that at least one sample had a concentration of that particular COC which was greater than its respective risk-based screening level (RBSL) or ARAR/ TBC value.

b. Column 2 shows the units of measurement.

c. Column 3 shows the number of positive results over the total number of samples analyzed for a particular COC.

d. Column 4 is the lowest concentration that was detected.

e. Column 5 is the highest concentration that was detected.

f. Column 6 lists the range of detection limits for the analyses.

g. Column 7 shows typical background values. Starred superscript numbers refer to the reference used.

h. Column 8 is the RBSL for a COC that is carcinogenic. Starred superscript numbers refer to the reference used.

i. Column 9 shows the number of samples that had concentrations of that COC that were greater than the RBSL.

j. Column 10 is the RBSL for a COC that is non-carcinogenic. Starred superscript numbers refer to the reference used.

k. Column 11 shows the number of samples that had concentrations of that COC that were greater than the RBSL.

l. Column 12 lists ARAR or TBC values for each COC. Values for "Residential" or "Inhalation" were used. Where several values were available, the most conservative value was used. Values for "Migration to Groundwater" were not used because the residents of Atka Island obtain their drinking water from surface water, not groundwater. Starred superscript numbers refer to the reference used.

m. Column 13 shows the number of samples with concentrations of that COC which were greater than the ARAR/ TBC value.

3.3.2 Fuels

Nine samples were analyzed for gasoline range organics (GRO) and every sample had a positive result, however, none of them exceeded the ARAR/ TBC value of 1,400 mg/kg. Sixteen samples were analyzed for diesel range organics (DRO) and residual range organics (RRO). Three samples had concentrations of DRO that were greater than the ARAR/ TBC value of 8,250 mg/kg. Two samples were obtained at the Generator Building Site and each of them had a DRO concentration of 12,000 mg/kg. The third sample was from the Cape Kudugnak Site and had a concentration of 26,000 mg/kg DRO. Two samples had RRO concentrations greater than the ARAR/ TBC value of 8,300 mg/kg. Both of these samples were from the Generator Building Site and had RRO concentrations of 15,000 mg/kg and 35,000 mg/kg, respectively (USACE, 1999).

3.3.3 Volatile Organic Compounds

Ten samples were analyzed for volatile organic compounds (VOCs) which include benzene, toluene, ethylbenzene, and xylenes (BTEX). None of the samples had positive results for benzene or toluene. One sample had an estimated 0.03 mg/kg of ethylbenzene and an estimated 0.118 mg/kg of total xylenes. Another sample had an estimated 0.077 mg/kg of total xylenes. Neither of these samples had concentrations of ethylbenzene or total xylenes that were greater than their respective RBSLs or ARAR/ TBC values. The total BTEX concentration was summed for each sample and only two samples had positive results. One sample had an estimated 0.148 mg/kg BTEX and the other had an estimated 0.077 mg/kg BTEX. Neither of these totals was greater than the BTEX RBSL or ARAR/ TBC value. None of the samples had positive results for other VOCs (USACE, 1999).

3.3.4 Semi-Volatile Organic Compounds

Ten samples were analyzed for semi-volatile organic compounds (SVOCs) and six samples had positive results for both naphthalene and 2-methyl naphthalene. The duplicate sample collected at the Generator Building Site had the highest concentration of both naphthalene and 2-methylnaphthalene with concentrations of 8.30 mg/kg and 5.20 mg/kg, respectively. The risk for each these COCs was considered when determining the risk for the aromatic portion of DRO and consequently RBSLs are not listed in the table (USACE, 1999).

3.3.5 Pesticides and Polychlorinated Biphenyls

Eight samples were analyzed for pesticides and none of them had positive results.

Seventeen samples were analyzed for polychlorinated biphenyls (PCBs). Three samples collected at the Cape Kudugnak Site had positive results for Arochlor 1260. One sample obtained on the east side of the radio-building site had an estimated concentration of 0.7 mg/kg, which was greater than the RBSL of 0.32 mg/kg. A duplicate sample obtained at the same location had an estimated concentration of 2.3 mg/kg which exceeds the RBSL and the ARAR/TBC value of 1 mg/kg for Arochlor 1260 (USACE, 1999).

3.3.6 Metals

Fifteen samples were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, nickel, and vanadium. The analyses indicated that none of the samples contained arsenic; however, every sample contained barium. None of the samples, however, had concentrations of barium that were greater than the RBSL or ARAR/ TBC values.

Six samples had positive results for cadmium. One sample obtained at the Hospital Site had a cadmium concentration of 46 mg/kg, which was greater than the RBSL of 39 mg/kg. None of the samples had cadmium in a concentration greater than the ARAR/ TBC value of 83 mg/kg.

Twelve samples had positive results for chromium, but none of them had concentrations greater than the RBSL of 230 mg/kg or the ARAR/ TBC value of 420 mg/kg.

Fourteen samples had positive results for lead. Three samples from the Cape Kudugnak Site had the highest concentrations that also exceeded the ARAR/TBC value of 400 mg/kg. These lead concentrations were 49,000 mg/kg, 2,500 mg/kg, and 2,000 mg/kg.

Eight samples had positive results for mercury. One sample obtained at Cape Kudugnak had the highest concentration of mercury, which was an estimated value of 47 mg/kg. This concentration exceeded the RBSL of 23 mg/kg and the ARAR/ TBC value of 13 mg/kg.

Five samples had positive results for nickel. The highest concentration was only 37 mg/kg, which was much less than the RBSL and the ARAR/ TBC value for nickel.

All 15 samples contained vanadium. The highest vanadium concentration was 200 mg/kg which is less than the vanadium RBSL and ARAR/ TBC value (USACE, 1999).

3.3.7 Asbestos

Three samples were analyzed for asbestos, however, the results were all negative (USACE, 1999).

3.3.8 Explosives

The investigation team did not find any ammunition or explosives during this site visit, however, local residents stated that Korovin Lake contains a large amount of small-arms ammunition. If this is true, the water in Korovin Lake may have high concentrations of phosphorous or lead.

3.4 Debris

In 1986, the former military buildings and structures were demolished and completely buried in three landfills. Since then, high winds have eroded the landfill caps and exposed the once buried material. Fuel drums, steel, wood, and airfield matting are now evident at

the landfills and pose a safety hazard to the local residents. In addition, precipitation may be reacting with this debris and producing a leachate that could impact surface and groundwater in the vicinity of the three landfill sites.

4.0 Conclusions and Recommended Future Actions

The analytical results for the Cape Kudugnak Site indicate that the soil has high concentrations of diesel fuel, PCBs, lead, and mercury, which exceed risk-based screening and/ or ARAR/ TBC levels. The Generator Building Site has high concentrations of diesel and residual range fuels, which exceed ARAR/ TBC values. The inhabitants of Atka travel throughout the island hunting and gathering plants for food. The analytical results indicate that the concentration of contaminants at the Cape Kudugnak Site and the Generator Building Site may put the inhabitants of Atka Island at risk. Therefore, both of these sites should be investigated further under a Tier-2 study to determine the magnitude and extent of remediation that may be necessary.

The Hospital Site had one soil sample with a concentration of cadmium, which exceeded the risk-based screening level, but not the ARAR/ TBC value. This site should also undergo a Tier-2 study to determine the extent of cadmium contamination and to determine whether remediation is warranted.

The analytical results for the other sites did not have any chemicals of concern with concentrations greater than their respective risk-based screening levels or ARAR/ TBC values. Therefore, no further chemical investigation or remediation is warranted for the Motor Pool Site, any of the Disposal Sites, or the Drainage Pathways Site (Headquarters Area).

The disposal site landfills should be investigated for repairs to their eroded caps. Wind has scoured the volcanic ash soil from the top of three landfills and has exposed the rusted debris. Possible contaminant leachate may have seeped into the groundwater beneath the three sites and migrated offsite. Groundwater monitoring may be warranted.

Korovin Lake and its surrounding area should be investigated for large scale disposal of small arms ammunition, and its water should be sampled for possible contaminant quantification.

5.0 References

(18 AAC 70) Alaska Administrative Code. Water Quality Standards, revised Jan 1999.

(18 AAC 75) _____. Oil and Hazardous Substances Pollution Control Regulations- Articles 3 and 9- Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances and General Provisions, amended Jan 1999.

(40 CFR 141) Code of Federal Regulations. Subpart G- National Revised Primary Drinking Water Regulations: Maximum Contaminant Levels, in Part 141- National Primary Drinking Water Regulations.

(40 CFR 261) _____. Subpart C- Characteristics of Hazardous Waste, in Part 261- Identification and Listing of Hazardous Waste.

(40 CFR 761) _____. Subpart G- PCB Cleanup Policy, in Part 761- Polychlorinated Biphenyls Manufacturing, Processing, Distribution, and Use Prohibition.

(ADCRA, 1998) Alaska Department of Community and Regional Affairs. Community of Atka, Alaska, Community Database,<http://alaskan.comm/namesedd.html>, Dec 1998.

(ASTM, 1994) American Society for Testing and Materials. Emergency Standards for Risk-Based Corrective Actions Applied to Petroleum Release Sites, ES-38-94, July 1994.

(CBI, 1986) Chris Berg, Incorporated. Solid Waste Disposal Permit- Closeout Report, Atka Island, Alaska, submitted to AK Department of Environmental Conservation, Dec 1986.

(EPA, 1988) U. S. Environmental Protection Agency. Compliance With Other Laws Manual, EPA 9234.1-01 and 02, August 1988.

(EPA, 1990) _____. Ground Water, Volume I: Ground Water and Contamination, EPA Handbook, EPA625-6-90.016a, Sep 1990.

(EPA, 1994)_____. Draft Soil Screening Guidance, (EPA/540/R-94/101), December 1994.

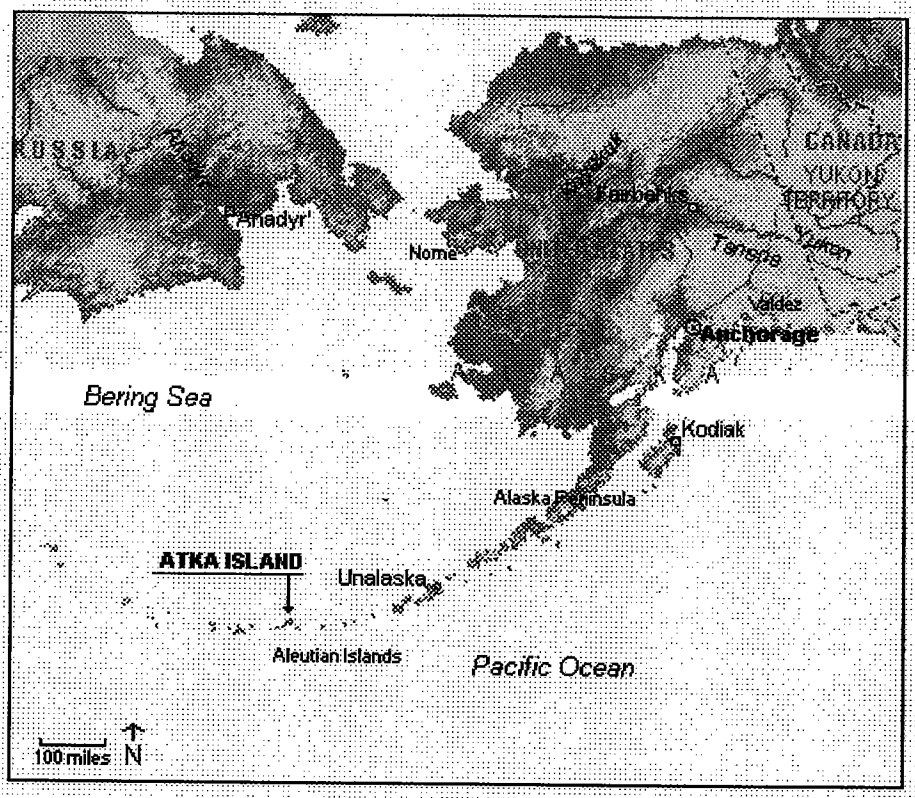
(EPA, 1996) _____. EPA Region III Risk-Based Concentration Tables, <http://www.epa.gov/reg3hwmd/risk/rbc1098.pdf>, Oct 1998.

(USACE, 1944) U. S. Army Corps of Engineers. Atka Army Air Base- Topography and As-Built Construction, Series of 13 maps, Nov 1944.

(USACE, 1998) _____. Work Plan- Site Investigation 1998- Atka Island, Alaska, Alaska District, May 1998.

(USACE, 1999) _____. Chemical Data Report, 1998 Site Investigation, Atka Island, Alaska, Alaska District, Jan 1999.

(UWY, 1998) University of Wyoming. The Atka Volcanic Center, Aleutian Islands, Alaska, Department of Geology and Geophysics, <http://www.uwyo.edu/a%26s/geol/research/aleutians/centers/atka/atka.htm>, Mar 1998.



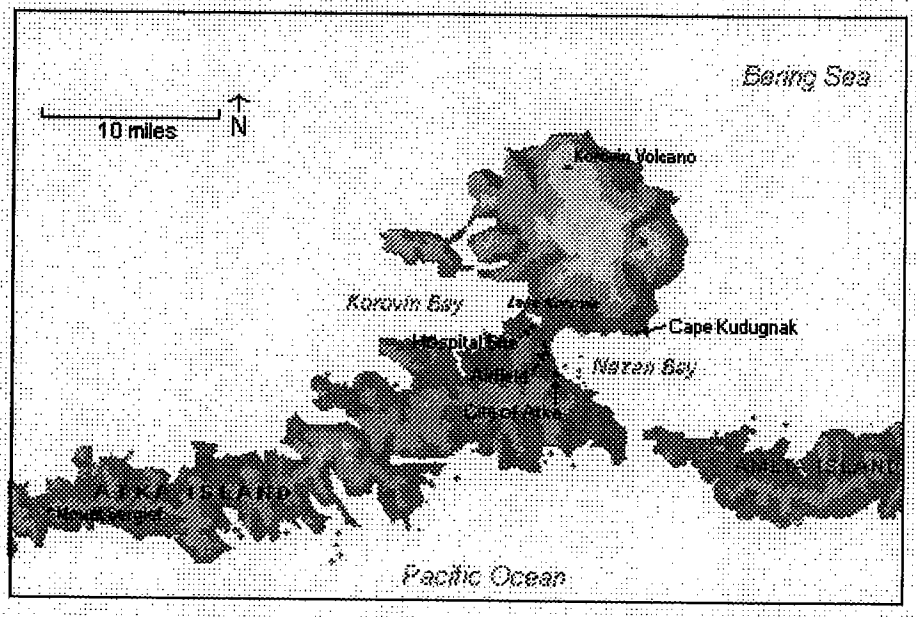


FIGURE 1

LOCATION MAP

Atka Island

Maps adapted from MicroSoft ExpediaMaps

Conceptual Site Model
Atka Island, Alaska

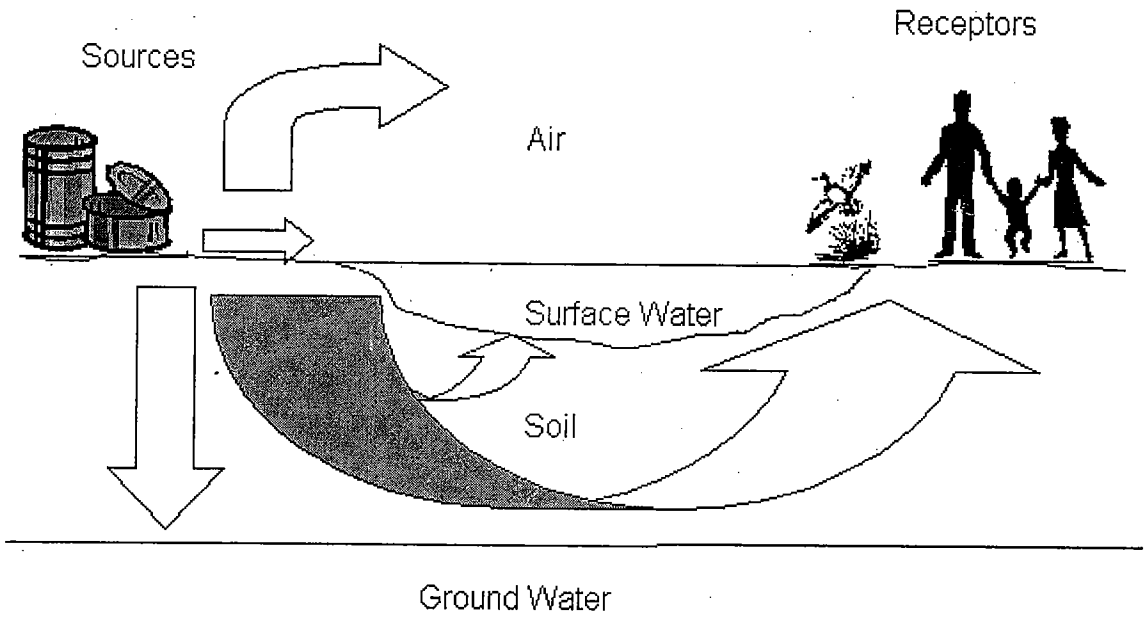


Figure 2. Conceptual Site Model for Contaminants on Atka Island.

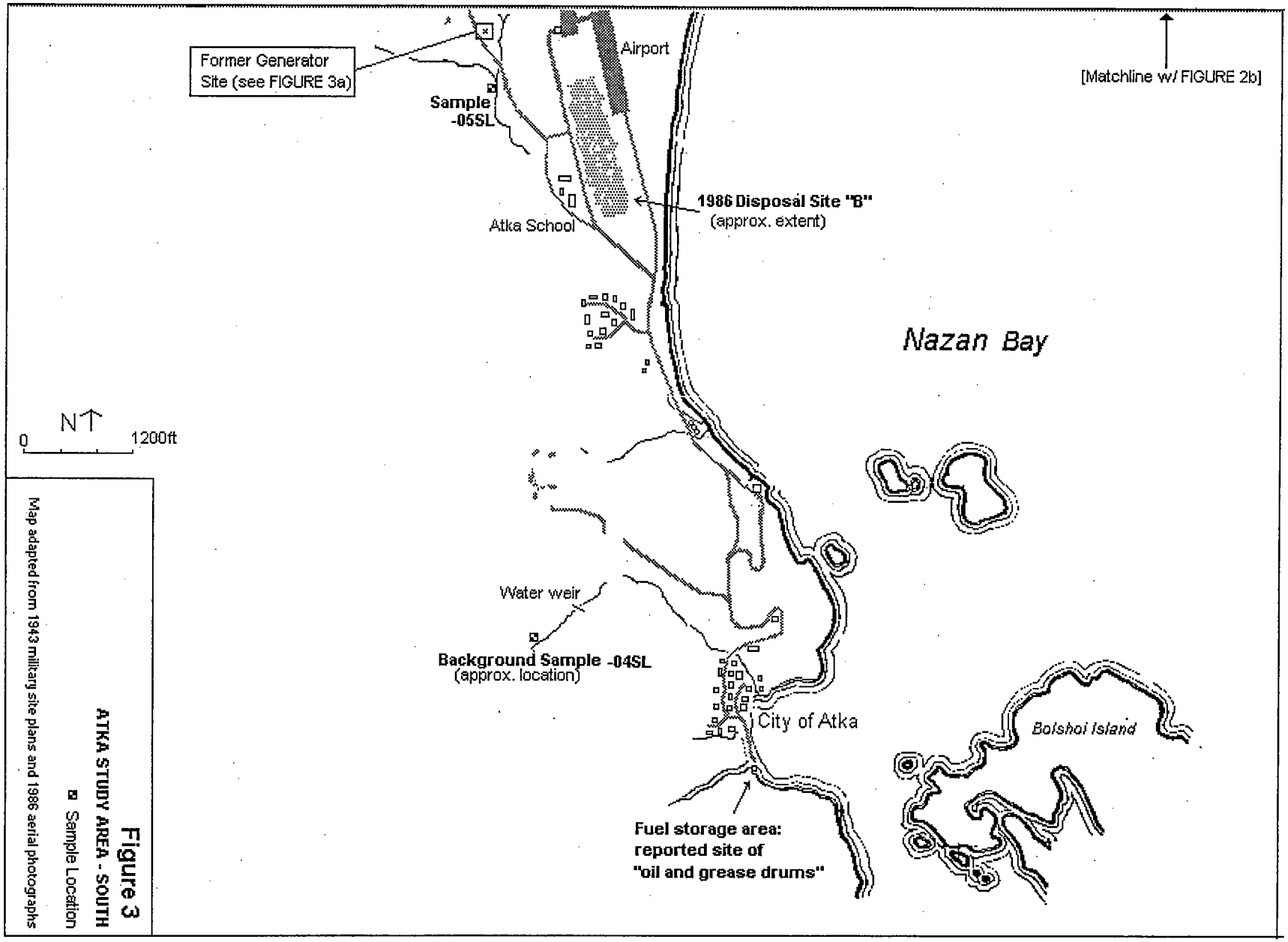
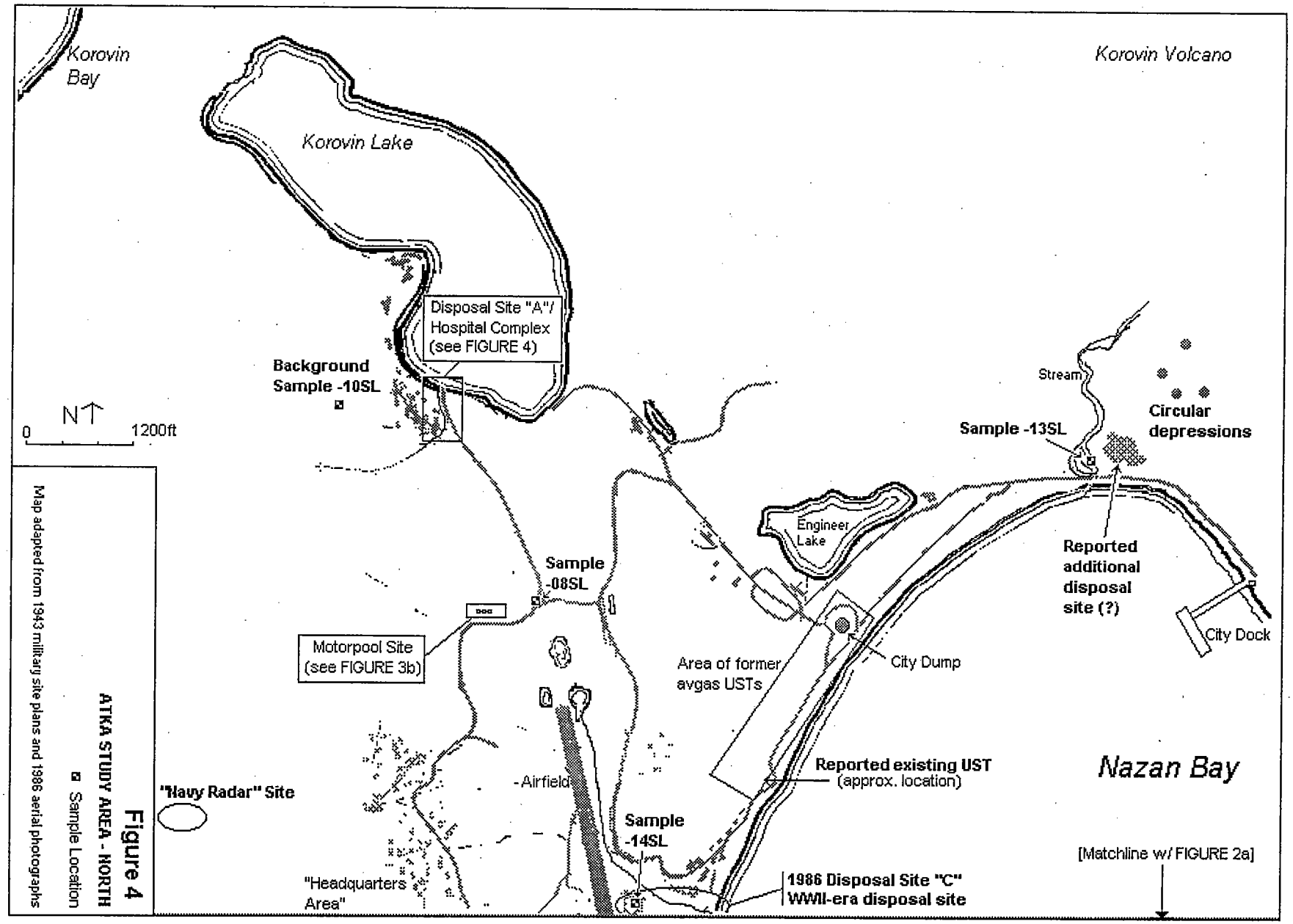


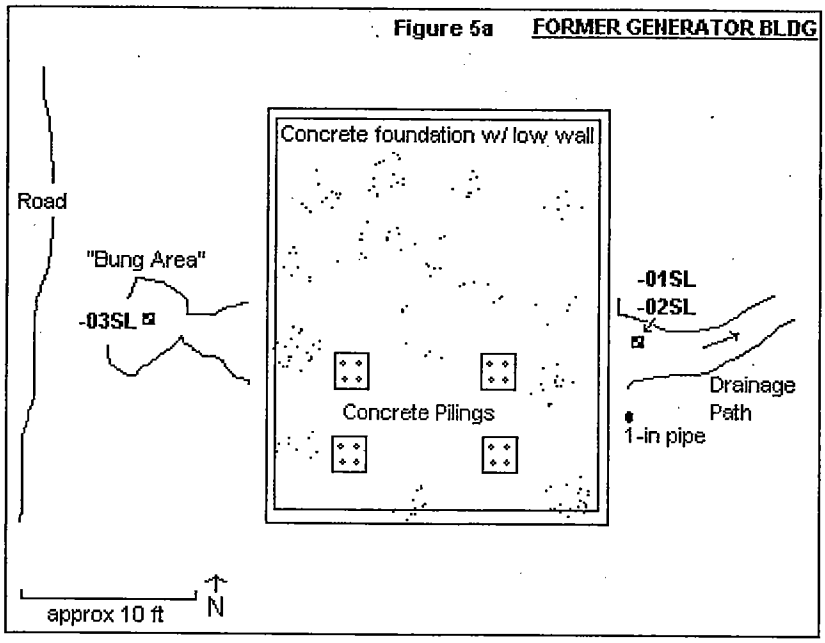
Figure 3

ATKA STUDY AREA - SOUTH

▣ Sample Location

Map adapted from 1943 military site plans and 1986 aerial photographs


Korovin Bay
Korovin Volcano
Korovin Lake
Disposal Site "A"/ Hospital Complex (see FIGURE 4)
Background Sample -10SL
N
0
1200ft
Stream
Circular depressions
Sample -13SL
Engineer Lake
Reported additional disposal site (?)
City Dock
Sample -08SL
Motorpool Site (see FIGURE 3b)
Area of former avgas USTs
City Dump
Reported existing UST (approx. location)
Nazan Bay
"Navy Radar" Site
Airfield
Sample -14SL
"Headquarters Area"
1986 Disposal Site "C" WWII-era disposal site
[Matchline w/ FIGURE 2a]
Figure 4
ATKA STUDY AREA - NORTH
Sample Location
Map adapted from 1943 military site plans and 1986 aerial photographs



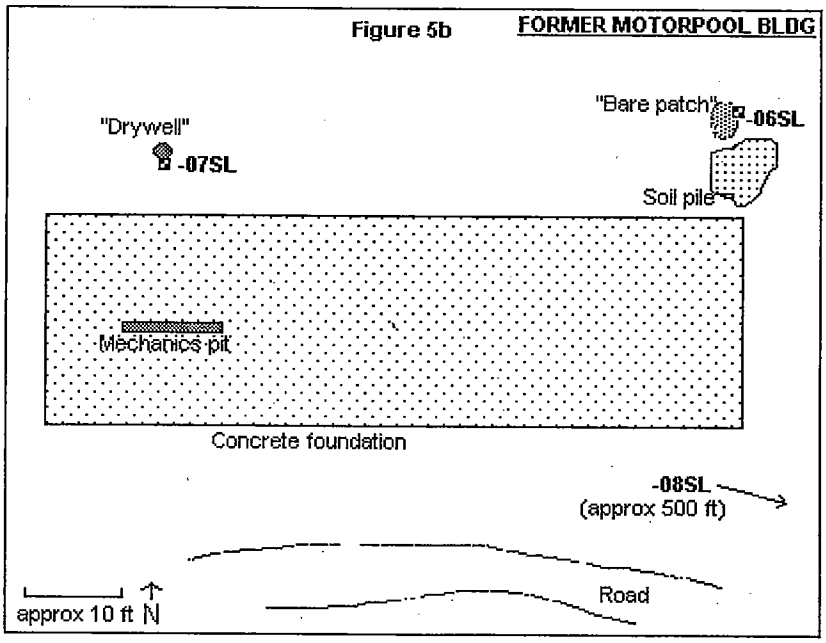


Figure 5

SAMPLING LOCATIONS

Former Generator Building
Former Motorpool Building
Atka Island

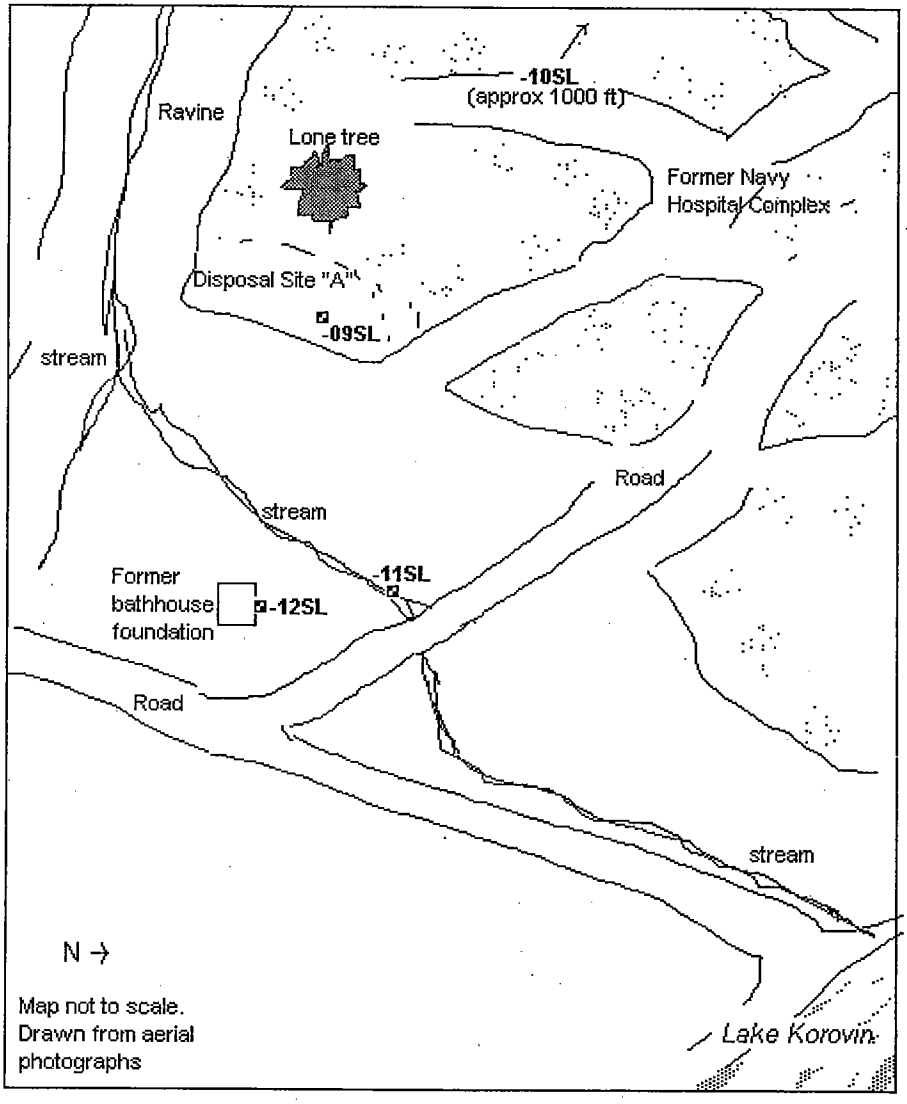
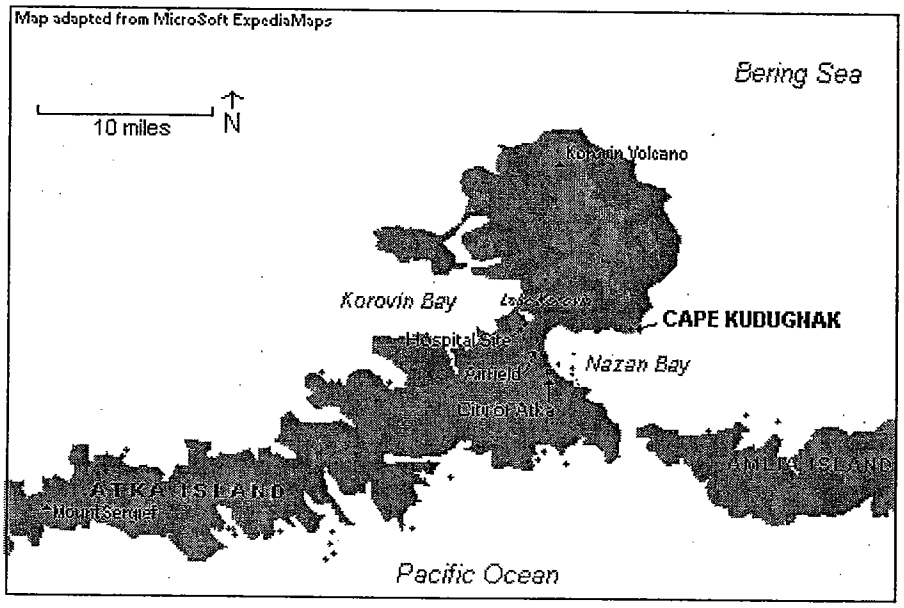


Figure 6

▫ SAMPLE LOCATIONS
Former Hospital/Disposal Site "A"
Atka Island



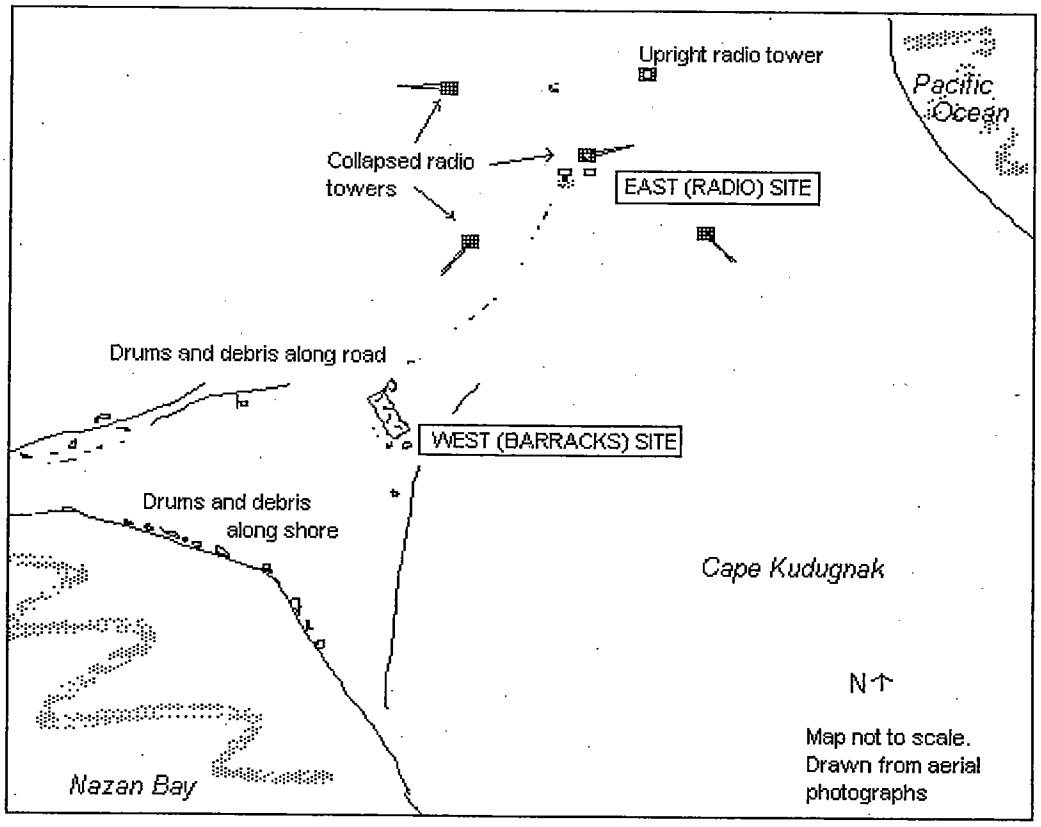
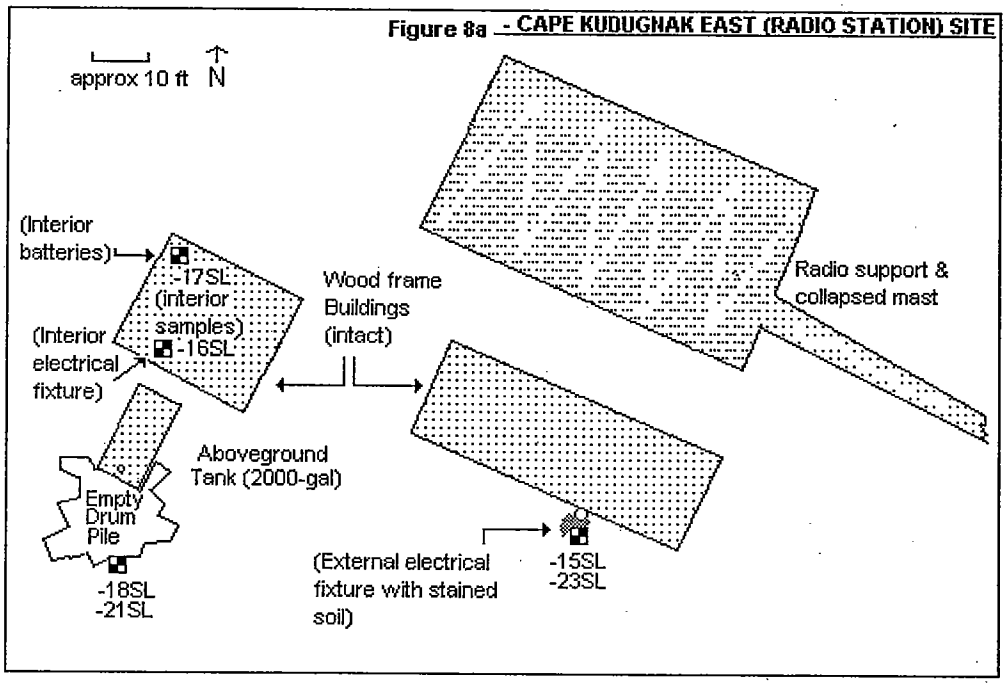


Figure 7

SITE LOCATION MAP

Cape Kudugnak
Atka Island



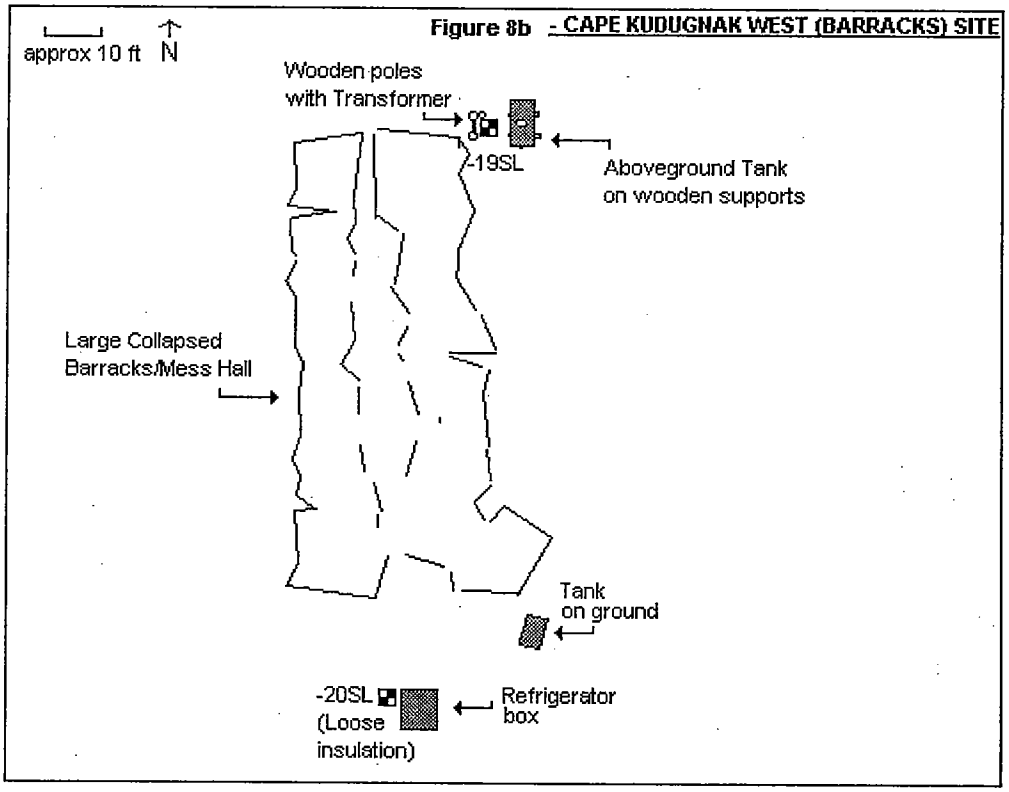


Figure 8

SAMPLE LOCATIONS
Cape Kudugnak Site
Atka Island

Table 1.- Summary of Potential Chemical-Specific ARARs and TBCs.

Act or Regulation	Description
Federal	
Safe Drinking Water Act (SDWA) (40 CFR 141, 142)	Establishes maximum contaminant levels (MCLs) for specific contaminants which are health-based standards for public drinking water systems. Establishes drinking water quality goals at a level at which no adverse health effects may occur with an adequate margin of safety.
Clean Water Act (CWA) (40 CFR 131)	Requires states to establish ambient water quality criteria (AWQC) for surface water based on use classifications and the criteria stated under Section 304(a) of the Clean Water Act.
Resource Conservation and Recovery Act (RCRA) (40 CFR 261)	Provides guidance for cleanup of contaminated soils based on EPA-derived chronic exposure assumptions; intended as screening levels at RCRA facilities to determine if a more detailed health-risk evaluation is warranted. Risk-based action levels for contaminants in soil which, if exceeded, would trigger the need for a Corrective Measures Study.
Toxic Substance Control Act (TSCA) (40 CFR 761)	Provides guidance on manufacture, storage, disposal, and destruction of PCBs.
State of Alaska	
Alaska Water Quality Standards (18 AAC 70)	Establishes water quality standards and criteria for the surface waters of the state.
Alaska Oil and Hazardous Substance Pollution Control (18 AAC 75)	Defines release reporting requirements for discharge, and requirements for cleanup of petroleum hydrocarbons. Disposal of a hazardous substance must have prior approval by the ADEC.
Alaska Underground Storage Tank Regulations (18 AAC 78)	Sets cleanup levels for soils contaminated with diesel, gasoline, or other petroleum products.
Alaska Drinking Water Regulations (18 AAC 80)	Establishes MCLs for specific contaminants which are health-based standards for public drinking water systems.

Table 2.- Summary of Potential Action-Specific ARARs and TBCs.

Act or Regulation	Description
Federal	
Resource Conservation and Recovery Act (RCRA)(40 CFR 261)	Specifies whether or not a waste is hazardous and provides identification and listing of hazardous waste.
Clean Water Act (CWA) (40 CFR 122)	Prohibits discharge of dredged or fill material that contributes to degradation of water quality, or jeopardizes endangered of threatened species.
Nationwide Permit 38 as part of the Clean Water Act; Cleanup of Hazardous and Toxic Waste (33 CFR 330, Appendix A).	Covers specific activities required to effect the containment, stabilization or removal of hazardous or toxic waste materials that are performed, ordered or sponsored by a government agency with established legal or regulatory authority, provided the permittee notifies the District Engineer in accordance with the "Notification" general condition, and has authorization from the Alaska Department of Fish and Game.
Department of Transportation (DOT) Hazardous Materials, Substances and Waste Regulation (49 CFR Parts 171, 172 and 173)	Regulates transportation of various preservatives, field supplies, and investigation-derived wastes supplies in accordance with DOT regulations. Transportation of hazardous material within coastal waters is subject to United States Coast Guard (USCG) enforcement. The USCG regulations require vessels to obtain permits to ship hazardous materials
Safety and Health Requirements Manual (EM385-1-1)	Prescribes health and safety requirements for Corps activities.
Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA (EPA/ 9355.3-01, 1988)	Outlines procedures for completion of Remedial Investigations including the use of ARARs, TBCs and risk-based cleanup levels.
State of Alaska	
Alaska Solid Waste Management (18 AAC 60)	Regulates solid waste accumulation, storage, transportation, and disposal.
Alaska Oil and Hazardous Substance Pollution Control (18 AAC 75)	Defines release reporting requirements for discharge, and requirements for cleanup of petroleum hydrocarbons. Disposal of a hazardous substance must have prior approval by the ADEC.
Underground Storage Tanks (18 AAC 78)	Provides direction for sampling, site investigation, and closure of UST sites.
Fish and Game (AS, Title 16)	Requires acquisition of a Fish Resource Permit if fishery resources may be impacted.

Management of Investigation-Derived Waste During Site Inspections	Outlines procedures for handling and disposal of investigation-derived waste.
Underground Storage Tanks Procedure Manual (18 AAC, 78)	Provides guidance for standard sampling procedures accepted by ADEC.
Transportation of Hazardous Waste (18 AAC 62)	Mandates procedures for transporting hazardous waste in the state. Investigation-derived waste may be subject to manifesting requirements.

Table 3.- Summary of Potential Location-Specific ARARs and TBCs.

Act or Regulation	Description
Federal	
Resource Conservation and Recovery Act (RCRA)(40 CFR 261)	Specifies restrictions on location of facilities for treatment, storage, disposal of hazardous wastes.
Protection of Floodplains (40 CFR 6)	Limits activities in floodplain. Floodplain is defined as "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of off-shore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year."
Protection of Wetlands (40 CFR 6)	Minimizes impacts on areas designated as wetlands.
Clean Water Act, Section 404 (40 CFR 230, 33 CFR 320-330)	Prohibits discharge of dredged or fill material into waters of U.S. without permit. Requires Federal agencies to avoid, to the extent possible, adverse impacts associated with destruction or loss of wetlands.
Endangered Species Act (50 CFR 200, 50 CFR 402)	Protects endangered species and threatened species and preserves their habitat.
Bald and Golden Eagle Protection Act	Provides special protection for eagle species.
Wilderness Act (50 CFR 27, 50 CFR 53)	Limits activities within an area designed as a wilderness area. Limits the type of activities permitted in an area designated as a National Wildlife Refuge system
Fish and Wildlife Coordination Act (33 CFR 320-330, 40 CFR 6)	Prohibits activities affecting/modifying streams or bodies of water if the activity has a negative impact on fish or wildlife
Wild and Scenic Rivers Act (40 CFR 6)	Protects rivers that are designated as wild, scenic or recreational.
National Historic Preservation Act (NHPA) (7 CFR 650, 36 CFR 65 and 800)	Requires the preservation of historic properties included in or eligible for the National Register of Historic Places and to minimize harm to National Historic Landmarks.
Coastal Zone Management Act (16 USC Section 1451)	Limits activities affecting the coastal zone, including lands thereunder and adjacent shore lands.
Marine Mammal Protection Act	Establishes a moratorium on taking and importing marine mammals, their parts, and products.

Migratory Bird Treaty Act	Makes it unlawful for anyone to kill, capture, collect, etc. any migratory bird including parts, nests, or eggs.
State of Alaska	
Endangered Species Act (5 AAC 92)	Requires coordination with the Department of Fish and Game if activities impact on endangered/ threatened species or their habitat.
Alaska Historic Preservation Act (41 AS 35)	Provides for the preservation, protection, and enhancement of structures, sites, and objects pertaining to the historical or prehistorical culture of people in the State as well as to the natural history of the state.
Alaska Coastal Management Regulations (6 AAC 6)	Provides for the protection of Alaskan coastal resources and habitat, including areas that merit special attention.

Table 4.- Evaluation of Sample Analytical Results for Atka Island Sites.

Shaded cells indicate chemicals of concern with concentrations greater than RBSL or ARAR/TBC values.

1. Compound of Potential Concern	2. units	3. Detection frequency above SQL	4. Minimum Concentration above SQL	5. Maximum Concentration above SQL	6. Detection Limits	7. Background Concentration	8. Risk Based Screening Level (10^{-6}) (carcinogen)	9. Detection Frequency above RBSL (carcinogen)	10. Risk Based Screening Level (non-carcinogen)	11. Detection Frequency above RBSL (non-carcinogen)	12. Potential ARAR/ TBC	13. Detection Frequency above ARAR/TBC
Soil Samples												
GRO	mg/kg	9/ 9	0.44 J	9	0.1- 0.53						1,400[*1]	0/ 9
DRO	mg/kg	13/ 16	3.8 J	26,000	3.4- 1,700						8,250[*1]	5/ 16
RRO	mg/kg	16/ 16	12 B	35,000 B	1.9- 2,400						8,300[*1]	2/ 16
Total BTEX[1]	mg/kg	2/ 10	0.077	0.148	--						356[*1]	0/ 10
Ethylbenzene	mg/kg	1/ 10	0.03 J	0.03 J	0.00049- 0.0025				7,800 [*3]	0/ 10	89 [*1]	0/ 10
Total Xylenes	mg/kg	2/ 10	0.077	0.118	0.00068- 0.0047				160,000[*3]	0/ 10	81[*1]	0/ 10
2-Methyl-naphthalene	mg/kg	6/ 10	0.10	5.20	0.018- 0.050		The risk from this compound is included in the aromatic portion of DRO.					
Naphthalene	mg/kg	6/ 10	0.15	8.30	0.009- 0.025		The risk from this compound is included in the aromatic portion of DRO.					
Aroclor 1260	mg/kg	3/ 17	0.30 J	2.30 J	0.110- 0.270		0.32 [*3]	2/ 17			1 [*3]	1/ 17
Barium	mg/kg	15/ 15	11	350	0.12- 82	678[*5]			5,500[*3]	0/ 15	5,800[*1]	0/ 15
Cadmium	mg/kg	6/ 15	5.9 J	46	7.2- 40				39 [*3]	1/ 15	83 [*1]	0/ 15
Chromium	mg/kg	12/ 15	1.1 J	56	1.4- 5	64[*5]			230[*3]	0/ 15	420[*1]	0/ 15
Lead	mg/kg	14/ 15	10 J	49,000	12- 75	14[*5]					400 [*2]	8/ 15
Mercury	mg/kg	8/ 15	0.091 J	47 J	0.081- 0.15				23[*2]	1/ 15	13[*2]	1/ 15
Nickel	mg/kg	5/ 15	3.1 J	37	4.2- 47	33 [*5]			1,600 [*3]	0/ 15	1,700 [*1]	0/ 15
Vanadium	mg/kg	15/ 15	6.9 J	200	1.6- 18	129 [*5]			550 [*3]	0/ 15	580 [*1]	0/ 15

[1] Based on calculated values where Total BTEX = Benzene + Toluene + Ethylbenzene + Total Xylenes. Laboratory did not report data as total BTEX.

Notes:

*1	(18 AAC 75) ADEC RBSL List
*2	(EPA, 1996) Soil Screening Tables
*3	(EPA, 1998) Region III RBSL List
*4	Not used
*5	(USGS, 1988) Background soil chemistry
*6	(40 CFR 261) Hazardous waste regulations
*7	(40 CFR 141) National Primary Drinking Water regulations
*8	(40 CFR 761.125) PCB regulations
B	Analyte also detected in the laboratory method blank.
D	Sample was diluted.
E	Reported concentration is above the instrument calibration range.
J	Analyte detected above the instrument detection limit, but below the analytical reporting limit.
mg/kg	micrograms per kilogram or parts per million

Appendix A

Work Plan

WORK PLAN

SITE INVESTIGATION 1998

Atka Island,
Alaska

<<DRAFT>>

Prepared by the

Technical Engineering Section
Environmental Engineering Branch
Alaska District Army Corps of Engineers

May 1998

Table of Contents

WORK PLAN

1. Introduction

1.1 Document Organization

This document presents the Work Plan for the proposed site investigation of the Formerly Used Defense Site (FUDS) at Atka Island, Alaska. This Work Plan consists of four basic components:

- Project Work Plan. Describes the basic scope of work and objectives of the site investigation. Outlines project organization and responsibilities. Presents site history and background information, including the findings of previous investigations at the site.

- Attachment I- Sampling and Analysis Plan (SAP): The Sampling and Analysis Plan is subdivided into two parts:
  - Part A – Field Sampling Plan (FSP): Describes in detail the field sampling and sample handling procedures to be followed.
  - Part B – Quality Assurance Project Plan (QAPP): Describes the chemical data quality management procedures to be followed, and the data reporting requirements for these projects.

- Attachment II – Site Specific Health and Safety Plan (SSHSP): Describes on-site health and safety procedures that will be followed during these site investigations.

1.2 Project Organization and Responsibilities

1.2.1 Tasking Authority: This Work Plan has been prepared by the Technical Engineering Section of the U.S. Army Corps of Engineers, Alaska District (CEPOA-EN-EE-TE), at the request of the CEPOA Project Management Division (CEPOA-PM-E-F), through the Inactive Installations Section, Environmental Engineering Branch (CEPOA-EN-EE-II; ref. 4g). The proposed site investigation is funded under the Formerly-Used Defense Site (FUDS) program of the Defense Environmental Restoration Program (DERP).

The responsibilities of the technical project management team are defined below.

1.2.2 Engineering/Technical Management: At the request of EN-EE-II, most project technical management responsibilities will be performed by EN-EE-TE; an EN-EE-II engineering manager will not be assigned to this project.

1.2.3 Plan Development: CEPOA-EN-EE-TE is responsible for development of the project Work Plan, which will include the documentation described in Section 1.1 above. The Work Plan will be consistent with the requirements of the U.S. Army

Corps of Engineers, the U.S. Environmental Protection Agency (EPA), and the State of Alaska Department of Environmental Conservation (ADEC).

1.2.4 Laboratory Analytical Services: The CEPOA Geotechnical Branch, Materials and Instrumentation Section (CEPOA-EN-G-MI) wil be responsible for selecting laboratories and procuring analytical services for any chemical analyses that will be performed as part of this site investigation. EN-G-MI and EN-EE-TE will work jointly to assure that appropriate laboratories and analytical methods are selected, and that the appropriate chemical data quality management procedures are implemented. See the QAPP for further details.

1.2.5 Field Work: The site visits will be accomplished by personnel from EN-EE-TE, PM-E-F, and possibly representatives from other agencies; the exact composition of the field team will be determined in the future. All environmental sampling will be accomplished by the EN-EE-TE environmental engineer/scientist, who will function as the Sampling Team Leader. On-site photography and documentation functions will be shared by the field team members. See the FSP for further details.

1.2.6 Site Safety Officer: The EN-EE-TE environmental engineer/scientist will assume the role of Site Safety Officer, unless that role is delegated to another site investigation participant. See the SSHSP for further details.

1.2.7 Data Quality Review: CEPOA-EN-G-MI will be responsible for receiving raw data reports from the analytical laboratories, and arranging for the review of the data and the preparation of a Chemical Quality Assurance Report (CQAR). A Chemical Data Quality Assessment Report (CDQAR) will be prepared by a EN-G-MI chemist. See the QAPP for further details.

1.2.8 SI Report: The SI Reports will be prepared by EN-EE-TE, using the findings of the field investigations, with the analytical results and CQAR provided by EN-G-MI. Separate SI Reports will be prepared for each site.

2. Project Background

2.1 Site Location and History

Atka Island is located within the Andreanof Islands group near the center of the Aleutian Islands chain, and is one of the larger of the Aleutian Islands. The City of Atka is located at the eastern end of the island, on Nazan Harbor. The village is approximately 90 miles east of the former naval station at Adak Island, and 1,250 miles west of Anchorage.

The island has been inhabited for several thousand years, with the present townsite occupied since the 1860's. In June 1942, the U.S. Navy evacuated the inhabitants of Atka, and destroyed the village. The island was occupied by the U.S. military beginning in August

1942. The military facilities were constructed mainly along Nazan Harbor to the north of the village site, with observation posts on Korovin Bay, and an aircraft control service (ACS) site on a mountainside to the north of the harbor. The airfield was made operational in November 1942. Atka was primarily an Army installation, although the Navy also performed air operations there, and serviced weather stations and submarine cable systems. Atka became secondary in importance to Adak, and was largely abandoned by late 1945. The native Aleuts who survived the evacuation were returned to Atka in 1945 (ref. 4h).

The primary military facilities at Atka ultimately included a 4,000-foot by 100-foot runway with steel-mat surfacing, a taxi-way and hardstands, a ship dock, a 50-bed hospital, warehouses, and quarters for 1,056 personnel. Smaller outlying facilities included the ACS station, a radar station, and observation posts (ref. 4h)

2.2 Environmental Setting

2.2.1 Geology: Like the rest of the Aleutian Chain, Atka Island is primarily volcanic in origin. Mount Kliuchef and the Korovin Volcano dominate the east end of the island, and lie immediately north of the project site. The last reported eruption of Korovin was in 1974. The soils in the project area consist of volcanic materials such as basalt, andesites, and brecchias (ref. 4i).

2.2.2 Climate: Atka experiences the typical Aleutian maritime climate of moderate temperatures but frequent precipitation and high winds. Temperatures range from 25-35 degrees F in January to 45-55 degrees F in August. Prevailing winds are from the west-southwest with a mean velocity of 13 knots; wind velocities in excess of 120 knots have been reported during storm conditions. Precipitation totals approximately 60 inches per year (ref. 4i)

2.2.3 Ecological Resources: The marine environment surrounding Atka Island supports both commercial and subsistence fishing for pollack, Atka mackerel, Pacific cod, halibut, crab, and shellfish. The extent of harvest within Nazan Harbor and other inshore areas is unknown.

Birds of the Atka Island area include bald eagles, ravens, rock ptarmigans, puffins, and other seabirds. The island fox population limits nesting opportunities on Atka Island, but Bolshoi Island in Nazan Harbor reportedly supports nesting populations of bald eagles, the rare whiskered auklet, and other seabirds.

Reindeer were introduced to Atka in 1914; several thousand roam the island, and are hunted for food. Foxes are common on the island. Sea otters, sea lions, and seals are found along the coast.

Vegetation on the island consists of various arctic and alpine species of mosses, bryophytes, grasses and other low-growing plants. No trees exist on Atka, except where a few may have been introduced. At 1,000 feet above sea level, vegetation becomes very

sparse due exposure to high winds (ref. 4i).

2.2.4 Culture and Economy: Atka is the most isolated native community in the Aleutian Islands, and is the western-most civilian community in the United States. The current population is approximately 100 people. The local economy is based on commercial fishing and seafood processing, and upon subsistence fishing and hunting. Atka has a State-owned lighted runway, and seaplane base; scheduled air services are available twice weekly. Commercial sea-freight service is available from May to October (ref. 4j)

2.2.5 Land Ownership: The village and much of the project site area lies within the surface holdings of the Axtam Corporation. Most of the rest of the island is part of the Alaska Maritime National Wildlife Refuge or Aleutian Island Wilderness, and is under juridiction of the U.S. Fish and Wildlife Service (USFWS). Some outlying sites of interest may lie within USFWS lands (ref. 4i, 4j)

2.3 Previous Site Activities

No significant environmental investigations are known to have occurred at Atka Island. A major restoration project took place in 1986, by Chris Berg, Inc., under contract to the U.S. Army Corps of Engineers. The documentation and reporting requirements for that project were those of a construction project, rather than an environmental investigation, and there is very little documentation of environmental contamination or sources of contamination. The focus of that project was the demolition of abandoned military buildings and burial of the debris in three large disposal pits. Debris from hundreds of buildings, thousands of drums, and over 400,000 square feet of steel runway matting were buried in the disposal pits. Drums of product and transformers were noted and perhaps tested, but the results never officially reported. No sampling of soil, sediment, or water appears to have occurred. The disposal site closeout report (ref. 4l) implies that all materials, including drums, were disposed of in the disposal pits, and the daily reports do not mention off-site transportation or disposal for any materials (ref. 4m, 4n).

Reports from the U.S. Coast Guard and local officials suggest that drums located in the village and former military areas may be military in origin. The soil cover of the disposal areas has also reportedly been blown partially away, exposing debris in the disposal pits.

3. Project Objectives

The fundamental objective of this site investigation is to obtain information that will clarify the status of the site with respect to the FUDS program. The highest priority will be placed on attempting to identify any existing environmental contamination that may be associated with the former military facilities.

3.1 Data Gaps

The principal data gaps for Atka Island are, at present:

(a) Lack of information on potential environmental chemical contamination remaining from the 1986 debris removal actions;

(b) Uncertainty as to the completeness of the 1986 removal action (e.g., possibility of military drums and structures remaining);

(c) Lack of chemical data from the site, resulting in an inability to rank the site in the FUDS Relative Risk Site Evaluation Program (RRSEP); and

(d) Uncertainty as to the current condition of the three 1986 debris disposal sites.

3.2 Proposed Site Investigation Activities

To fill the data gaps described above, the major on-site tasks envisioned for this site investigation are:

(a) Investigate the sites of the former military facilities for evidence of chemical contamination of the environment. The large size of the former W.W.I.I. garrison may require that the investigation focus on fuel-storage facility and powerplant locations, such as can be determined from site records;

(b) Investigate reports of drums and military structures remaining after the 1986 removal action;

(c) Collect samples of contaminated surface soil or sediment associated with (a) or (b) for chemical analysis;

(d) Inspect and document the current condition of the three 1986 disposal sites; collect samples of soil or sediment if contamination is suspected at or leaching from the disposal sites;

(e) Interview local citizens for information on potential FUDS chemical contamination.

(f) Obtain information necessary to fill out an Alaska Department of Environmental Conservation (ADEC) Ecological Checklist (ref 4u).

3.3 Data Quality Objectives

Specific analytical data quality objectives (DQOs) will be discussed in the Sampling

and Analysis Plan. General Project DQOs can be described as follows:

(a) Chemical data from representative areas of the project site sufficient to obtain an RRSEP ranking for the site, and to compare to current regulatory standards.(see below);

(b) Documented observations sufficient to identify environmental chemical contamination (e.g., stained soils), estimate the extent of such contamination, and determine whether the contamination is likely to be of military origin;

(c) Documented observations of reported existing sources of contamination (e.g., drums) sufficient to determine whether the source is of military origin;

(d) Documented observations (including photodocumentation) of the 1986 disposal sites, sufficient to document the reported damage, and allow for design of a possible future remedy.

(d) Ecological information sufficient to provide a picture of potential ecological receptors in the site area.

3.4 ARAR's and TBCs.

It is necessary to identify regulatory and/or nonregulatory criteria that may apply to the site, so that analytical DQOs can be developed that generate data useable under the identified criteria. Regulatory and nonregulatory criteria for chemical contamination are commonly referred to as "Applicable or Relevant and Appropriate requirements" (ARARs), and "To Be Considered's" (TBCs), respectively.

Based on the known history of these site and previous observations, the dominant form of contamination would be expected to be petroleum hydrocarbons, primarily from medium or heavy-weight fuel oils. The sole true regulatory ARAR identified for these site is the promulgated State of Alaska Department of Environmental Conservation (ADEC) regulation governing the cleanup of fuel contamination in soils, 18 AAC 75, Oil and Hazardous Substances Pollution Control Regulations, May 1992 (ref 4p).

A very great number of TBCs could be applied to these project site. For these projects, TBCs for specific chemical compounds are drawn from *proposed* soil cleanup standards developed by ADEC and published in 18 AAC 75, Oil and Hazardous Substances Pollution Control Regulations – Public Review Draft, November 1997 (ref. 4f).

For any compounds not listed in the proposed ADEC regulations (ref. 4f), TBCs may be drawn from risk-based concentration (RBC) tables published by the U.S. Environmental Protection Agency, Region III (ref. 4q) or other established risk-based concentrations (ref. 4r).

If drum and tank contents are tested for waste characterization or used-oil recycling,

then the ARARs would be the hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA, 40 CFR 261) and/or standards for the management of used oil (40 CFR 279).

Development of analytical DQOs from the ARARs and TBCs is discussed in the QAPP of the attached Sampling and Analysis Plan.

4. References

a. U.S. Army Corps of Engineers, ER 1110-1-263, Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities, 1 April 1996.

b. U.S. Army Corps of Engineers, EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans, 1 September 1994.

c. U.S. Army Corps of Engineers, EM 200-1-6, Chemical Quality Assurance for HTRW Projects, 10 October 1997.

d. U.S. Army Corps of Engineers, EM 200-1-2, Technical Project Planning Guidance for HTRW Data Quality Design, 31 July 1995.

e. U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 Third Edition, Final Update III, December 1996.

f. State of Alaska Department of Environmental Conservation, 18 AAC 75, Oil and Hazardous Substances, Pollution Control Regulations, Cleanup Standards, Public Review Draft, 12 November 1997.

g. Memorandum CEPOA-PM-E-F dated 25 Nov 97, subject: Work Request.

h. U.S. Army Corps of Engineers, Alaska District, World War II in Alaska: A Historic and Resources Management Plan, May 1987.

i. U.S. Army Corps of Engineers, Alaska District, Technical Report, Small Boat Harbor, Atka, Alaska, January 1988.

j. Alaska Department of Community & Regional Affairs, Alaska's Cities, Towns and Villages Database, updated January 1996.

k. Telephone conversation with George Dirks, Vice Mayor of Atka, 30 March 1998.

l. Chris Berg, Inc., DEC Solid Waste Disposal Site Closeout Report for Atka Island, 12 December 1986

m. U.S. Army Corps of Engineers, Alaska District, Daily Construction Quality Reports, Debris Cleanup & Site Restoration, Atka Island, Contract No. DACA85-85-C-0100, 30 April to 6 June 1986.

n. U.S. Army Corps of Engineers, Alaska District, DACA85-85-B-0053, Bidding Documents for Debris Cleanup and Site Restoration, Defense Environmental Restoration Account, Amchitka and Atka Islands, Alaska, August 1985.

o. Conversations with Dwane (Colt) Denfeld, CEPOA-EN-EE-II, U.S. Army W.W.II activities in Aleutian Islands, January-April 1998.

p. Correspondence/conversation with Sonce DeVries, U.S. Fish and Wildlife Service, FUDS site within the Alaska Maritime National Wildlife Refuge, 5 February 1998.

q. Bush, James D., LTC, Narrative Report of Alaska Construction, 1941-1944, November-December 1944 (printed edition 1984).

r. State of Alaska Department of Environmental Conservation, 18 AAC 75, Oil and Hazardous Substances, Pollution Control Regulations, Cleanup Standards,14 May 1992.

s. U.S. Environmental Protection Agency, Region III, Risk-Based Concentration Tables, 22 Oct 97.

t. U.S. Environmental Protection Agency, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund site, OSWER Directive #9355.4-02, 1989.

u. State of Alaska Department of Environmental Conservation, Contaminated Sites Remediation Program, Risk Assessment Procedures Manual, for Remedy Standard 3.0, 6 October 1997.

Attachment I

SAMPLING AND ANALYSIS PLAN

SITE INVESTIGATION 1998

Atka Island,
Alaska

<<DRAFT>>

Prepared by the

Technical Engineering Section
Environmental Engineering Branch
Alaska District Army Corps of Engineers

May 1998

Table of Contents

ATTACHMENT I:
SAMPLING AND ANALYSIS PLAN

then the ARARs would be the hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA, 40 CFR 261) and/or standards for the management of used oil (40 CFR 279).

Development of analytical DQOs from the ARARs and TBCs is discussed in the QAPP of the attached Sampling and Analysis Plan.

4. References

a. U.S. Army Corps of Engineers, ER 1110-1-263, Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities, 1 April 1996.

b. U.S. Army Corps of Engineers, EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans, 1 September 1994.

c. U.S. Army Corps of Engineers, EM 200-1-6, Chemical Quality Assurance for HTRW Projects, 10 October 1997.

d. U.S. Army Corps of Engineers, EM 200-1-2, Technical Project Planning Guidance for HTRW Data Quality Design, 31 July 1995.

e. U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 Third Edition, Final Update III, December 1996.

f. State of Alaska Department of Environmental Conservation, 18 AAC 75, Oil and Hazardous Substances, Pollution Control Regulations, Cleanup Standards, Public Review Draft, 12 November 1997.

g. Memorandum CEPOA-PM-E-F dated 25 Nov 97, subject: Work Request.

h. U.S. Army Corps of Engineers, Alaska District, World War II in Alaska: A Historic and Resources Management Plan, May 1987.

i. U.S. Army Corps of Engineers, Alaska District, Technical Report, Small Boat Harbor, Atka, Alaska, January 1988.

j. Alaska Department of Community & Regional Affairs, Alaska's Cities, Towns and Villages Database, updated January 1996.

k. Telephone conversation with George Dirks, Vice Mayor of Atka, 30 March 1998.

l. Chris Berg, Inc., DEC Solid Waste Disposal Site Closeout Report for Atka Island, 12 December 1986

m. U.S. Army Corps of Engineers, Alaska District, Daily Construction Quality Reports, Debris Cleanup & Site Restoration, Atka Island, Contract No. DACA85-85-C-0100, 30 April to 6 June 1986.

n. U.S. Army Corps of Engineers, Alaska District, DACA85-85-B-0053, Bidding Documents for Debris Cleanup and Site Restoration, Defense Environmental Restoration Account, Amchitka and Atka Islands, Alaska, August 1985.

o. Conversations with Dwane (Colt) Denfeld, CEPOA-EN-EE-II, U.S. Army W.W.II activities in Aleutian Islands, January-April 1998.

p. Correspondence/conversation with Sonce DeVries, U.S. Fish and Wildlife Service, FUDS site within the Alaska Maritime National Wildlife Refuge, 5 February 1998.

q. Bush, James D., LTC, Narrative Report of Alaska Construction, 1941-1944, November-December 1944 (printed edition 1984).

r. State of Alaska Department of Environmental Conservation, 18 AAC 75, Oil and Hazardous Substances, Pollution Control Regulations, Cleanup Standards,14 May 1992.

s. U.S. Environmental Protection Agency, Region III, Risk-Based Concentration Tables, 22 Oct 97.

t. U.S. Environmental Protection Agency, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund site, OSWER Directive #9355.4-02, 1989.

u. State of Alaska Department of Environmental Conservation, Contaminated Sites Remediation Program, Risk Assessment Procedures Manual, for Remedy Standard 3.0, 6 October 1997.

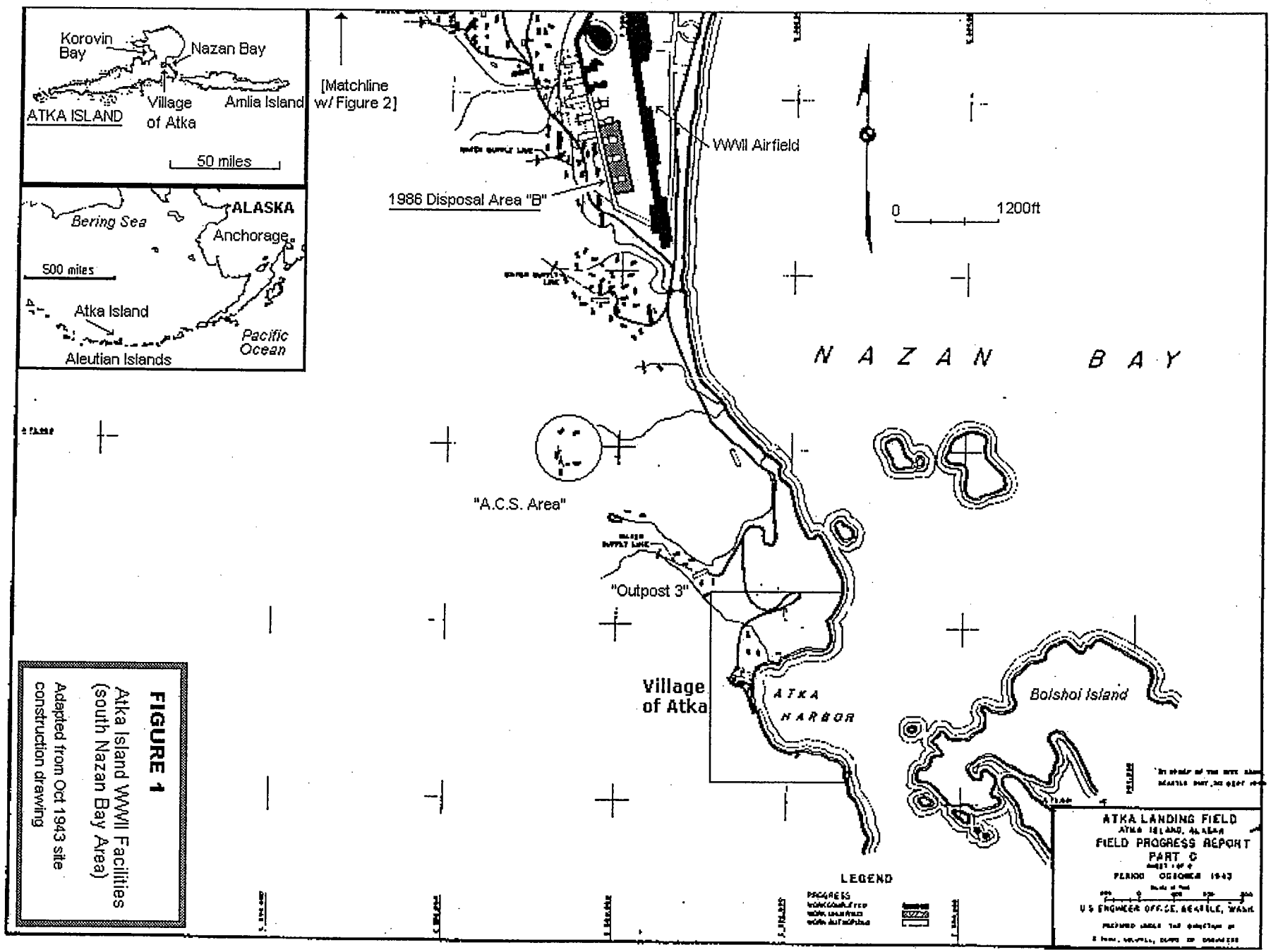


FIGURE 1

Atka Island WWII Facilities (south Nazan Bay Area)

Adapted from Oct 1943 site construction drawing

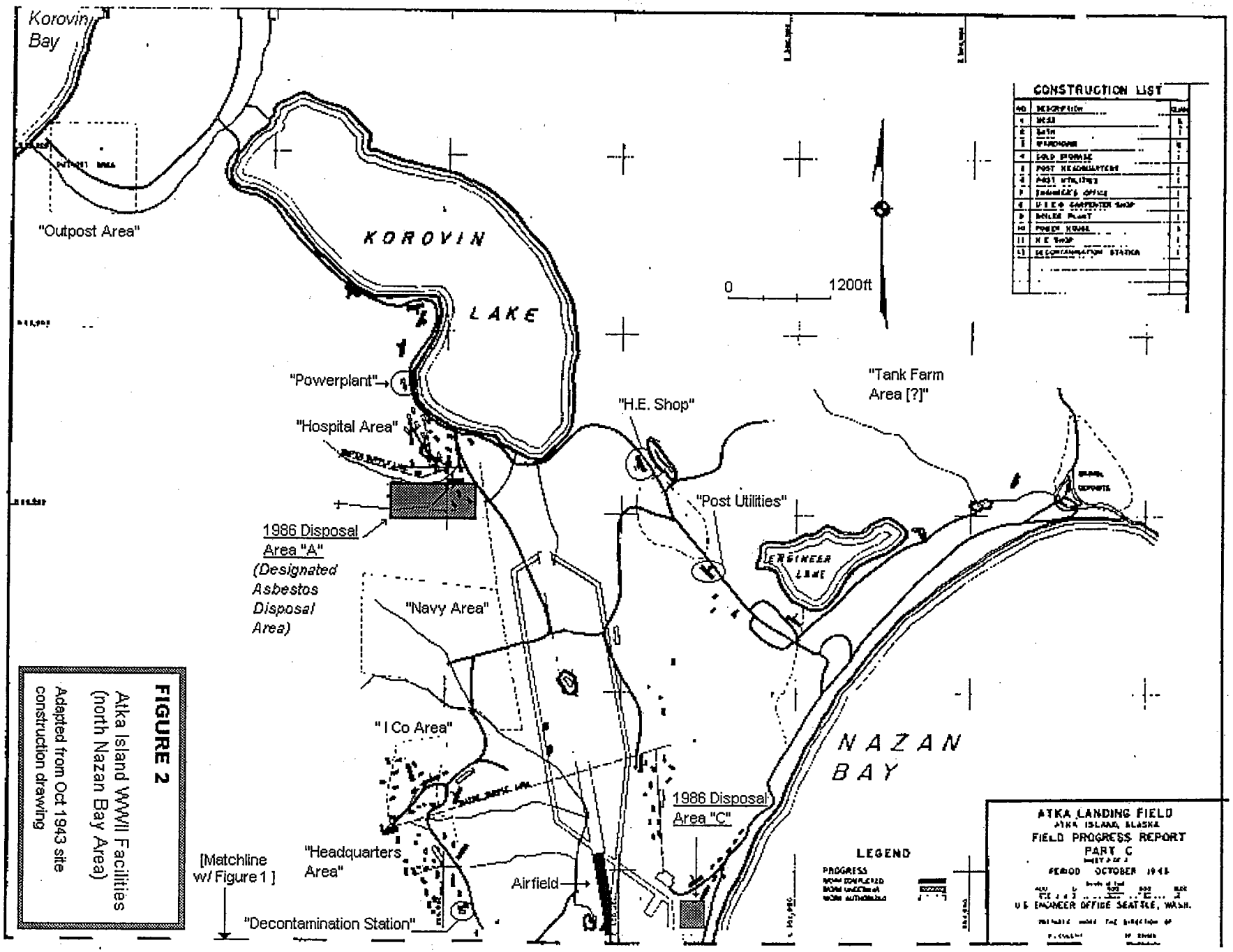


FIGURE 2

Atka Island WWII Facilities (north Nazan Bay Area)

Adapted from Oct 1943 site construction drawing

Attachment I

SAMPLING AND ANALYSIS PLAN

SITE INVESTIGATION 1998

Atka Island,
Alaska

<<DRAFT>>

Prepared by the

Technical Engineering Section
Environmental Engineering Branch
Alaska District Army Corps of Engineers

May 1998

Table of Contents

ATTACHMENT I:
SAMPLING AND ANALYSIS PLAN

ATTACHMENT I – SAMPLING AND ANALYSIS PLAN

A. Field Sampling Plan

1. Introduction

This Field Sampling Plan (FSP) has been prepared for the planned Site Investigation at Atka Island Aircraft Warning Service (AWS) site, and details the scope of the proposed sampling activities, as well as the sampling procedures and equipment to be used.

2. Project Organization and Responsibilities

Project organization and responsibilities are detailed in Section 1.2 of the Work Plan. For this site, sample collection, documentation, and sample handling will be performed by the CEPOA-EN-EE-TE technical manager.

3. Scope and Objectives of Sampling

The primary objectives of the planned sampling at the Atka Island site are to:

- Examine areas of former military facilities and debris disposal areas for signs of soil contamination;

- Evaluate any petroleum-contaminated soils for the petroleum fractions present, as well as toxicologically-significant petroleum constituent compounds (monoaromatic and polyaromatic hydrocarbons), as required by proposed State of Alaska regulations, and by the site-ranking model

- Examine the 1986 debris disposal areas for signs of erosion and runoff, and evaluate soils for contamination by petroleum, petroleum constituent compounds, PCBs, solvents, metals, and asbestos

- In a limited fashion, estimate horizontal extent of any significant soil contamination encountered.

3.1 Expected Types of Contamination

Based on the history of the site, the potential contaminants of concern at these site are:

- Fuels, primarily ranging from Diesel #2 to bunker oil (or the equivalent);

- Polychlorinated biphenyls (PCBs), associated with electronics equipment and transformers;

- Metals, associated with electrical equipment and fuel residues.

- Chlorinated solvents, from possible machine shops and maintenance facilities.

3.2 Known and Suspected Sources of Contamination

Little is known at present concerning the types and locations of facilities existing before the 1986 removal action. Site construction plans show building locations, but identify the function of only a few of the structures. In general, it can be surmised that an establishment the size of the Atka Island WWII facilities included fuel handling facilities, power generation facilities, maintenance facilities, mess halls, hospitals, and communications facilities. The search for more detailed information will continue.

3.3 Scope of Analytical Methods

The analytical methods selected for these Site Investigations are shown in Table A1 below; specific target compounds for multi-analyte methods are shown in Table B-1 of the QAPP:

Table A-1 Proposed Analytical Methods

Analytical Method	Target Contaminants
AK-102/103, Diesel Range Organics (DRO) and Residual Range Organics (RRO)	Mid-range and heavy fuel oils
AK-101, Gasoline Range Organics (GRO)	Gasolines
Method 8021B, Volatile Org. Compounds (BTEX only)	Fuel constituent compounds
Method 8260B, Selected Chlorinated Hydrocarbons	Chlorinated solvents
Method 8270B SIMS, Polyaromatic Hydrocarbons (PAHs)	Fuel constituent compounds
Method 8082, Polychlorinated Biphenyls (PCBs)	PCB dielectric from electrical equipment
Methods 6010-7000 series, Total Metals	Metals from electronic equipment, fuel residues
Method 9002, Asbestos	Asbestos from disposal cell

BTEX: Benzene, toluene, ethylbenzene, xylenes
SIMS: Selected Ion Mass Spectroscopy; see Table B-1 of the QAPP for list of target PAHs
Metals: Arsenic, Barium, Cadmium, Chromium, Mercury, Vanadium, and Nickel

Chemical data from similar site indicate that volatile organic compounds are typically not detected in WWII-era surface fuel contamination; samples for BTEX analysis are proposed here to comply with proposed State of Alaska regulations. The list of metals has been adapted from the eight Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic metals; the rarely-detected selenium and silver have been replaced with vanadium and nickel, metals often associated with bunker oils.

3.4 Scope of Sampling Locations

The actual locations and numbers of samples to be collected will be determined in the

field. Because of the lack of site-specific information, the scope of sampling and other activities at Atka Island will tend to resemble a Preliminary Assessment.

(a) At areas of stained surface soil not associated with powerplants, electrical, or maintenance facilities, selected samples will be analyzed for DRO/RRO, GRO/BTEX, PAHs, and metals.

(b) At areas of stained surface soil associated with identified locations of powerplants or electrical equipment, selected samples will be analyzed for PCBs, as well as the parameters listed in (a).

(c) At areas of stained surface soil associated with identified locations of machine shops or maintenance facilities, selected samples may be analyzed for chlorinated solvents and PCBs, as well as the parameters listed in (a).

(d) At the debris disposal areas, exposed soils or runoff areas will be selectively sampled for all the parameters in Table A-1.

The estimated numbers of samples to be collected at each site are shown in Table A-2.

3.4.1 Background Samples: At least one sample for DRO/RRO, metals, and PAHs will be collected at each site, from a location thought to most likely be unaffected by on-site sources of contamination.

3.4.2 Duplicate Samples: A field duplicate sample will be collected at each site, for each analytical method used. The field duplicate will be sent to the laboratory as a "blind" duplicate, as an external check of laboratory precision.

4. Field Sampling Activities

4.1 Site Access and Logistics: Transportation to will be by contract helicopter, staged out of Adak. The field team will travel to Adak via commercial air transport, and meet the helicopter and pilot in Adak

Sampling equipment may be staged in Adak ahead of the arrival of the field team. If methanol preservative is used in samples for BTEX analysis, some equipment and samples may need to be shipped on cargo-only flights, depending on the carriers' interpretation of transport regulations (see Appendix IA-1).

4.2 Sampling Equipment and Procedures

4.2.1 Sampling Equipment: Sampling equipment will be clean, new, stainless-steel spoons, a trowel or shovel, appropriate sample collection jars, and clean, new,

polyethylene bags for homogenization of samples. It will not be feasible to decontaminate sampling equipment at these site, so all equipment used to manipulate samples will be single-use.

4.2.2 Surface Soil Collection: Soil samples will generally be collected from the top two to six inches of mineral soil available at the sampling point. The expected nature of the site soils (tundra peat overlying shallow bedrock) may require the appropriate sampling depth to be determined on a location-by-location basis. Any mat of live or dead vegetation will be carefully cut away and removed from the sampling point. A clean spoon or trowel will be used to collect soil from the desired depths. The soil will be transferred to a clean polyethylene bag, and homogenized. After homogenization, the soil will be transferred to the appropriate sample containers (see Table A-2). If any samples are collected for volatiles analyses (e.g., GRO and BTEX, volatile organic compounds, gasoline range organics), jars for those analyses will be filled first and directly from the sampling point, with no homogenization. Any vegetation mat removed will be restored to the sampling point, if feasible.

4.2.3 Methanol Preservation: Soil samples for GRO and BTEX analysis will be preserved with a solution of methanol and internal standards, in accordance with the ADEC methodology for AK-101. Vials of the methanol and tared, coded sampling jars will be provided by the contract analytical laboratory. In the field, the sampler places one or two ounces of soil in the sampling jar, then adds the methanol solution to the jar sufficient to completely cover the soil. The sampler must record the identification code of the jar and amount of methanol added to the jar for each sample.

5. Sample Chain-of-Custody and Documentation

5.1 Field Logbook

All information pertinent to a field activity will be entered in a bound logbook with consecutively numbered pages. Entries in the logbook will include at least the following information:

- Names, addresses, phone numbers of all pertinent field contacts.
- Date and time of sampling or site entry.
- Sample location (to include horizontal and vertical measurements), sample identification number, and tests required.
- Detailed field observations, to include soil type, apparent contamination, nearby debris or containers, type and markings on containers, condition and type of nearby vegetation.
- Any field measurements such as temperature, depth, etc.
- Climatic conditions for each day.
- Names of field personnel, with signature of recordkeeper.
- Any deviations from the Sampling and Analysis Plan

Because sampling situations vary widely, notes shall be as descriptive and inclusive as possible. Descriptions of sampling locations should be sufficiently complete to allow the sampling situation to be later recreated and correlated with analytical data. Information will be entered into the logbook in ink, with errors crossed out with a single line. If anyone other than the recordkeeper makes an entry in the logbook, he/she will date and sign that entry.

5.2 Sample Documentation

Each sample must be sealed in a labeled container immediately after it is collected. Labels may be filled out and firmly affixed to the container prior to collection to minimize handling of the sample containers. The labels will include at least the following information:

- Name/Signature of Collector
- Date of Collection
- Project Name
- Sample Preservative
- Test to be Performed
- Sample Number

A standard CEPOA chain-of-custody form will be prepared for each sample shipment.

5.3 Sample Numbering System

A standard CEPOA sample identification number system will be used, consisting of two digits designating the year, then a project code of up to four letters, then a two-digit sample number, followed by a two-letter matrix code. For example, "98-ATKA-01-SO" would be the number assigned to the first soil sample collected at Atka Island. Samples from each location will be given a unique two-digit sample number. The matrix codes to be used are "SO" for soil, "SE" for sediment, and "DR" for drum product.

5.4 Photographs

Extensive photodocumentation of the site will be prepared. All sampling locations will be photographed; cards bearing the sample identification number will be placed at each sampling point when the photograph is taken, and photos of the sampling point will show the surrounding area and context of the sampling point. All structures and debris thought to be of interest will be photographed. A log will be maintained that indicates the location, subject, and direction of view of each photograph.

6. Sample Packaging and Shipping

Samples will be shipped to the laboratory with sufficient time allowed for the laboratory to analyze the sample within the holding time requirements of the analytical method. Samples will be shipped to the laboratory using the fastest delivery time possible.

Only waterproof metal or equivalent-strength plastic ice chest or cooler will be used to ship samples. Vermiculite will be placed in the bottom of the cooler to a depth of 3 inches. Each jar will be wrapped in an absorbent towel to cushion the jar and absorb moisture. The jars will then be individually sealed in plastic bags. The jars will be placed in the cooler, and additional inert packing material will be added to protect the jars from breakage. Ice packs will be inserted around and on top of the jars. The cooler will be filled to the top with cushioning and insulating material. The cooler will be packed to maintain the samples within a temperature range of 2 to 6 degrees Centigrade. The packed cooler must not exceed weight limitations established by the commercial carrier (typically, 70 pounds).

Chain-of-custody forms and other appropriate documentation will be sealed in a plastic bag and affixed with tape to the inside of the cooler lid. If the cooler has a drain, the drain will be taped shut. The lid of the cooler will be secured by wrapping heavy-duty tape completely around the cooler at least two locations without obscuring any labels. The appropriate shipping labels will be affixed to the top of the cooler. Dated and signed custody seals will be placed at the front right and back left corners of the cooler, overlapping both the lid and cooler body.

6.1 Shipment of Methanol

Special reporting and packaging provisions will be necessary for shipping the methanol preservative solution to the field and back to the laboratory. Air carriers in Alaska vary in their specific requirements for transporting methanol. A summary of reporting and packaging requirements is provided in Appendix IA-1. Specific shipping requirements will be ascertained well in advance of the site visit.

7. Ecological Checklist

A modified ecological checklist from Appendix B of the ADEC Risk Assessment Procedures Manual (WP ref. 4o), will be filled out at the site, or soon after the site visit. A copy of this checklist is provided in Appendix IA-2.

TABLE A-2 Sampling Summary, Atka Island

Analytical Method	(#) and Type of Sample Container	Sample Preservation	Sample Holding Time[1]	Primary Samples	Field Duplicates	Back-ground Samples	Field Blanks[2]	TOTAL
Methods AK-102/103, DRO & RRO	(1) 4-oz glass jar	cool to 4°C	14 days	13	1	1	0	15
Method AK-101 GRO +Method 8021B, BTEX	(1) 4-oz amber glass jar w/ septum lid	methanol/ surrogate soln, cool to 25°C	14 days	8	1	0	1	10
Method 8260B, Chlorinated Solvents	(1) 4-oz amber glass jar w/ septum lid	aqueous preservation soln	14 days	5	1	0	0	6
Method 8270B SIMS, PAHs	(1) 4-oz glass jar	cool to 4°C	14 days	8	1	1	0	10
Method 8082, PCBs	(1) 4-oz glass jar	cool to 4°C	14 days	9	1	0	0	10
Methods 6010-7000, Total Metals	(1) 4-oz glass jar	cool to 4°C	60 days[3]	8	1	1	0	10
Method 9002, Asbestos	(1) 4-oz glass jar	not applicable	not applicable	3	0	0	0	1

DRO, RRO, BTEX, SIMS, PAHs, PCBs: See table A-1 for explanation of abbreviations.

1. Holding time is allowed time between sample collection and extraction.
2. Methanol/surrogate trip blanks required by Method AK-101.
3. Holding time for mercury is 28 days.

ATTACHMENT I: SAMPLING AND ANALYSIS PLAN

Part B: Quality Assurance Project Plan

1. Introduction

This Quality Assurance Project Plan (QAPP) presents the data quality objectives, data quality control and quality assurance procedures, and data reporting procedures to be used for this project.

2. Organization and Responsibilities

Project organization and responsibilities are detailed in Section 1.2 of the Work Plan. For these site, data quality objectives have been developed jointly by the CEPOA-EN-EE-TE technical manager, and the CEPOA-EN-G-MI project chemist. The acquisition of laboratory analytical services and data review services will be performed by the CEPOA-EN-G-MI project chemist.

3. Analytical Data Quality Objectives

The Data Quality Objectives (DQOs) for the chemical sampling at these site are to generate chemical data that will quantitate and characterize potential petroleum, PCBs, and metals contamination at the site, and can be compared with selected regulatory or risk-based benchmark values. The benchmark values are taken from the ARARs and TBCs described in Section 3.4 of the Work Plan:

- State of Alaska, 18 AAC 75, Oil and Hazardous Substances Pollution Control Regulations, 14 May 1992;

- State of Alaska, 18 AAC 75, Oil and Hazardous Substances Pollution Control Regulations (Proposed Revision), 12 Nov 1997;

- U.S. Environmental Protection Agency, Region III, Risk-Based Concentration Tables.

- U.S. Environmental Protection Agency, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund site

The proposed benchmark values are shown in Table B-1. For some chemicals, the lowest concentration benchmarks may not be achievable by readily-available analytical methods, and it is not always feasible to select a detection limit below the lowest cited benchmark value. In most cases, the low benchmark is an ADEC proposed soil-to-

Table B-1 Proposed Benchmark Concentrations (mg/kg)

Parameter	18 AAC 75, May 1992 (Level A matrix score)	18 AAC 75, (proposed Nov 1997) soil ingestion	18 AAC 75, (proposed Nov 1997) soil-to-gw	Other
Diesel Range Organics	100	-	-	-
Residual Range Organics	2000	-	-	-
Gasoline Range Organics	50	-	-	-
Benzene	-	230	0.02	-
Toluene	-	17000	5	-
Ethylbenzene	-	8300	5	-
Xylenes	-	170000	60	-
Chlorinated Hydrocarbons:				
Tetrachloroethene	-	130	0.03	-
Trichloroethene	-	620	0.02	-
cis-1,2-Dichloroethene	-	830	0.2	-
trans-1,2-Dichloroethene	-	1700	0.3	-
1,1,2,2-Tetrachloroethane	-	34	0.01	-
1,1,1-Trichloroethane	-	-	0.9	-
Carbon Tetrachloride	-	52	0.03	-
Vinyl chloride	-	4	0.008	-
Chlorobenzene	-	1700	0.5	-
1,2-Dichlorobenzene	-	7500	6	-
Polyaromatic Hydrocarbons:				
-Anthracene	-	24900	3900	-
-Acenaphthene	-	5000	190	-
-Benzo(a)anthracene	-	9	6	-
-Benzo(b)fluoranthene	-	9	17	-
-Benzo(k)fluoranthene	-	93	170	-
-Benzo(a)pyrene	-	2	0.9	-
-Chrysene	-	930	550	-
-Dibenzo(a,h)anthracene	-	5	0.9	-
-Fluorene	-	3300	240	-
-Indeno(1,2,3-cd)pyrene	-	50	9	-
-Naphthalene	-	3300	38	-
-Pyrene	-	2500	1400	-
Polychlorinated Biphenyls	-	-	-	0.32[1]
Arsenic	-	4	0.1*	-
Barium	-	5800	4	-
Cadmium	-	83	0.01*	-
Chromium (total)	-	420	0.2*	-
Lead	-	-	-	400[2]
Mercury	-	25	0.006*	-
Nickel	-	1700	2	-
Vanadium	-	580	0.6*	-

1. U.S. Environmental Protection Agency, Region III, Risk-Based Concentration Tables, 22 Oct 97 (ingestion of soil, residential exposure).
2. U.S. Environmental Protection Agency, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund site, OSWER Directive #9355.4-02, 1989.
* Benchmark concentration is below detection limit of available analytical methodology.

groundwater screening criterion for metals; background sampling for metals will be important in assessing whether that criterion is truly appropriate

In selecting benchmarks, the inhalation pathway for volatiles in soils was not considered due to the age of the expected contamination and the high winds typical at the site. Ecological TBCs were not considered for this preliminary stage of these projects.

Table B-2 presents the analytical data quality objectives (DQOs) necessary to meet the project DQOs described in the FSP and Work Plan.

4. Project Chemical Data Quality Control Program

The quality of the data obtained will be assured through the use of the following quality control and quality assurance elements, consistent with guidance provided in EM 200-1-6.

- Use of Approved Laboratories: The laboratories assigned by CEPOA-EN-G-MI will be ones validated by the U.S. Army Corps of Engineers HTRW Center of Expertise (CENWO-HX) for the analytical methods requested, and approved by the Alaska Department of Environmental Conservation (ADEC).

These laboratories will also report on the condition (e.g., correct temperature, proper chain-of-custody, etc.) of the samples they receive.

- Collection of Field Quality Control Duplicates: Duplicate samples will be collected at a frequency of approximately one out of every ten samples, for each analytical method (see Table A-2 of the FSP). Each duplicate sample will accompany its associated primary sample to the assigned primary laboratory as a blind quality control duplicate.

- Assessment of Data: All analytical data will undergo a quality review by a person or firm contracted by CEPOA-EN-G-MI. The data quality review may include examinations of sampling chain-of-custody and documentation, examinations of data from laboratory control samples and duplicates, matrix spike samples and duplicates, surrogate recoveries, and field duplicates. The extent of the data review will be determined jointly by CEPOA-EN-G-MI and CEPOA-EN-EE-TE, and will be consistent with guidelines provided in Appendix C of EM 200-1-6.

The person or firm performing the data quality review will prepare a Chemical Quality Assurance Report (CQAR). The CQAR will be consistent with guidelines provided in Appendix D of EM 200-1-6.

A Chemical Data Quality Assessment Report (CDQAR) will be prepared by a CEPOA-EN-G-MI chemist, to report on whether the data meet project needs.

5. Data Reduction, Review, and Reporting

Raw data submitted by the laboratories will be received by CEPOA-EN-G-MI, and forwarded to the data review contractor preparing the CQAR. CEPOA-EN-G-MI staff will prepare data summary tables from the raw data. The data tables and the CQAR will be used by CEPOA-EN-EE-TE in preparing the SI Report.

Table B-2 Analytical DQOs, Atka Island

Parameter, Analytical Method	Extraction Method	Maximum MRL, (mg/kg)	Precision (% Relative Difference)	Accuracy (%)	Completeness of Data
Diesel Range Organics, ADEC Method AK-102	method specific	10	20	60-120	90%
Residual Range Organics, ADEC Method AK-103	method specific	100	20	60-120	90%
Gasoline Range Organics, ADEC Method AK-101	method specific	10	20	60-130	90%
Volatile Organics (BTEX), SW-846 Method 8021B	AK-101 extract. method (?)	0.01	20	60-140	90%
Selected Chlorinated Hydro-carbons, Method 8260B	SW-846 5035	0.005	20	60-140	90%
Polyaromatic Hydrocarbons, SW-846 Method 8270B SIMS	SW-846 3510	0.5	20	60-140	90%
Polychlorinated Biphenyls, SW-846 Method 8082	SW-846 3450	0.1	20	60-140	90%
Arsenic, SW-846 6010 or 7060	SW-846 3050	1	20	60-140	90%
Barium, SW-846 6010	SW-846 3050	1	20	60-140	90%
Cadmium, SW-846 6010	SW-846 3050	1	20	60-140	90%
Chromium, SW-846 6010	SW-846 3050	1	20	60-140	90%
Lead, SW-846 6010 or 7421	SW-846 3050	5	20	60-140	90%
Mercury, SW-846 7471	method specific	0.1	20	60-140	90%
Nickel, SW-846 6010	SW-846 3050	1	20	60-140	90%
Vanadium, SW-846 6010	SW-846 3050	1	20	60-140	90%

MRL: Method Reporting Limit
ADEC: Alaska Department of Environmental Conservation

Appendix IA-1

Transportation of Methanol by Aircraft

Transportation of Methanol by Aircraft

February 15, 1996

Concerns over possible shipping restrictions of methanol have been voiced by several firms and labs. ADEC has researched this issue and contacted the Department of Transportation Hazardous Materials Coordinator in Anchorage. Smaller airlines flying in Alaska that are operating under 14 CFR Part 135 for air taxi or commercial operators follow DOT regulations for dangerous goods (49 CFR) and use the Hazardous Materials Operations Manual. Commercial operators of larger aircraft governed by 14 CFR Part 121 use the International Air Transport Association Dangerous Goods Regulations (IATA DGR).

Methanol is listed in the Hazardous Materials Table, DOT Regulations, 49 CFR 172.101 as UN 1230, Class 3 flammable liquid only, and requires Packing Group II. Special packaging exceptions in 49 CFR 173.150, for flammable liquid in Packaging Group II, such as methanol, shipped in limited quantities (1.0 liter net quantity/package) are exempt from the specification packaging requirements and only require a strong outer packaging.

A label is required which states the following: *flammable liquid, class 3, Methanol UN 1230, Excepted package*. Liquid hazardous materials must also have *orientation markings* on two opposite vertical sides of the package, with the arrows pointing in the correct upright direction (49 CFR, 173.312). A *shipper's declaration for dangerous goods* form must be completed. It indicates the full address of the shipper; the address of the recipient; airport of departure and destination; whether the shipment is within the limitations prescribed for passenger and cargo aircraft, or cargo only; that it is non-radioactive; the nature of the dangerous goods (Methanol, Class 3, UN 1230, Packing Group II, quantity of the goods (no. of ml), and that it is an excepted package); name and title of signatory; place; date; and signature. Some examples of airlines that exclusively use the 49 CFR out of the Anchorage hub are Penn Air, Southcentral, Reeve Aleutian, Northern Air Cargo, United Parcel Service, FS Air, and ERA. Those which exclusively use 49 CFR out of the Fairbanks hub are Larry Slang Services, Warbelo's Air Ventures, Alaska Central Express, 40 Mile Air, Canada Air Services, and Wright Air Service.

The larger airlines, such as Alaska, follow IATA DGR which list dangerous goods in section 4.2. Methanol is listed as a flammable liquid (Class 3) and has a subsidiary risk as a poison (Class 6.1). It would be packaged under the Packing Group II. It can be carried *on passenger flights* in quantities of *1 liter maximum* net quantities/package using packaging 305 or Y305, and by *cargo aircraft at 60 liters maximum* net quantities/package. The packing instructions Y305 for limited quantities of flammable liquids in packing group II (methanol falls into this category) and all general packing requirements have to be met. However, the packages don't have to meet the more stringent marking and testing requirements of IATA DGR subsection 10.0.4 and 10.3, but they do have to meet construction criteria in subsection 10.2, as well as test criteria in 10.6 which requires both a drop test from 4 feet and a stacking test.

Some airlines, i.e., Alaska Airlines, have special operator variations that are in place which limit methanol shipment due to the subsidiary risk label. Alaska Airlines recently put out a dangerous goods bulletin to their air cargo managers, effective immediately, which states that Alaska Airlines will accept methanol in accordance with the current IATA DGR if it is packed in accordance with packing instruction 305 or Y305. The bulletin contains a special provision, A-104, which states that *the toxic subsidiary risk label should not be used with methanol shipments.*

Appendix IA-2

Site Ecological Checklist

Figure B.1 ECOLOGICAL CHECKLIST #1: GENERAL

1. SITE NAME: _____

   ADEC LC: _____

2. LOCATION: _____
   _____

3. LATITUDE: _____
4. LONGITUDE: _____

5. APPROXIMATE SITE AREA: _____

6 DATES OF SITE VISITS:

_____
_____
_____
_____

☐ ATTACH USGS TOPOGRAPHIC MAP
☐ ATTACH AVAILABLE PHOTOS

7. LAND USE ON THE SITE

_____% RESIDENTIAL
_____% RURAL
_____% URBAN
_____% INDUSTRIAL/COMMERCIAL
_____% AGRICULTURAL
_____% RECREATIONAL
_____% FOREST/WOODED
_____% WETLANDS
_____% UNDISTURBED
_____% OTHER

8. LAND USE SURROUNDING THE SITE

_____% RESIDENTIAL
_____% RURAL
_____% URBAN
_____% INDUSTRIAL/COMMERCIAL
_____% AGRICULTURAL
_____% RECREATIONAL
_____% FOREST/WOODED
_____% WETLANDS
_____% UNDISTURBED

_____% OTHER

9. DESCRIBE MOVEMENT OF SOIL ON THE SITE

- ☐ AGRICULTURAL USE
- ☐ NATURAL EVENTS
- ☐ EROSION
- ☐ HEAVY EQUIPMENT
- ☐ MINING
- ☐ OTHER

10. IDENTIFY SENSITIVE ENVIRONMENTS
(PLEASE SEE SECTION 4.2.4.2 State Sensitive Environments AND 4.2.4.3 Federal Sensitive Environments)

_____
_____
_____
_____
_____
_____
_____

11. POTENTIAL ROUTES OF OFF-SITE MIGRATION

- ☐ SWALES
- ☐ RUNOFF
- ☐ DEPRESSIONS
- ☐ WINDBLOWN PARTICULATES
- ☐ DRAINAGE DITCHES
- ☐ VEHICULAR TRAFFIC
- ☐ OTHER_____

12. DEPTH OF WATER TABLE _____

13. IDENTIFY WATER BODIES ON THE VICINITY OF THE SITE

14. EVIDENCE OF FLOODING
- ☐ YES
- ☐ NO

Figure B.2 ECOLOGICAL CHECKLIST #2: TERRESTRIAL

A. WOODED AREAS

1. ARE THERE WOODED AREAS AT THE SITE
   - ☐ YES
   - ☐ NO

2. PERCENTAGE OF SITE WOODED
   _____%
   _____acres

3. DOMINANT TYPE OF VEGETATION

   - ☐ DECIDUOUS
   - ☐ MIXED
   - ☐ OTHER _____

4. DOMINANT TREE SIZE BY DIAM ETER
   - ☐ 0-6 INCH
   - ☐ 6-12 INCH
   - ☐ > 12 INCH

B. SHRUB/SCRUB

1. IS THERE SHRUB/SCRUB VEGETATION PRESENT AT THE SITE
   - ☐ YES
   - ☐ NO

2. PERCENTAGE OF SITE COVERED WITH SHRUB/SCRUB
   _____%
   _____acres

3. DOMINANT TYPE OF VEGETATION

   - ☐
   - ☐

4. DOMINANT HEIGHT OF SHRUB/SCRUB VEGETATION
   - ☐ 0-2 FEET
   - ☐ 2-5 FEET
   - ☐ > 5 FEET

5. SHRUB/SCRUB DENSITY
   - ☐ DENSE
   - ☐ PATCHY
   - ☐ SPARSE

C. OPEN AREAS

1. ARE THERE OPEN (BARE, BARREN) FIELD AREAS PRESENT AT THE SITE
   - ☐ YES
   - ☐ NO

2. PERCENTAGE OF SITE OPEN FIELD
   _____%
   _____acres

3. DOMINANT TYPE OF PLANT

   ☐
   ☐
   ☐

4. DOMINANT HEIGHT OF DOMINANT PLANT
   - ☐ 0-2 FEET
   - ☐ 2-5 FEET
   - ☐ > 5 FEET

5. SHRUB/SCRUB DENSITY
   - ☐ DENSE
   - ☐ PATCHY
   - ☐ SPARSE

Figure B.3 ECOLOGICAL CHECKLIST #3: AQUATIC-FLOWING SYSTEMS

1. TYPE OF FLOWING WATER SYSTEMS PRESENT AT SITE
   - ☐ RIVER
     - __ PERENNIAL
     - __ INTERMITTENT
   - ☐ STREAM
     - __ PERENNIAL
     - __ INTERMITTENT
   - ☐ CREEK
   - ☐ BROOK
   - ☐ DRY WASH
   - ☐ MAN-MADE (DITCH, ETC.)
   - ☐ ARROYO
   - ☐ INTERMITTENT STREAM
   - ☐ CHANNELING SPARSE
   - ☐ LAKE OR POND
   - ☐ TIDAL STREAM
     - __ BAY
     - __ESTUARY
   - ☐ OTHER

2. GENERAL COMPOSITION OF SUBSTRATE
   - ☐ BEDROCK
   - ☐ SAND
   - ☐ SILT
   - ☐ BOULDER
   - ☐ COBBLE
   - ☐ GRAVEL
   - ☐ MARL
   - ☐ CLAY
   - ☐ MUCK
   - ☐ DEBRIS
   - ☐ MUCK
   - ☐ CONCRETE
   - ☐ OTHER

3. CONDITION OF THE BANK - HEIGHT, SLOPE, ETC.

4. FLOW INTERMITTENT
   - ☐ YES

☐ NO

5. DISCHARGE FROM SITE TO WATER BODY
   ☐ YES
   ☐ NO

6. DISCHARGE FROM WATER BODY
   ☐ YES
   ☐ NO

7. TYPE OF AQUATIC VEGETATION PRESENT
   ☐ EMERGENT
   ☐ SUBMERGENT
   ☐ FLOATING
   ☐ NONE

8. OTHER ORGANISMS PRESENT
   ☐ BENTHIC MACRO INVERTEBRATES
   ☐ FISH
   ☐ BIRDS
   ☐ MAMMALS
   ☐ OTHER
   ☐ NONE

Figure B.4 ECOLOGICAL CHECKLIST #4: AQUATIC NON-FLOWING SYSTEMS

1. TYPE OF OPEN WATER NON-FLOWING SYSTEMS PRESENT AT SITE
   FLOWING WATER SYSTEMS PRESENT AT SITE
   - ☐ NATURAL
   - ☐ MAN MADE

2. KNOWN USES OF WATER BODY
   - ☐ RECREATIONAL
   - ☐ NAVIGATIONAL
   - ☐ SUBSISTENCE
   - ☐ OTHER

3. APPROXIMATE SIZE OF WATER BODY
   _____ACRES

4. TYPE OF AQUATIC VEGETATION PRESENT
   - ☐ EMERGENT
   - ☐ SUBMERGENT
   - ☐ FLOATING

5. DEPTH OF WATER
   _____FEET

6. GENERAL COMPOSITION OF SUBSTRATE
   - ☐ BEDROCK
   - ☐ SAND
   - ☐ SILT
   - ☐ BOULDER
   - ☐ COBBLE
   - ☐ GRAVEL
   - ☐ MARL
   - ☐ CLAY
   - ☐ MUCK
   - ☐ DEBRIS
   - ☐ MUCK
   - ☐ CONCRETE
   - ☐ OTHER

7. SOURCE OF WATER IN THE WATER BODY
   - ☐ RIVER/STREAM/CREEK
   - ☐ GROUNDWATER
   - ☐ SURFACE RUNOFF
   - ☐ INDUSTRIAL DISCHARGE
   - ☐ OTHER

8. DISCHARGE FROM SITE TO WATER BODY
   - ☐ YES
   - ☐ NO

9. DISCHARGE FROM WATER BODY

☐	RIVER STREAM	☐ ON-SITE	☐ OFF-SITE
☐	GROUNDWATER	☐ ON-SITE	☐ OFF-SITE
☐	WETLAND	☐ ON-SITE	☐ OFF-SITE
☐	IMPOUNDMENT	☐ ON-SITE	☐ OFF-SITE

Figure B.5 ECOLOGICAL CHECKLIST #5: WETLANDS

1. ANY DESIGNATED OR KNOWN W ETLANDS AT THE SITE

   ☐ YES
   ☐ NO

2. ARE WETLAND HABITATS EXPECTED

   ☐ YES
   ☐ NO

3. TYPES OF VEGETATION PRESENT

   ☐ EMERGENT
   ☐ SUBMERGENT
   ☐ SCRUB/SHRUB
   ☐ WOODED
   ☐ OTHER

4. DISCHARGE FROM SITE TO WETLANDS

   ☐ YES
   ☐ NO

5. DISCHARGE FROM WETLAND

   ☐ RIVER STREAM ☐ ON-SITE ☐ OFF-SITE
   ☐ GROUNDWATER ☐ ON-SITE ☐ OFF-SITE
   ☐ LAKE/POND ☐ ON-SITE ☐ OFF-SITE
   ☐ MARINE ☐ ON-SITE ☐ OFF-SITE

Attachment II

SITE SPECIFIC HEALTH AND SAFETY PLAN

SITE INVESTIGATION 1998

Atka Island,
Alaska

<<DRAFT>>

Prepared by the

Technical Engineering Section
Environmental Engineering Branch
Alaska District Army Corps of Engineers

May 1998

Table of Contents

ATTACHMENT II:
SITE SPECIFIC HEALTH AND SAFETY PLAN

ATTACHMENT II: SITE SPECIFIC HEALTH AND SAFETY PLAN

1. INTRODUCTION

This Site Specific Health and Safety Plan (SSHSP) has been prepared to outline safety requirements, practices and procedures that will be followed during the site investigations at the Atka Island AWS site .

1.1 Safety Plan Requirements

This Site-Specific Health and Safety Plan will be implemented to comply with the provisions of 29 CFR 1910.120. A copy of this site specific safety plan must be kept on site during the contamination investigation described in the Field Sampling Plan of this project.

All work must be done in accordance with applicable regulations: OSHA (29 CFR), EM 385-1-1, State, and EPA. This safety plan meets the applicable requirements.

This site specific safety and health plan must be read and signed by each employee physically present on the site. Each employee must supply the personal data for the Field Personnel Roster (see Appendix A). If an employee cannot supply the necessary data, the Sampling Leader/Site Safety Officer will document that, or other deficiencies, such as for training or medical exams.

1.2 Site Location.

Atka Island is located within the Andreanof Islands group near the center of the Aleutian Islands chain, and is one of the larger of the Aleutian Islands. The City of Atka is located at the eastern end of the island, on Nazan Harbor. The village is approximately 90 miles east of the former naval station at Adak Island, and 1,250 miles west of Anchorage.

1.3 Entry Objectives

The site investigations will involve low-risk, minimal-impact activities such as observation, photography, site measurements, and surface-soil sampling.

No confined-space-entry, drum-handling, or other uniquely hazardous activities will be performed.

2. Personnel Requirements

2.1 Personnel Training and Documentation

All personnel working at the project site must be current in the following; any deficiencies must be documented:

2.1.1. Hazardous Waste Operations and Emergency Response (HAZWOPER) Training: All persons participating in field work will have completed all training required by OSHA, 29 CFR 1910.120, 29 CFR 1919.1200, and related regulations such as 29 CFR 1910.34. All persons shall be trained in the specific responsibilities of their job assignments.

The Site Safety Officer shall have completed the 40 hour training required under 29 CFR 1910.120 (e)(3)(i), and the additional 8 hours training required under paragraph (e)(4) of that regulation. In addition, the Site Safety Officer will have at least 5 days experience on site with similar hazards or certified training in safety and health evaluation.

2.1.2. Medical Examinations: All persons participating in field work will have a current medical exam on file for general hazardous, toxic waste work, per 29 CFR 1910.120, and Corps of Engineers medical program requirements. Medical exams will include medical qualification for respirator use.

2.2 First Aid and CPR Training

If the project site is more than five minutes from a medical facility, at least one person at the project site should have current first aid and CPR training.

2.3 On-Site Organization

The following safety functions will be assigned to the participating field personnel as needed, and recorded in the field logbook. One person may carry out more than one safety function.

-Sampling Team Leader
-Site Safety Officer
-Security Officer:
-Record Keeper

2.4. Statement of Understanding

All site personnel, including visitors, must read this plan and become familiar with its provisions. An individuals signature on the field roster (Appendix A) certifies that he or she has read, understands, and will comply with the guidelines set forth in the Site Specific Health and Safety Plan.

3. Safety Meetings

An initial safety meeting will be held immediately preceding the start of on-site work and as needed thereafter. The pre-start meeting will cover the location of safety items, telephone, potable water, escape routes, required PPE, MSDS data, buddy system requirements, available medical facilities, and any items peculiar to the site. Additional safety meetings will be held as needed. Close calls or incidents that threaten life, property, or the environment will be discussed immediately, or before the start of the next work session. Any major change in working conditions will be the subject for a safety discussion. Safety and emergency response equipment use and location will be addressed. Problems such as extreme weather hazards will be addressed.

A flight safety briefing will be requested from the helicopter pilot before flight.

4. Hazards and Safety Procedures

4.1 Site Description

Expected work date: Mid-June
Expected weather conditions: High winds, fog, rain, cold temperatures likely.
Site characteristic: Abandoned military site.
Surrounding area: Rugged, broken terrain, sheer cliffs, heavy surf.
Expected contamination: Weathered fuel, possible PCBs and/or lead.

4.2 Hazards

4.2.1 Physical Hazards: The expected physical hazards are those associated with entry into an abandoned military facility.

a. Exposure to potentially hazardous (e.g., sharp, unstable) debris .
b. Slips, trips, and falls, due to rugged terrain.
c. Potential weather extremes.
d. Potential OEW.

4.2.2 Chemical Exposure Hazards: The known or expected chemical contamination at the site is primarily heavy fuels, with the possibility of PCBs or lead. Because of the age and weathering of the contamination, and the non-invasive nature of the investigation, the primary potential route of exposure is expected to be dermal contact.

Material Safety Data Sheets (MSDS) for the predictable bulk chemical hazards are available in Appendix B.

4.3 Physical Hazard Control : The expected physical hazards will be minimized through:

a. Ensuring personnel awareness of potential physical hazards, including weather.

a. Providing employee safety training and work process controls.
b. Providing and requiring the use of protective equipment, such as hard hats, safety boots, gloves, hearing protection, and safety glasses, as appropriate.

4.3.1 Survival Equipment: This site investigation will entail travel in a chartered light aircraft to a remote location. The possibility always exists for a forced landing or extended grounding at the site due to weather conditions or mechanical failure, and reasonable provisions should be made for such contingencies

A certain amount of emergency equipment can be expected to be provided with the chartered aircraft, such as an emergency position-indicating radio beacon, signaling devices, radio communications, floatation devices, and first aid supplies. Personnel visiting the site should bring food rations for several days, water purification tablets, adequate clothing, small tools, and perhaps shelter. Because of weight restrictions, the team members should coordinate the items each will bring to avoid unnecessary redundancies of items.

4.3.2 Ordnance and Explosive Waste: The project site was not a scene of combat, but was occupied by military forces, and the presence of ordnance and explosive waste (OEW) is possible. The most likely form of OEW to be encountered at this site would be small arms ammunition. (WP ref. 4h, 4i). Personnel visiting the site will be familiarized with the appearance of potential ordnance items. If ordnance items are discovered, they will not be disturbed, but will be photographed and flagged if possible.

4.4 Chemical Hazard Control

4.4.1 Chemical Hazard Monitoring: There will be no specific health monitoring for chemical hazards at this site. If any visual or olfactory evidence of significant potential chemical exposure is discovered, field personnel will be directed away from the affected area.

4.4.2 Personal Protective Equipment: Based on the evaluation of potential hazards, LEVEL D personal protective equipment (PPE) has been designated for the initial site work:

a. Hard hats (when overhead hazards are present)
b. Safety boots
c. Chemical-resistant disposable gloves for sample handlers
d. Protective clothing (at workers discretion)
e. Hearing protection as necessary
f. Safety glasses as necessary

4.4.3 Decontamination Procedures: If work is performed in Level D PPE, no on-site personal decontamination is required. Any disposable protective overgarments will be bagged and carried from the site for proper disposal, and personnel will be encouraged to wash as soon as is practical.

4.4.4 On-Site Control: The nature of the site and the planned site activities preclude the site control measures associated with hazardous materials facilities. The site is not known to contain hazardous waste, and no access controls can be maintained after the site visit has concluded.

5. Emergency Procedures

Limited medical care or medical transportation is available at the project site. In case of on-site injuries, it may be necessary for the sampling team and helicopter pilot to provide immediate first aid care and transportation to medical facilities. In the case of severe injuries or accidents requiring patient extrication, it may be preferable to request aid from the U.S. Coast Guard via radio; however, such support from the Coast Guard may take hours to arrive.

The helicopter pilot will be requested to instruct team members in the correct emergency use of the radio.

5.1 NEAREST MEDICAL TREATMENT LOCATIONS

Atka Health Clinic: (907) 839-2232

The location of the clinic will be ascertained immediately upon arrival at Atka Island.

Adak Clinic: (907) 592-4189

5.2 EMERGENCY NUMBERS

Atka Health Clinic: (907) 839-2232

Atka First Responders: (907) 839-9902

Adak Off-Island Emergency: (907) 592-8141

U.S. Coast Guard - Emergency 1-800-478-5555

5.3 First Aid Equipment

The following first aid equipment will be available on site:

a. First Aid Kit: in vehicle/helicopter
b. Emergency Eye Wash: portable eyewash, or any potable or deionized water

5.4 Communications Procedures

Personnel in the Project Zone should remain in communication or within sight of the Project Team Leader. Any failure of communication requires an evaluation of whether personnel should leave the Exclusion Zone.

A shout or other verbal warning is the emergency signal to indicate that all personnel should leave the work site or Exclusion Zone.

The following standard hand signals will be used in case of failure of communications.

Hand gripping throat ----------Out of air, cannot breathe
Grip partner's wrist or
both hands around waist ----------Leave area immediately
Hands on top of head ----------Need assistance
Thumbs up ----------OK, I am all right, I Understand
Thumbs down ----------No, Negative

5.5 Emergency Response

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

5.5.1 Personnel Injury at the Work Site: Upon notification of an injury at the work site, the designated emergency signal (verbal warning) shall be sounded. The Site Safety Officer and other competent personnel should evaluate the nature of the injury. The on-site EMT or other competent person shall initiate the appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). Activities at the work site will cease until the cause of the injury or symptoms is determined, and the hazard is eliminated or minimized.

5.5.2 Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal (a shout of "Fire!") shall be sounded and all site personnel will immediately leave the work site and assemble at a safe distance. The fire department shall be alerted (if available) and all personnel moved to a safe distance from the involved area.

5.5.3 Escape Routes: any unobstructed route.

In all situations, when an on-site emergency results in evacuation of the work area, personnel shall not re-enter until:

a. The conditions resulting in the emergency have been corrected.

b. The hazards have been reassessed.
c. The Site Safety Plan has been reviewed.
d. Site personnel have been briefed on any changes in the Site Safety Plan.

APPENDIX II-A

Field Personnel Roster

FIELD PERSONNEL ROSTER
Atka Island FUDS

Name:______________________________Position:___________________________HAZWOPER Training, Date and Location:______________First Aid and CPR Training, Date and Location:__________Medical Examination, Date and Location:_____________Respirator Make, Model and Size:_______________Date of Respirator Fit-Test:
Signature and Date:

Name:______________________________Position:___________________________HAZWOPER Training, Date and Location:______________First Aid and CPR Training, Date and Location:__________Medical Examination, Date and Location:_____________Respirator Make, Model and Size:_______________Date of Respirator Fit-Test:
Signature and Date:

Name:______________________________Position:___________________________HAZWOPER Training, Date and Location:______________First Aid and CPR Training, Date and Location:__________Medical Examination, Date and Location:_____________Respirator Make, Model and Size:_______________Date of Respirator Fit-Test:
Signature and Date:

Name:______________________________Position:___________________________HAZWOPER Training, Date and Location:______________First Aid and CPR Training, Date and Location:__________Medical Examination, Date and Location:_____________Respirator Make, Model and Size:_______________Date of Respirator Fit-Test:
Signature and Date:

APPENDIX II-B

Material Safety Data Sheets

METHYL ALCOHOL

MAL

Common Synonyms
Methanol
Wood alcohol
Wood spirit
Pyroxylic spirit
Colonial spirit
Columbian spirit

Watery liquid Colorless Alcohol odor

Floats and mixes with water. Flammable, irritating vapor is produced.

Stop discharge if possible. Keep people away.
Shut off ignition sources and call fire department.
Stay upwind and use water spray to "knock down" vapor.
Avoid contact with liquid and vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

FLAMMABLE.
Vapor may explode if ignited in an enclosed area.
Flashback along vapor trail may occur.
Extinguish with dry chemical, alcohol foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause dizziness, headache, difficult breathing, or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
POISONOUS IF SWALLOWED.
Irritating to skin and eyes.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-high flammability
Restrict access
Evacuate area
Disperse and flush

2. LABEL

2.1 **Category:** Flammable liquid
2.2 **Class:** 3

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Alcohol, glycol
3.2 **Formula:** CH_3OH
3.3 **IMO/UN Designation:** 3.2/1230
3.4 **DOT ID No.:** 1230
3.5 **CAS Registry No.:** 67-56-1

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Liquid
4.2 **Color:** Colorless
4.3 **Odor:** Faint alcohol; like ethyl alcohol; faintly sweet; characteristic pungent

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Supplied Air Respirator (Do not use organic canister mask); goggles, rubber gloves; protective clothing
5.2 **Symptoms Following Exposure:** Exposure to excessive vapor causes eye irritation, head- ache, fatigue and drowsiness. High concentrations can produce central nervous system depression and optic nerve damage. 50,000 ppm will probably cause death in 1 to 2 hrs. Can be absorbed through skin. Swallowing may cause death or eye damage.
5.3 **Treatment of Exposure:** Remove victim from exposure and apply artifical respiration if breathing has ceased. INGESTION: induce vomiting, then give 2 teaspoons of baking soda in glass of water, call a physician. SKIN OR EYES: flush with water for 15 min.
5.4 **Threshold Limit Value:** 200 ppm
5.5 **Short Term Inhalation Limits:** 250 mg/m³ for 60 min.
5.6 **Toxicity by Ingestion:** Grade 1; LD_{50} = 5 to 15 g/kg (rat)
5.7 **Late Toxicity:** None
5.8 **Vapor (Gas) Irritant Characteristics:** Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 **Liquid or Solid Irritant Characteristics:** Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 **Odor Threshold:** 100 ppm
5.11 **IDLH Value:** 25,000 ppm

6. FIRE HAZARDS

6.1 **Flash Point:** 54°F C.C.; 61°F O.C.
6.2 **Flammable Limits in Air:** 6.0%-36.5%
6.3 **Fire Extinguishing Agents:** Alcohol foam, dry chemical, or carbon dioxide
6.4 **Fire Extinguishing Agents Not to be Used:** Water may be ineffective
6.5 **Special Hazards of Combustion Products:** Not pertinent
6.6 **Behavior in Fire:** Containers may explode.
6.7 **Ignition Temperature:** 867°F
6.8 **Electrical Hazard:** Class I, Group D
6.9 **Burning Rate:** 1.7 mm/min.
6.10 **Adiabatic Flame Temperature:** Data not available
6.11 **Stoichiometric Air to Fuel Ratio:** Data not available
6.12 **Flame Temperature:** Data not available

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** No reaction
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** 20

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** 250 ppm/11 hr/goldfish/died/fresh water
8.2 **Waterfowl Toxicity:** Data not available
8.3 **Biological Oxygen Demand (BOD):** 0.6 to 1.12 lb/lb in 5 days
8.4 **Food Chain Concentration Potential:** None

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** CP, Crude, ACS: all 99.9%
9.2 **Storage Temperature:** Ambient
9.3 **Inert Atmosphere:** No requirement
9.4 **Venting:** Open (flame arrester) or pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-P-Q-R-S

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** Flammable liquid
11.2 **NAS Hazard Rating for Bulk Water Transportation:**

Category	Rating
Fire	3
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Polution	
Human Toxicity	1
Aquatic Toxicity	1
Aesthetic Effect	1
Reactivity	
Other Chemicals	2
Water	0
Self Reaction	0

11.3 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue)	1
Flammability (Red)	3
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Liquid
12.2 **Molecular Weight:** 32.04
12.3 **Boiling Point at 1 atm:** 148.1°F = 64.5°C = 337.7°K
12.4 **Freezing Point:** −144.0°F = −97.8°C = 175.4°K
12.5 **Critical Temperature:** 464°F = 240°C = 513°K
12.6 **Critical Pressure:** 1142.0 psia = 77.7 atm = 7.87 MN/m²
12.7 **Specific Gravity:** 0.792 at 20°C (liquid)
12.8 **Liquid Surface Tension:** Not pertinent
12.9 **Liquid Water Interfacial Tension:** Not pertinent
12.10 **Vapor (Gas) Specific Gravity:** 1.1
12.11 **Ratio of Specific Heats of Vapor (Gas):** 1.254
12.12 **Latent Heat of Vaporization:** 473.0 Btu/lb = 262.8 cal/g = 11.00 X 10⁵ J/kg
12.13 **Heat of Combustion:** −8419 Btu/lb = −4677 cal/g = −195.8 X 10⁵ J/kg
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** (est.) −9 Btu/lb = −5 cal/g = −0.2 X 10⁵ J/kg
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** 23.70 cal/g
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** 4.5 psia

NOTES

POLYCHLORINATED BIPHENYL

PCB

Common Synonyms	Oily liquid to solid powder	Light yellow liquid, or white powder	Weak odor
PCB Chlorinated biphenyl Arochlor Halogenated waxes Polychloropolyphenyls	Sinks in water.		

Stop discharge if possible. Keep people away.
Avoid contact with liquid and solid.
Call fire department.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with water, foam, dry chemical, or carbon dioxide.

Exposure

CALL FOR MEDICAL AID.

LIQUID OR SOLID
Irritating to skin and eyes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-water contaminant
Should be removed
Chemical and physical treatment

2. LABEL

2.1 **Category:** None
2.2 **Class:** Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Not listed
3.2 **Formula:** $(C_{12}H_{10-x})Cl_x$
3.3 **IMO/UN Designation:** Not listed
3.4 **DOT ID No.:** 2315
3.5 **CAS Registry No.:** 1336-36-3

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Liquid or solid
4.2 **Color:** Pale yellow (liquid); colorless (solid)
4.3 **Odor:** Practically odorless

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Gloves and protective garments.
5.2 **Symptoms Following Exposure:** Acne from skin contact.
5.3 **Treatment of Exposure:** SKIN: wash with soap and water.
5.4 **Threshold Limit Value:** 0.5 to 1.0 mg/m³
5.5 **Short Term Inhalation Limits:** Data not available
5.6 **Toxicity by Ingestion:** Grade 2; oral rat LD_{50} = 3980 mg/kg
5.7 **Late Toxicity:** Causes chromosomal abnormalities in rats, birth defects in birds
5.8 **Vapor (Gas) Irritant Characteristics:** Vapors cause severe irritation of eyes and throat and cause eye and lung injury. They cannot be tolerated even at low concentrations.
5.9 **Liquid or Solid Irritant Characteristics:** Contact with skin may cause irritation.
5.10 **Odor Threshold:** Data not available
5.11 **IDLH Value:** 5 to 10 mg/m³

6. FIRE HAZARDS

6.1 **Flash Point:** >286°F
6.2 **Flammable Limits in Air:** Data not available
6.3 **Fire Extinguishing Agents:** Water, foam, dry chemical, or carbon dioxide
6.4 **Fire Extinguishing Agents Not to be Used:** Not pertinent
6.5 **Special Hazards of Combustion Products:** Irritating gases are generated in fires.
6.6 **Behavior in Fire:** Not pertinent
6.7 **Ignition Temperature:** Data not available
6.8 **Electrical Hazard:** Not pertinent
6.9 **Burning Rate:** Data not available
6.10 **Adiabatic Flame Temperature:** Data not available
6.11 **Stoichiometric Air to Fuel Ratio:** Data not available
6.12 **Flame Temperature:** Data not available

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** No reaction
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** Data not available

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** 0.278 ppm/96 hr/bluegill/TL_m/fresh water
0.005 ppm/336-1080 hr/pinfish/TL_m/salt water
8.2 **Waterfowl Toxicity:** LD_{50} 2000 ppm (mallard duck)
8.3 **Biological Oxygen Demand (BOD):** Very low
8.4 **Food Chain Concentration Potential:** High

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** 11 grades (some liquid, some solids) which differ primarily in their chlorine content (20%-68% by weight)
9.2 **Storage Temperature:** Ambient
9.3 **Inert Atmosphere:** No requirement
9.4 **Venting:** Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

II

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** ORM-E
11.2 **NAS Hazard Rating for Bulk Water Transportation:** Not listed
11.3 **NFPA Hazard Classification:** Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Solid
12.2 **Molecular Weight:** Not pertinent
12.3 **Boiling Point at 1 atm:** Very high
12.4 **Freezing Point:** Not pertinent
12.5 **Critical Temperature:** Not pertinent
12.6 **Critical Pressure:** Not pertinent
12.7 **Specific Gravity:** 1.3—1.8 at 20°C (liquid)
12.8 **Liquid Surface Tension:** Not pertinent
12.9 **Liquid Water Interfacial Tension:** Not pertinent
12.10 **Vapor (Gas) Specific Gravity:** Not pertinent
12.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
12.12 **Latent Heat of Vaporization:** Not pertinent
12.13 **Heat of Combustion:** Not pertinent
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** Not pertinent
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** Data not available
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** Data not available

NOTES

OILS: DIESEL

ODS

Common Synonyms	Oily liquid	Yellow-brown	Lube or fuel oil odor
Fuel oil 1-D Fuel oil 2-D	Floats on water.		

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with dry chemical, foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Not applicable
3.3 IMO/UN Designation: 3.1/1270
3.4 DOT ID No.: 1270
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Light brown
4.3 Odor: Like fuel oil

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Goggles or face shield.
5.2 Symptoms Following Exposure: If liquid is ingested, an increased frequency of bowel movements will occur.
5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting. SKIN: wipe off, wash with soap and water. EYES: wash with copious amounts of water for at least 15 min.
5.4 Threshold Limit Value: No single TLV applicable.
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: (1-D) 100°F C.C.; (2-D) 125°F C.C.
6.2 Flammable Limits in Air: 1.3-6.0 vol.%
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: (1-D) 350-625°F (2-D) 490-545°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: 204 mg/l/24 hr/juvenile American shad/TL_m/salt water
8.2 Waterfowl Toxicity: >20 ml/kg /LD_{50}/mallards
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Diesel Fuel 1-D (ASTM); Diesel Fuel 2-D (ASTM)
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 550—640°F = 288—338°C = 561—612°K
12.4 Freezing Point: 0 to —30°F = —18 to —34°C = 255 to 239°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.841 at 15°C (liquid)
12.8 Liquid Surface Tension: (est.) 25 dynes/cm = 0.025 N/m at 20°C
12.9 Liquid Water Interfacial Tension: (est.) 50 dynes/cm = 0.05 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: —18,400 Btu/lb = —10,200 cal/g = 429 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Varies

NOTES

OILS, FUEL: 6

OSX

Common Synonyms	Thick liquid	Black	Tar odor
Bunker C oil Residual fuel oil No. 6	Usually floats on water.		

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with dry chemical, foam or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon mixture
3.2 Formula: Not listed
3.3 IMO/UN Designation: 3.3/1223
3.4 DOT ID No.: 1223
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Dark
4.3 Odor: Tarry; like kerosene

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Protective gloves; goggles or face shield.
5.2 Symptoms Following Exposure: INGESTION: gastrointestinal irritation. ASPIRATION: pulmonary irritation is normally minimal but may become more severe several hours after exposure.
5.3 Treatment of Exposure: INGESTION: do NOT lavage or induce vomiting. ASPIRATION: treatment probably not required; delayed development of pulmonary irritation can be detected by serial chest x-rays; consider prophylactic antibiotic regime if condition warrants. EYES: wash with copious quantity of water. SKIN: wipe off and wash with soap and water.
5.4 Threshold Limit Value: Data not available
5.5 Short Term Inhalation Limits: Not pertinent
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: None
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: >150°F C.C.
6.2 Flammable Limits in Air: 1%-5%
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 765°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity:
2400 ppm/48 hr/juvenile American shad/TL_m/fresh water
2417 mg/l/48 hr/juvenile American shad/TL_m/salt water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: Data not available

9. SHIPPING INFORMATION

9.1 Grades of Purity: Commercial
9.2 Storage Temperature: Elevated
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 415—>>1093°F = 212—>>588°C = 485—>>861°K
12.4 Freezing Point: 25 to 55°F = —4 to +13°C = 269 to 286°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.95 (approx.) at 20°C (liquid)
12.8 Liquid Surface Tension: (est.) 25 dynes/cm = 0.025 N/m at 20°C
12.9 Liquid Water Interfacial Tension: (est.) 50 dynes/cm = 0.05 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: —18,000 Btu/lb = —10,000 cal/g = —418.68 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

DATA VALIDATION REPORT

Atka Island

Soil Sampling

Prepared for

Army Corps of Engineers - Alaska Division

Project #

98-056

1.0 Introduction

This report summarizes the technical review of analytical results generated in support of the soil sampling event at Atka Island. The criteria applied for this review are consistent with analytical method protocols, in conjunction with the laboratory-established control limits. In cases where specific guidance was not available from either of these sources, the data have been evaluated using professional judgement consistent with industry standards. The review included evaluation of sample collection, holding time and summary information for blanks (to assess contamination), sample duplicates (to assess precision), laboratory control samples (to assess accuracy) and matrix spike and surrogate recoveries (to assess matrix effect). Instrument calibration review and raw data verification were not performed.

The report is arranged by method; within each method section is a sub-section addressing each data quality indicator. In situations where all applicable criteria were met, it will be stated. If criteria were not met , the non-compliance, qualifier and associated samples are listed. Appendices A and B list qualifier definitions and acronyms, respectively. Appendix C, the data summary table, displays all sample results, as well as qualifiers and descriptors that may apply. Appendix D includes a summary of all qualified data, by analytical method.

2.0 Sample Collection, Preservation and Handling

Samples were collected on June 21, 1998. Samples were received by Sound Analytical Services, Inc. four days after collection. The following samples were collected and analyzed by all applicable methods:

Laboratory: SAS

Project / Lab ID	Field ID	Field QC ID	Matrix	Date Collected	Temp °C	Q [1]
73811						
-01	98ATKA01SL	98ATKA02SL	S	6/21/98	7	J/UJ
-02	98ATKA02SL		S	6/21/98	7	J/UJ
-03	98ATKA03SL		S	6/21/98	7	J/UJ
-04	98ATKA04SL		S	6/21/98	7	J/UJ
-05	98ATKA05SL		S	6/21/98	7	J/UJ
-06	98ATKA06SL		S	6/21/98	7	J/UJ
-07	98ATKA07SL		S	6/21/98	7	J/UJ
-08	98ATKA08SL		S	6/21/98	7	J/UJ
-09	98ATKA09SL		S	6/21/98	7	J/UJ
-10	98ATKA10SL		S	6/21/98	7	J/UJ
-11	98ATKA11SL		S	6/21/98	7	J/UJ
-12	98ATKA12SL		S	6/21/98	7	J/UJ
-13	98ATKA13SL		S	6/21/98	7	J/UJ
-14	98ATKA14SL		S	6/21/98	7	J/UJ
-15	98ATKA15SL		S	6/21/98	7	J/UJ
-16	98ATKA16SL		S	6/21/98	7	J/UJ
-16	98ATKA16SL	98ATKA23SL	S	6/21/98	7	J/UJ
-17	98ATKA17SL		S	6/21/98	7	J/UJ
-18	98ATKA18SL		S	6/21/98	7	J/UJ
-18	98ATKA18SL	98ATKA21SL	S	6/21/98	7	J/UJ
-19	98ATKA19SL		S	6/21/98	7	J/UJ
-20	98ATKA20SL		S	6/21/98	7	J/UJ
-21	98ATKA21SL		S	6/21/98	7	J/UJ
-23	98ATKA23SL		S	6/21/98	7	J/UJ

[1] According to the National Functional Guidelines for Data Review, if the sample temperature exceeds 6° C, for selected analytes, flag all associated positive and non-detect results as estimated (J/UJ)

Samples from this site were received at the laboratory along with samples collected at two other sites (Cape Yakak and Ogliuga Island). A total of three sample coolers were received by the laboratory; one at 7°C, two at room temperature. The association of specific samples and cooler temperatures was not clearly identified on the sample receipt documentation, therefore the lowest temperature recorded, which did exceed the temperature requirement, was used. As a result of these sample handling deficiencies, results reported for all analytical methods except metals were qualified as estimated.

Field rinsate blanks were not collected for this sampling event. High levels of diesel range organics and residual range organics were found in many of the samples; low levels were also found in several samples. The potential for cross-contamination as a result of the sampling process cannot be evaluated.

3.0 Gasoline Range Organics (AK101)

3.1 Holding Time

All samples were analyzed within the required technical holding time.

3.2 Surrogates

All surrogate recoveries were within the required limits.

3.3 Blanks

Method blanks were analyzed at the minimum required frequency. Gasoline range organics were reported as non-detect at the practical quantitation limit.

One trip blank was collected for analysis by this method; however it was not received by the laboratory. Trip blanks collected for sampling events at Ogliuga Island and Cape Yakak, which were transported with these samples as well, were used to evaluate for potential sample transport contamination. The following result was found:

Laboratory: SAS
Date Collected: 6/22/98

Field Blank ID	ANALYTE	Result	PQL	Units
98OGLI22SL Methanol Trip Blank	gasoline range organics	1.3	2.5	mg/kg

Affected samples:			Qualified Result	Bias	RC	
98ATKA01SL	gasoline range organics	2.9	2.9 B	H	k	mg/kg
98ATKA02SL	gasoline range organics	1.1	1.1 B	H	k	mg/kg
98ATKA03SL	gasoline range organics	4.8	4.8 B	H	k	mg/kg
98ATKA06SL	gasoline range organics	0.93	0.93 B	H	k	mg/kg
98ATKA08SL	gasoline range organics	0.63	0.63 B	H	k	mg/kg
98ATKA12SL	gasoline range organics	2.1	2.1 B	H	k	mg/kg
98ATKA13SL	gasoline range organics	0.44	0.44 B	H	k	mg/kg
98ATKA18SL	gasoline range organics	2.4	2.4 B	H	k	mg/kg

No field rinsate blanks were collected.

3.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

3.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries and RPDs were within the required limits.

3.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the quantitation limits suggested by this method for soil samples. All positive results reported that were not attributable to trip blank contamination were above the quantitation limit.

3.7 Overall Assessment

Due to temperature exceedance, all samples were qualified as estimated. Estimated data are useable for limited purposes. Due to trip blank contamination, low levels found in eight samples were qualified as nondetect.

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

4.0 Volatile Aromatic Hydrocarbons (SW8021)

4.1 Holding Time

All samples were analyzed within the required technical holding time except the following:

Laboratory: SAS

Field ID	Matrix	Collected	Prepared	Analyzed	Holding Time (Days) Analysis	RTHT[1] (Days) Analysis	Q	Bias	RC
98ATKA01SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA02SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA03SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA06SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA07SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA08SL	S	6/21/98	7/3/98	7/3/98	12	7*	J/UJ	L	e
98ATKA12SL	S	6/21/98	7/3/98	7/4/98	13	7*	J/UJ	L	e
98ATKA13SL	S	6/21/98	7/3/98	7/4/98	13	7*	J/UJ	L	e
98ATKA18SL	S	6/21/98	7/3/98	7/4/98	13	7*	J/UJ	L	e

[1] Required technical holding time established for the method is 14 days; according to the National Functional Guidelines for Organic Data Review, if samples exceed 6°C holding time may be reduced to 7 days

4.2 Surrogates

All surrogate recoveries were within the required limits.

4.3 Blanks

Method blanks were analyzed at the minimum required frequency. All target compounds were reported as non-detect at the practical quantitation limit.

4.3 Blanks (cont.)

One trip blank was collected for analysis by this method; however it was not received by the laboratory. Trip blanks collected for sampling events at Ogliuga Island and Cape Yakak, which were transported with these samples as well, were used to evaluate for potential sample transport contamination. The following results were found:

Laboratory: SAS
Date Collected: 6/22/98

Field Blank ID	ANALYTE	Result		PQL		Units
98YAKA14SL						
Methanol Trip Blank						
	toluene	0.12		0.04		mg/kg
	m,p-xylene	0.16		0.08		mg/kg
Affected samples:			**Qualified Result**	**Bias**	**RC**	
98ATKA03SL	m,p-xylene	0.08	0.08 B	H	k	mg/kg
98ATKA07SL	m,p-xylene	0.077	0.077 B	H	k	mg/kg

No field rinsate blanks were collected.

4.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

4.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries and RPDs were within the required limits.

4.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. The following positive results reported were below the quantitation limit, and are flagged "J":

Field ID	Matrix	Dil Factor	Analyte	Result	PQL	Units	Q
98ATKA03SL	S	1	o-xylene	0.04	0.051	mg/kg	J
98ATKA03SL	S	1	ethylbenzene	0.03	0.051	mg/kg	J

Results below the quantitation limit are considered qualitatively acceptable but quantitatively unreliable.

4.7 Overall Assessment

Due to holding time exceedance, all samples were qualified as estimated for all compounds. Estimated data are useable for limited purposes. Due to trip blank contamination, two samples were qualified as nondetect for m,p-xylene.

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

5.0 Diesel Range Organics (AK102)

5.1 Holding Time

All samples were prepared and analyzed within the required technical holding time.

5.2 Surrogates

All surrogate recoveries were within the required limits except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits [1]	Q [2]	Bias	RC
98ATKA01SL	S	200	o-terphenyl (surr)	0	50 - 150	none*	NA	NA
98ATKA02SL	S	100	o-terphenyl (surr)	0	50 - 150	none*	NA	NA
98ATKA03SL	S	1	o-terphenyl (surr)	0	50 - 150	J/UR	L	b
98ATKA03SL-D	S	50	o-terphenyl (surr)	0	50 - 150	none*	NA	NA
98ATKA07SL	S	1	o-terphenyl (surr)	2010	50 - 150	J/none	H	b
98ATKA07SL-D	S	50	o-terphenyl (surr)	0	50 - 150	none*	NA	NA
98ATKA15SL	S	10	o-terphenyl (surr)	1520	50 - 150	none*	NA	NA
98ATKA15SL-D	S	100	o-terphenyl (surr)	0	50 - 150	none*	NA	NA

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

* qualifiers do not apply if the sample was diluted by more than five times, and the recovery is < LCL

5.3 Blanks

Method blanks were analyzed at the minimum required frequency. Diesel range organics were reported as non-detect at the practical quantitation limit.

No field rinsate blanks were collected.

5.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory-established limits.

5.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries were within the required limits.

5.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the quantitation limits suggested by this method for soil samples. The following positive results reported were below the quantitation limit, and are flagged "J":

Field ID	Matrix	Dil Factor	Analyte	Result	PQL	Units	Q
98ATKA14SL	S	1	diesel range organics	3.8	4.9	mg/kg	J

Results below the quantitation limit are considered qualitatively acceptable but quantitatively unreliable.

5.7 Overall Assessment

Due to temperature exceedance, results for all samples were qualified as estimated. Due to surrogate recovery problems, results for two samples were qualified as estimated. Estimated data are useable for limited purposes.

Samples 98ATKA03SL, 98ATKA07SL and 98ATKA15SL were reanalyzed at a dilution, due to calibration range exceedance. Results from the diluted(-D) analysis should be used as the final validated result.

Several data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

6.0 Residual Range Organics (AK103)

6.1 Holding Time

All samples were prepared and analyzed within the required technical holding time.

6.2 Surrogates

All surrogate recoveries were within the required limits except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits [1]	Q [2]	Bias	RC
98ATKA01SL	S	200	7,12-dimethylbenz(a)anthracene	0	50 - 150	none*	NA	NA
98ATKA02SL	S	1000	7,12-dimethylbenz(a)anthracene	0	50 - 150	none*	NA	NA
98ATKA04SL	S	1	7,12-dimethylbenz(a)anthracene	20	50 - 150	J/UJ	L	b
98ATKA05SL	S	1	7,12-dimethylbenz(a)anthracene	6	50 - 150	J/UJ	L	b
98ATKA07SL	S	1	7,12-dimethylbenz(a)anthracene	34	50 - 150	J/UJ	L	b
98ATKA07SL-D	S	10	7,12-dimethylbenz(a)anthracene	0	50 - 150	none*	NA	NA
98ATKA08SL	S	1	7,12-dimethylbenz(a)anthracene	16	50 - 150	J/UJ	L	b
98ATKA09SL	S	1	7,12-dimethylbenz(a)anthracene	21	50 - 150	J/UJ	L	b
98ATKA10SL	S	1	7,12-dimethylbenz(a)anthracene	13	50 - 150	J/UJ	L	b
98ATKA13SL	S	1	7,12-dimethylbenz(a)anthracene	33	50 - 150	J/UJ	L	b
98ATKA14SL	S	1	7,12-dimethylbenz(a)anthracene	5	50 - 150	J/UJ	L	b
98ATKA15SL	S	10	7,12-dimethylbenz(a)anthracene	0	50 - 150	none*	NA	NA
98ATKA18SL	S	5	7,12-dimethylbenz(a)anthracene	0	50 - 150	J/UJ	L	b
98ATKA21SL	S	5	7,12-dimethylbenz(a)anthracene	0	50 - 150	J/UJ	L	b

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

* qualifiers do not apply if the sample was diluted by more than five times, and the recovery is < LCL

6.3 Blanks

Method blanks were analyzed at the minimum required frequency. All were reported as non-detect at the practical quantitation limit except the following:

LABORATORY: SAS

MB Batch ID	Analyte	Result	Units
DI1613-RRO			
MATRIX: S			
	residual range organics	3.1	mg/kg

Affected samples:			Qualified Result [1]	Bias	
98ATKA05SL	residual range organics	12	12 B	H	mg/kg
98ATKA10SL	residual range organics	15	15 B	H	mg/kg
98ATKA13SL	residual range organics	14	14 B	H	mg/kg

[1] According to the National Functional Guidelines for Organic Data Review, any compound detected in a blank that was also detected in an associated sample is qualified if the sample result is less than 10x the blank concentration for common laboratory contaminants, or 5x for all other analytes. The associated (PQL) is elevated to the sample result or the CRQL (RDL), whichever is higher. Flagging for this project modified to "B" at the amount found in the sample.

No field rinsate blanks were collected.

6.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

6.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries were within the required limits.

6.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the quantitation limits suggested by this method for soil samples. All results reported were above the quantitation limit.

6.7 Overall Assessment

Due to temperature exceedance, all samples were qualified as estimated. Due to surrogate recovery problems, ten samples were qualified as estimated. Estimated data are useable for limited purposes.

Due to method blank contamination, results for three samples were qualified as nondetect.

6.7 Overall Assessment (cont.)

Samples 98ATKA03SL, 98ATKA06SL, 98ATKA07SL and 98ATKA12SL were reanalyzed at a dilution, due to calibration range exceedance. Results from the diluted (-D) analysis should be used as the final validated result.

Many data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

7.0 Organochlorine Pesticides by GC/ECD (SW8081)

7.1 Holding Time

All samples were prepared and analyzed within the required technical holding time.

7.2 Surrogates

All surrogate recoveries were within the required limits except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits [1]	Q [2]	Bias	RC
98ATKA01SL	S	50						
			TCMX (surr)	0	63 - 149	none*	NA	NA
			decachlorobiphenyl (surr)	0	57 - 143	none*	NA	NA
98ATKA02SL	S	50						
			TCMX (surr)	0	63 - 149	none*	NA	NA
			decachlorobiphenyl (surr)	0	57 - 143	none*	NA	NA

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

* qualifiers do not apply if the sample was diluted by more than five times, and the recovery is < LCL

7.3 Blanks

Method blanks were analyzed at the minimum required frequency. All target compounds were reported as non-detect at the practical quantitation limit.

No field rinsate blanks were collected.

7.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

7.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries and RPDs were within the required limits.

7.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. All samples were reported as nondetect for organochlorine pesticides.

7.7 Overall Assessment

Due to temperature exceedance, results for all samples were qualified as estimated for all compounds. Estimated data are useable for limited purposes.

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

8.0 Polychlorinated Biphenyls (SW8082)

8.1 Holding Time

All samples were prepared and analyzed within the required technical holding time.

8.2 Surrogates

All surrogate recoveries were within the required limits except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits [1]	Q [2]	Bias	RC
98ATKA16SL	S	10	decachlorobiphenyl (surr)	55	57 - 143	none*	NA	NA

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

* qualifiers do not apply if the sample was diluted by more than five times, and the recovery is < LCL

8.3 Blanks

Method blanks were analyzed at the minimum required frequency. All aroclors were reported as non-detect at the practical quantitation limit.

No field rinsate blanks were collected.

8.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

8.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries were within the required limits.

8.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. All positive results reported were above the quantitation limit.

8.7 Overall Assessment

Due to temperature exceedance, all samples were qualified as estimated for all aroclors. Estimated data are useable for limited purposes.

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

9.0 Semivolatile Organics by GC/MS (SW8270)

9.1 Holding Time

All samples were prepared and analyzed within the required technical holding time.

9.2 Surrogates

All surrogate recoveries were within the required limits except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits [1]	Q [2]	Bias	RC
98ATKA01SL	S	500	nitrobenzene-d5 (surr)	0	23 - 120	none*	NA	NA
98ATKA02SL	S	500	nitrobenzene-d5 (surr)	0	23 - 120	none*	NA	NA

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

* qualifiers do not apply if the sample was diluted by more than five times, and the recovery is < LCL

9.3 Blanks

Method blanks were analyzed at the minimum required frequency. All target compounds were reported as non-detect at the practical quantitation limit.

No field rinsate blanks were collected.

9.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory - established limits.

9.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries were within the required limits.

9.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. All positive results reported were above the quantitation limit.

9.7 Overall Assessment

Due to temperature exceedance, all samples were qualified as estimated for all target compounds. Estimated data are useable for limited purposes.

9.7 Overall Assessment (cont.)

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

10.0 Volatile Organics by GC/MS (SW8260)

10.1 Holding Time

All samples were analyzed outside the required technical holding time as follows:

Laboratory: SAS

Field ID	Matrix	Collected	Prepared	Analyzed	Holding Time (Days) Analysis	RTHT[1] (Days) Analysis	Q	Bias	RC
98ATKA01SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e
98ATKA02SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e
98ATKA06SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e
98ATKA07SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e
98ATKA09SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e
98ATKA14SL	S	6/21/98	7/2/98	7/3/98	12	7*	J/UJ	L	e

[1] Required technical holding time established for the method is 14 days; according to the National Functional Guidelines for Organic Data Review, if samples exceed 6°C holding time may be reduced to 7 days

10.2 Surrogates

All surrogate recoveries were within the required limit except the following:

Field ID	Matrix	Dil Factor	Surrogate	%Rec	Recovery Limits[1]	Q[2]	Bias	RC
98ATKA02SL	S	1						
			bromofluorobenzene (surr)	68	74 - 131	J/UJ	L	b
98ATKA07SL	S	1						
			toluene-d8 (surr)	116	87 - 109	J/none	H	b
			bromofluorobenzene (surr)	52	74 - 131	J/UJ	L	b

[1] Method-established limits

[2] According to the Functional Guidelines for Organic Data Review, if the surrogate recovery is > UCL, flag positive results J; if the surrogate recovery is < LCL, flag positive results J and non-detects UJ; if the surrogate recovery is less than 10%, flag positive results J and non-detects UR

10.3 Blanks

Method blanks were analyzed at the minimum required frequency. All were reported as non-detect at the practical quantitation limit.

One trip blank was collected for analysis by this method; however it was not received by the laboratory. The potential for cross-contamination cannot be evaluated. No field rinsate blanks were collected.

10.4 Matrix Spike/Matrix Spike Duplicates

MS/MSDs were not analyzed by this method.

10.5 Laboratory Control Samples

Laboratory control samples were analyzed at the required frequency. All recoveries and RPDs were within the required limits.

10.6 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. All samples were reported as nondetect for all target compounds.

10.7 Overall Assessment

Due to surrogate recovery and holding time exceedance, two samples were qualified as estimated for all target compounds. Due to holding time exceedance, four samples were qualified as estimated for all target compounds.

Minor data quality deficiencies were found, which had a significant impact to data usability. All data generated by this method should be considered estimated as reported.

11.0 Total Metals (SW6010 and SW7471)

11.1 Holding Time

All samples were analyzed within the required technical holding time.

11.2 Blanks

Method blanks were analyzed at the minimum required frequency. All target analytes were reported as non-detect at the practical quantitation limit.

No field rinsate blanks were collected.

11.3 Matrix Spike/Sample Duplicates

MS/SDs were analyzed at the required frequency. Recoveries and RPDs were within the laboratory-established limits except the following:

Laboratory: SAS
Prep Date: 7/7/98
Prep Batch ID: S916
Spiked Sample: 98ATKA07SL
Matrix: S
Dil Factor: 1

ANALYTE	Sample Result mg/kg	Spike Conc. mg/kg	% Recovery MS	% Recovery MSD	Limits [1]	MS/Dup RPD	Limit [1]	Q [2]	Bias	RC
mercury	< 0.1	1.23	116	NA	75 - 125	200	35	J/UJ	N	f

Associated Samples:

98ATKA01SL	98ATKA02SL	98ATKA04SL
98ATKA05SL	98ATKA06SL	98ATKA07SL
98ATKA09SL	98ATKA10SL	98ATKA11SL
98ATKA12SL	98ATKA13SL	98ATKA14SL
98ATKA15SL	98ATKA16SL	98ATKA17SL

[1] Limits established by the laboratory

[2] If the MS or MSD recovery is < LCL apply J to all positive results, apply UJ to all non-detects; if the MS or MSD recovery is > UCL apply J to all positive results; if the RPD is > UCL apply J to all positive results, apply UJ to all non-detects. For metals analysis, qualifiers apply to all associated batch samples

11.4 Laboratory Control Samples

Laboratory control samples were not analyzed for total metals.

11.5 Quantitation Limits

The practical quantitation limits (PQLs) achieved by the laboratory were acceptable relative to the estimated quantitation limits (EQL) suggested by this method for soil samples. The following positive results reported were below the quantitation limit, and are flagged "J":

Field ID	Matrix	Dil Factor	Analyte	Result	PQL	Units	Q
98ATKA04SL	S	1	cadmium	20	33	mg/kg	J
98ATKA05SL	S	1	chromium	1.7	2.1	mg/kg	J
98ATKA05SL	S	1	cadmium	5.9	17	mg/kg	J
98ATKA05SL	S	1	lead	10	32	mg/kg	J
98ATKA07SL	S	1	lead	24	42	mg/kg	J
98ATKA09SL	S	1	chromium	3.1	5	mg/kg	J
98ATKA09SL	S	1	lead	46	75	mg/kg	J
98ATKA10SL	S	1	lead	18	29	mg/kg	J
98ATKA10SL	S	1	chromium	1.8	2	mg/kg	J
98ATKA10SL	S	1	nickel	5.3	7.8	mg/kg	J
98ATKA11SL	S	1	lead	28	31	mg/kg	J
98ATKA11SL	S	1	mercury	0.09	0.1	mg/kg	J
98ATKA11SL	S	1	chromium	1.1	2.1	mg/kg	J
98ATKA12SL	S	1	vanadium	11	18	mg/kg	J
98ATKA13SL	S	1	nickel	3.1	6.9	mg/kg	J
98ATKA13SL	S	1	lead	18	26	mg/kg	J
98ATKA14SL	S	1	chromium	1.8	2.2	mg/kg	J
98ATKA14SL	S	1	lead	15	33	mg/kg	J
98ATKA15SL	S	1	cadmium	46	94	mg/kg	J
98ATKA16SL	S	1	vanadium	6.9	10	mg/kg	J

Results below the quantitation limit are considered qualitatively acceptable but quantitatively unreliable.

11.6 Overall Assessment

Due to poor duplicate precision, all samples were qualified as estimated for mercury. Estimated data are useable for limited purposes.

Minor data quality deficiencies were found, which had a slight impact to data usability. Except where noted, all data generated by this method should be considered useable as reported.

12.0 QC Duplicates

Three sets of interlaboratory QC duplicates were collected for analysis by all applicable methods. Results reported by the laboratory were in agreement except for the following:

	Primary 98ATKA16SL				QC Dup 98ATKA23SL				
	Result		Q	Bias	Result		Q	Bias	Difference
Polychlorinated Biphenyls (PCBs)									
aroclor 1260	300	µg/kg	J	L	2300	µg/kg	J	L	>5X - Major Disagreement

13.0 References

"USEPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods", July 1992 (SW-846)

"National Functional Guidelines for Organic Data Review", February, 1994

"National Functional Guidelines for Inorganic Data Review", February, 1994

"State of Alaska Method AK101, Determination of Gasoline Range Organics"

"State of Alaska Method AK102, Determination of Diesel Range Organics"

"State of Alaska Method AK103, Determination of Residual Range Organics"

Appendix A

Qualifier Definitions

B	The sample result is less than 5 or 10 times (for common laboratory contaminants) the associated blank contamination.
U	The analyte was analyzed for, but was not detected above the reported quantitation limit.
UJ	The analyte was not detected above the reported quantitation limit. However, the reported quantitation is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J/none	Sample results for the analyte are estimated for positive results; results reported below the quantitation limit are not qualified (high bias).
J/UJ	Sample results for the analyte are estimated for both positive results and results reported below the quantitation limit (low bias).
R/UR	The sample results are rejected for both positive results and results reported below the quantitation limit due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Appendix B

Acronyms

CRQL - Contract Required Quantitation Limit
H - High Bias
L - Low Bias
LCL - Lower Control Limit
LCS/LCSD - Laboratory Control Sample/Laboratory Control Sample Duplicate
MB - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike/Matrix Spike Duplicate
N - No Bias Determined
NA - Not Applicable
NE - Not Established
NR - Not Reported
PQL - Practical Quantitation Limit
Q - Qualifier
QA - Quality Assurance
QC - Quality Control
RPD - Relative Percent Difference
RRL - Required Reporting Limit
RSD - Relative Standard Deviation
RTHT - Required Technical Holding Time
S - Soil (solid) matrix
SAS - Sound Analytical Services, Inc.
SD - Sample Duplicate
SW-846 - EPA Test Methods for Evaluating Solid Waste
UCL - Upper Control Limit
W - Water (aqueous) matrix

Appendix C

Data Summary Table

QUALIFIER REASON CODES

a - The analyte was found in the method blank

a- - Negative drift observed in instrument calibration blanks

b - Surrogate spike recovery outside control limits

c - Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery outside control limits

d - Laboratory Control Sample (LCS) recovery outside control limits

e - Holding time exceeded

f - MS/LCS sample duplicate failed precision criteria

h - Second column results indicate that the environmental results were not confirmed

i - Instrument Calibration outside control limits

k - The analyte was found in the field blank

m - Numerical value between the MDL and PQL

n - Laboratory care narrative related issues

p - Sample was not properly collected, preserved or shipped

s - Internal Standard outside control limits

t - Sample temperature outside acceptance criteria

(Note: Where multiple qualifiers have been applied the first qualifier corresponds to the first reason code)

Diesel Range Organics

DATA SUMMARY TABLE

Sample ID	-01			-02			-03			-03D			-04			-05		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA03SL			98ATKA03SL-D			98ATKA04SL			98ATKA05SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
diesel range organics	12000	J	t	12000	J	t	4000	J	b,t	4500	J	t	16	J	t	5	UJ	t

Diesel Range Organics

DATA SUMM[illegible] TABLE

Sample ID	-06			-07			-07D			-08			-09			-10		
Field ID	98ATKA06SL			98ATKA07SL			98ATKA07SL-D			98ATKA08SL			98ATKA09SL			98ATKA10SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
diesel range organics	81	J	t	4700	J	b,t	4100	J	t	23	J	t	18	J	t	5.2	UJ	t

Diesel Range Organics

DATA SUMMA[illegible]BLE

Sample ID	-12			-13			-14			-15			-15D			-18		
Field ID	98ATKA12SL			98ATKA13SL			98ATKA14SL			98ATKA15SL			98ATKA15SL-D			98ATKA18SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
diesel range organics	82	J	t	4.9	UJ	t	3.8	J	m,t	25000	J	t	26000	J	t	140	J	t

Diesel Range Organics

DATA SUMMA[illegible]ABLE

Sample ID	-21					
Field ID	98ATKA21SL					
Matrix	S					
Date Collected	6/21/98					
Units	mg/kg					
Analyte	RESULT	Q	RC			
diesel range organics	120	J	t			

Gasoline Range Organics

DATA SUMMARY TABLE

Sample ID	-01			-02			-03			-06			-07			-08		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA03SL			98ATKA06SL			98ATKA07SL			98ATKA08SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
gasoline range organics	2.9	BJ	k,t	1.1	BJ	k,t	4.8	BJ	k,t	0.93	BJ	k,t	9	J	t	0.63	BJ	k,t

Gasoline Range Organics

DATA SUMMARY TABLE

Sample ID	-12			-13			-18					
Field ID	98ATKA12SL			98ATKA13SL			98ATKA18SL					
Matrix	S			S			S					
Date Collected	6/21/98			6/21/98			6/21/98					
Units	mg/kg			mg/kg			mg/kg					
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC			
gasoline range organics	2.1	BJ	k,t	0.44	BJ	k,t	2.4	BJ	k,t			

General Chemistry

DATA SUMMARY TABLE

Sample ID	-09			-11			-20					
Field ID	98ATKA09SL			98ATKA11SL			98ATKA20SL					
Matrix	S			S			S					
Date Collected	6/21/98			6/21/98			6/21/98					
Units	%			%			%					
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC			
asbestos	1	U		1	U		1	U				

Organochlorine Pesticides by GC/ECD

DATA SUMMARY TABLE

Sample ID	-01			-02			-04			-05			-06			-09		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA04SL			98ATKA05SL			98ATKA06SL			98ATKA09SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			µg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
aldrin	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
alpha-BHC	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
beta-BHC	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
delta-BHC	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
gamma-BHC (lindane)	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
chlordane	680	UJ	t	800	UJ	t	21	UJ	t	12	UJ	t	17	UJ	t	25	UJ	t
4,4'-DDD	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
4,4'-DDE	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
4,4'-DDT	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
dieldrin	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
endosulfan I	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
endosulfan II	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
endosulfan sulfate	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
endrin	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
endrin aldehyde	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
heptachlor	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
heptachlor epoxide	68	UJ	t	80	UJ	t	2.1	UJ	t	1.2	UJ	t	1.7	UJ	t	2.5	UJ	t
methoxychlor	680	UJ	t	800	UJ	t	21	UJ	t	12	UJ	t	17	UJ	t	25	UJ	t
endrin ketone	140	UJ	t	160	UJ	t	4.2	UJ	t	2.4	UJ	t	3.4	UJ	t	4.9	UJ	t
toxaphene	6800	UJ	t	8000	UJ	t	210	UJ	t	120	UJ	t	170	UJ	t	250	UJ	t

Organochlorine Pesticides by GC/ECD

DATA SUMMARY TABLE

Sample ID	-14			-18						
Field ID	98ATKA14SL			98ATKA18SL						
Matrix	S			S						
Date Collected	6/21/98			6/21/98						
Units	µg/kg			µg/kg						
Analyte	RESULT	Q	RC	RESULT	Q	RC				
aldrin	1.2	UJ	t	2.7	UJ	t				
alpha-BHC	1.2	UJ	t	2.7	UJ	t				
beta-BHC	1.2	UJ	t	2.7	UJ	t				
delta-BHC	1.2	UJ	t	2.7	UJ	t				
gamma-BHC (lindane)	1.2	UJ	t	2.7	UJ	t				
chlordane	12	UJ	t	27	UJ	t				
4,4'-DDD	2.3	UJ	t	5.5	UJ	t				
4,4'-DDE	2.3	UJ	t	5.5	UJ	t				
4,4'-DDT	2.3	UJ	t	5.5	UJ	t				
dieldrin	2.3	UJ	t	5.5	UJ	t				
endosulfan I	1.2	UJ	t	2.7	UJ	t				
endosulfan II	2.3	UJ	t	5.5	UJ	t				
endosulfan sulfate	2.3	UJ	t	5.5	UJ	t				
endrin	2.3	UJ	t	5.5	UJ	t				
endrin aldehyde	2.3	UJ	t	5.5	UJ	t				
heptachlor	1.2	UJ	t	2.7	UJ	t				
heptachlor epoxide	1.2	UJ	t	2.7	UJ	t				
methoxychlor	12	UJ	t	27	UJ	t				
endrin ketone	2.3	UJ	t	5.5	UJ	t				
toxaphene	120	UJ	t	270	UJ	t				

Polychlorinated Biphenyls (PCBs)

DATA SUMMARY TABLE

Sample ID	-01			-02			-03			-05			-06			-07		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA03SL			98ATKA05SL			98ATKA06SL			98ATKA07SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			µg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
aroclor 1016	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t
aroclor 1221	280	UJ	t	300	UJ	t	300	UJ	t	250	UJ	t	320	UJ	t	280	UJ	t
aroclor 1232	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t
aroclor 1242	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t
aroclor 1248	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t
aroclor 1254	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t
aroclor 1260	140	UJ	t	150	UJ	t	150	UJ	t	130	UJ	t	160	UJ	t	140	UJ	t

Polychlorinated Biphenyls (PCBs)

DATA SUMMAR. .ABLE

Sample ID	-08			-09			-11			-12			-13			-14		
Field ID	98ATKA08SL			98ATKA09SL			98ATKA11SL			98ATKA12SL			98ATKA13SL			98ATKA14SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			µg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
aroclor 1016	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t
aroclor 1221	310	UJ	t	480	UJ	t	280	UJ	t	350	UJ	t	230	UJ	t	230	UJ	t
aroclor 1232	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t
aroclor 1242	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t
aroclor 1248	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t
aroclor 1254	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t
aroclor 1260	150	UJ	t	240	UJ	t	140	UJ	t	170	UJ	t	110	UJ	t	110	UJ	t

Polychlorinated Biphenyls (PCBs)

DATA SUMMARY TABLE

Sample ID	-15			-16			-18			-19			-23			
Field ID	98ATKA15SL			98ATKA16SL			98ATKA18SL			98ATKA19SL			98ATKA23SL			
Matrix	S			S			S			S			S			
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	
aroclor 1016	600	UJ	t	100	UJ	t	270	UJ	t	230	UJ	t	570	UJ	t	
aroclor 1221	1200	UJ	t	210	UJ	t	550	UJ	t	460	UJ	t	1100	UJ	t	
aroclor 1232	600	UJ	t	100	UJ	t	270	UJ	t	230	UJ	t	570	UJ	t	
aroclor 1242	600	UJ	t	100	UJ	t	270	UJ	t	230	UJ	t	570	UJ	t	
aroclor 1248	600	UJ	t	100	UJ	t	270	UJ	t	230	UJ	t	570	UJ	t	
aroclor 1254	600	UJ	t	100	UJ	t	270	UJ	t	230	UJ	t	570	UJ	t	
aroclor 1260	760	J	t	300	J	t	270	UJ	t	230	UJ	t	2300	J	t	

Residual Range Organics

DATA SUMMARY TABLE

Sample ID	-01			-02			-03			-03D			-04			-05		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA03SL			98ATKA03SL-D			98ATKA04SL			98ATKA05SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
residual range organics	15000	J	t	35000	J	t	210	J	t	220	J	t	99	J	b,t	12	BJ	a,b,t

Prepared by EJHX

9/23/98

Atka Island

SDG: 73811

Residual Range Organics

DATA SUMMARY TABLE

Sample ID	-06			-06D			-07			-07D			-08			-09		
Field ID	98ATKA06SL			98ATKA06SL-D			98ATKA07SL			98ATKA07SL-D			98ATKA08SL			98ATKA09SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
residual range organics	340	J	t	380	J	t	700	J	b,t	660	J	t	70	J	b,t	180	J	b,t

Residual Range Organics

DATA SUMM. TABLE

Sample ID	-10			-12			-12D			-13			-14			-15		
Field ID	98ATKA10SL			98ATKA12SL			98ATKA12SL-D			98ATKA13SL			98ATKA14SL			98ATKA15SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
residual range organics	15	BJ	a,b,t	390	J	t	320	J	t	14	BJ	a,b,t	16	J	b,t	2800	J	t

Prepared by

9/23/98

Atka Island

SDG: 73811

Residual Range Organics

DATA SUMMARY TABLE

Sample ID	-18			-21							
Field ID	98ATKA18SL			98ATKA21SL							
Matrix	S			S							
Date Collected	6/21/98			6/21/98							
Units	mg/kg			mg/kg							
Analyte	RESULT	Q	RC	RESULT	Q	RC					
residual range organics	520	J	b,t	550	J	b,t					

Prepared by ETTIX

9/23/98

Atka Island

SDG: 73811

Semivol[illegible]nics By GC/MS

DATA SUMMA[illegible]ABLE

Sample ID	-01			-02			-03			-05			-06			-07		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA03SL			98ATKA05SL			98ATKA06SL			98ATKA07SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			µg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
naphthalene	6100	J	t	8300	J	t	14	UJ	t	9.5	UJ	t	150	J	t	350	J	t
2-methylnaphthalene	3700	J	t	5200	J	t	27	UJ	t	19	UJ	t	100	J	t	150	J	t
acenaphthylene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
acenaphthene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
fluorene	1100	UJ	t	1300	UJ	t	27	UJ	t	19	UJ	t	29	UJ	t	22	UJ	t
phenanthrene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
anthracene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
fluoranthene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
pyrene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
benzo(a)anthracene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
chrysene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
benzo(b)fluoranthene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
benzo(k)fluoranthene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
benzo(a)pyrene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
indeno(1,2,3,c,d)pyrene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
dibenz(a,h)anthracene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t
benzo(g,h,i)perylene	540	UJ	t	670	UJ	t	14	UJ	t	9.5	UJ	t	14	UJ	t	11	UJ	t

Semivol... ...ganics By GC/MS

DATA SUMMA... ...ABLE

Sample ID	-09			-10			-15			-18				
Field ID	98ATKA09SL			98ATKA10SL			98ATKA15SL			98ATKA18SL				
Matrix	S			S			S			S				
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98				
Units	µg/kg			µg/kg			µg/kg			µg/kg				
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC		
naphthalene	25	UJ	t	9.2	UJ	t	1000	J	t	220	J	t		
2-methylnaphthalene	50	UJ	t	18	UJ	t	530	J	t	150	J	t		
acenaphthylene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
acenaphthene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
fluorene	50	UJ	t	18	UJ	t	110	UJ	t	44	UJ	t		
phenanthrene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
anthracene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
fluoranthene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
pyrene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
benzo(a)anthracene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
chrysene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
benzo(b)fluoranthene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
benzo(k)fluoranthene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
benzo(a)pyrene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
Indeno(1,2,3,c,d)pyrene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
dibenz(a,h)anthracene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		
benzo(g,h,i)perylene	25	UJ	t	9.2	UJ	t	55	UJ	t	22	UJ	t		

Total Metals

DATA SUMMARY TABLE

Sample ID	-01			-02			-04			-05			-06			-07		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA04SL			98ATKA05SL			98ATKA06SL			98ATKA07SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
arsenic	110	U		120	U		170	U		84	U		130	U		110	U	
barium	41			43			18			25			41			13		
cadmium	21	U		24	U		20	J	m	5.9	J	m	26	U		23	U	
chromium	13			12			4.1	U		1.7	J	m	6			5.8		
lead	61			87			62	U		10	J	m	220			24	J	m
mercury	0.23	J	f	0.15	UJ	f	0.21	J	f	0.1	UJ	f	0.15	UJ	f	0.1	UJ	f
nickel	11			20			17	U		8.4	U		13	U		11	U	
vanadium	83			85			150			67			49			51		

Total Metals

DATA SUMM[illegible] TABLE

Sample ID	-09			-10			-11			-12			-13			-14		
Field ID	98ATKA09SL			98ATKA10SL			98ATKA11SL			98ATKA12SL			98ATKA13SL			98ATKA14SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
arsenic	200	U		78	U		83	U		140	U		69	U		87	U	
barium	13			42			34			30			11			13		
cadmium	40	U		16	U		17	U		46			14	U		17	U	
chromium	3.1	J	m	1.8	J	m	1.1	J	m	3.5	U		1.7	U		1.8	J	m
lead	46	J	m	18	J	m	28	J	m	110			18	J	m	15	J	m
mercury	0.34	J	f	0.1	UJ	f	0.091	J	f,m	0.18	J	f	0.081	UJ	f	0.098	UJ	f
nickel	20	U		5.3	J	m	8.3	U		14	U		3.1	J	m	8.7	U	
vanadium	200			67			54			11	J	m	19			45		

Total Metals

DATA SUMMARY TABLE

Sample ID	-15			-16			-17					
Field ID	98ATKA15SL			98ATKA16SL			98ATKA17SL					
Matrix	S			S			S					
Date Collected	6/21/98			6/21/98			6/21/98					
Units	mg/kg			mg/kg			mg/kg					
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC			
arsenic	470	U		81	U		76	U				
barium	63			86			350					
cadmium	46	J	m	45			38					
chromium	39			53			56					
lead	2500			2000			49000					
mercury	47	J	f	0.11	J	f	0.11	J	f			
nickel	47	U		37			7.6	U				
vanadium	87			6.9	J	m	14					

Prepared by EVHX

9/23/98

Atka Island

SDG: 73811

Sample ID	-01			-02						-06			-07			-08		
Field ID	98ATKA01SL			98ATKA02SL			98		L	98ATKA06SL			98ATKA07SL			98ATKA08SI		
Matrix	S			S						S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	mg/kg			mg/kg			mg/kg			mg/kg			mg/kg			mg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
benzene	0.078	UJ	e	0.048	UJ	e	0.051	UJ	e	0.033	UJ	e	0.062	UJ	e	0.029	UJ	e
toluene	0.078	UJ	e	0.048	UJ	e	0.051	UJ	e	0.033	UJ	e	0.062	UJ	e	0.029	UJ	e
ethylbenzene	0.078	UJ	e	0.048	UJ	e	0.03	J	e,m	0.033	UJ	e	0.062	UJ	e	0.029	UJ	e
m,p-xylene	0.16	UJ	e	0.095	UJ	e	0.08	BJ	e,k	0.065	UJ	e	0.077	BJ	e,k	0.059	UJ	e
o-xylene	0.078	UJ	e	0.048	UJ	e	0.038	J	e,m	0.033	UJ	e	0.062	UJ	e	0.029	UJ	e

Volatile Organics by GC/MS

DATA SUMMARY TABLE

Sample ID	-01			-02			-06			-07			-09			-14		
Field ID	98ATKA01SL			98ATKA02SL			98ATKA06SL			98ATKA07SL			98ATKA09SL			98ATKA14SL		
Matrix	S			S			S			S			S			S		
Date Collected	6/21/98			6/21/98			6/21/98			6/21/98			6/21/98			6/21/98		
Units	µg/kg			µg/kg			µg/kg			µg/kg			µg/kg			µg/kg		
Analyte	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC	RESULT	Q	RC
vinyl chloride	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
trans-1,2-dichloroethene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
cis-1,2-dichloroethene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
1,1,1-trichloroethane	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
carbon tetrachloride	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
trichloroethene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
tetrachloroethene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
chlorobenzene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
1,1,2,2,-tetrachloroethane	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e
1,2-dichlorobenzene	620	UJ	e	290	UJ	b,e	320	UJ	e	570	UJ	b,e	730	UJ	e	520	UJ	e

Appendix D

Data Quality Summary

by Analysis Type

Data Quality Summary

Volatile Aromatic Hydrocarbons

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	45	-	-	-
TOTAL QUALIFIED DATA POINTS:	45	100.0%	-	-
TOTAL REJECTED DATA POINTS:	0	0.0%	-	-
Qualified/Rejected as a result of:				
e - Holding time exceeded	41	91.1%	91.1%	L
e,k - Multiple Reasons	2	4.4%	4.4%	N
e,m - Multiple Reasons	2	4.4%	4.4%	L

Data Quality Summary

Residual Range Organics

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	20	-	-	-
TOTAL QUALIFIED DATA POINTS:	20	100.0%	-	-
TOTAL REJECTED DATA POINTS:	0	0.0%	-	-
Qualified/Rejected as a result of:				
a,b,t - Multiple Reasons	3	15.0%	15.0%	L
b,t - Multiple Reasons	7	35.0%	35.0%	L
t - Sample temperature outside acceptance criteria	10	50.0%	50.0%	L

Data Quality Summary

Organochlorine Pesticides by GC/ECD

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	**160**	-	-	-
TOTAL QUALIFIED DATA POINTS:	**160**	100.0%	-	-
TOTAL REJECTED DATA POINTS:	**0**	0.0%	-	-
t - Sample temperature outside acceptance criteria	160	100.0%	100.0%	L

Data Quality Summary

Polychlorinated Biphenyls (PCBs)

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	153	-	-	-
TOTAL QUALIFIED DATA POINTS:	119	77.8%	-	-
TOTAL REJECTED DATA POINTS:	0	0.0%	-	-
t - Sample temperature outside acceptance criteria	119	77.8%	100.0%	L

Data Quality Summary

Volatile Organics by GC/MS

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	60	-	-	-
TOTAL QUALIFIED DATA POINTS:	60	100.0%	-	-
TOTAL REJECTED DATA POINTS:	0	0.0%	-	-
Qualified/Rejected as a result of:				
b,e - Multiple Reasons	20	33.3%	33.3%	L
e - Holding time exceeded	40	66.7%	66.7%	L

Data Quality Summary

Total Metals

	Data Points	% of Data	% of Qualified Data	Bias (low/none/high)
TOTAL DATA POINTS:	120	-	-	-
TOTAL QUALIFIED DATA POINTS:	34	28.3%	-	-
TOTAL REJECTED DATA POINTS:	0	0.0%	-	-
Qualified/Rejected as a result of:				
m - Numerical value is between the MDL and RL	19	15.8%	55.9%	N
f - Laboratory duplicate failed precision criteria	14	11.7%	41.2%	N
f,m - Multiple Reasons	1	0.8%	#Error	N

Appendix B

Chemical Data Report

Chemical Data Report

SITE INVESTIGATION 1998

Atka Island,
Alaska

Prepared by the
Materials and Instrumentation Section
Geotechnical Branch
Alaska District Army Corps of Engineers

January 1999

Table of Contents

Chemical Data Report

1. Introduction

This Chemical Data Report has been prepared by the Materials and Instrumentation Section of the U.S. Army Corps of Engineers, Alaska District (CEPOA-EN-G-MI), to report the results of soil sampling performed during a Site Investigation conducted 20-21 Jun 1998 at Atka Island, Alaska. This report has been prepared at the request of the Environmental Engineering Branch, Inactive Installations Section (CEPOA-EN-EE-II) and Technical Engineering Section (CEPOA-EN-EE-TE, refs 4c, 4d). The content of this report is intended to be incorporated into a Site Investigation Report to be prepared by CEPOA-EN-EE-TE. To avoid duplication of effort, the format of this report has been limited to a report of field activities, field observations, and chemical analytical results, on agreement between CEPOA-EN-EE-TE, EN-G-MI, and PM-F (refs. 4a, 4b). Interpretation of the data, and ecological, cultural, and other considerations are deferred to the Site Investigation Report.

2.0 Conduct of 1998 Field Investigation

2.1 Objectives of Investigation

The objectives of the 1998 Site Investigation were those defined in the Work Plan (ref. 4g):

- Investigate representative sites of the former military facilities for evidence of chemical contamination of the environment;

- Investigate reports of drums, attempt to determine if they are of military or civilian origin, and reports of military structures remaining after the 1986 removal action;

- Collect samples of contaminated surface soil or sediment for chemical analysis;

- Inspect and document the current condition of the three 1986 disposal sites; collect samples of soil or sediment if contamination is suspected at or leaching from the disposal sites;

- Interview local citizens for information on potential FUDS chemical contamination.

- Obtain information necessary to fill out an Alaska Department of Environmental Conservation (ADEC) Ecological Checklist.

2.2 Methods of Investigation

2.2.1 Sample Collection and Transport: All samples were collected from surface soils or exposed stream sediments (with the exception of a single bulk insulation sample), and were collected in a manner consistent with that described in the Sampling and Analysis Plan (ref. 4g). The first inch or so of surface soil was scraped away, and the sample was collected from the next several inches of newly-exposed soil. If the sample was collected from a vegetated area, the vegetation mat was carefully cut away from the sampling point, then replaced after the underlying soils were sampled. Soil was transferred directly into appropriate sample containers, with no homogenization. Samples to be analyzed for Gasoline Range Organics (Method AK-101) and volatile organic compounds (Methods 8021B and 8260B) were collected first. The Method AK-101 and 8021B samples were collected in tared vials containing a methanol preservative solution provided by the laboratory (in accordance with State of Alaska Method AK-101 and the "medium level" procedure under the U.S. EPA SW-846 extraction method 5035. The Method 8260B samples were collected in tared vials containing a sodium bisulfate preservative solution (in accordance with the "low-level" procedure under the U.S. EPA SW-846 extraction method 5035).

A standard CEPOA sample identification number system was used, consisting of two digits designating the year, then a project code of up to four letters, then a two-digit sample number, followed by a two-letter matrix code. For example, "98ATKA01SL" was the number assigned to the first soil sample. The matrix code "SL" was used for all samples collected.

All samples were collected on 21 June 1998. These samples were carried by charter helicopter with the CEPOA team to Adak Island, then shipped to Anchorage via Reeve Aleutian Air Cargo on 23 June. The samples were repackaged at Anchorage, and shipped to the laboratory via Alaska Air Cargo on 24 June. The project laboratory, Sound Analytical Services, Inc., of Tacoma, Washington, received the sample shipment on 25 June 1998.

Table 2.2.2 Analytical Methods

Analytical Method	Target Contaminants
AK-102/103, Diesel Range Organics (DRO) and Residual Range Organics (RRO)	Mid-range and heavy fuel products
AK-101, Gasoline Range Organics (GRO)	Gasolines, some aviation fuels
Method 8021B, Volatile Org. Compounds (BTEX only)	Fuel constituent compounds
Method 8260B, Selected Chlorinated Hydrocarbons	Chlorinated solvents
Method 8270B SIMS, Polyaromatic Hydrocarbons (PAHs)	Fuel constituent compounds
Method 8082, Polychlorinated Biphenyls (PCBs)	PCB dielectric from electrical equipment
Methods 6010-7000 series, Total Metals	Metals from electronic equipment, fuel residues
Method 9002, Asbestos	Asbestos from disposal cell

BTEX: Benzene, toluene, ethylbenzene, xylenes
SIMS: Selected Ion Mass Spectroscopy
Metals: Arsenic, Barium, Cadmium, Chromium, Mercury, Vanadium, and Nickel

2.2.2 Analytical Methods: The samples were analyzed by the analytical methods defined in the Work Plan, and summarized in Table 2.2.2 above. Table A-1 in Appendix A lists the samples collected at Atka Island and the analyses performed on each sample.

3.0 Site Investigations

3.1 General Information

3.1.1 Site Visit Overview: The investigation at Atka was performed as part of a series of site investigations in the Aleutian Islands. The CEPOA investigation team consisted of project manager Donnel Bethel (CEPOA-PM-F), environmental engineer Heather Gillihan (CEPOA-EN-EE-II), chemist Chris Floyd (CEPOA-EN-G-MI), and helicopter pilot Gary Brogdan from *Maritime Helicopters* of Homer, Alaska. The three CEPOA personnel arrived at Atka on 20 June 1998 via a commercial flight from Dutch Harbor; the helicopter pilot had flown alone from Dutch Harbor to Atka the day before. Most of the Atka investigation was performed 20-21 June by Don Bethel and Chris Floyd, while Heather Gillihan and the helicopter pilot attempted to locate several small sites on adjacent islands. The helicopter was used to reach the Cape Kudugnak site late on 21 June.

3.1.2 Interviews with Local Residents: Local residents of Atka provided valuable information concerning both previous activities at the former military sites, and current-day conditions. This information was provided both in telephone conversations prior to the CEPOA visit, and during the CEPOA visit. Many of the residents were away from the island fishing, and were unavailable for interviews.

Mr. George Dirks, the former vice mayor of Atka, and Mr. Louis Nevzoroff, the Atka Village Public Safety Officer (VSPO) reported a number of issues related to former military sites and potential contamination (ref. 4h).

- "Stacked oil and grease drums", reportedly military in origin, that had been buried by villagers at the old village site to protect children (see Figure 2a);

- Erosion at the 1986 debris disposal areas that had exposed much debris, including sharp-edged fragments of "Marston matting" (pierced steel planking used to surface the airfield in WWII). The Marston matting fragments are of particular concern, as they are found throughout the area, and are a hazard to both people and vehicles (see Figure 2a, 2b);

- Intact military underground storage tanks containing aviation fuel, located to the northeast of the runway and south of the city garbage dump (see Figure 2b);

- A disposal area for military debris and heavy equipment west of the new city dock, and former tanks located near the dock (see Figure 2b);

- Aircraft engines reportedly buried between the village site and the school;

- "Radio station" site on Cape Kudugnak.

Mr. Nevzoroff met the CEPOA team at Atka airport, and provided an extensive tour of the Atka area on 20 June. Most of the sites described in Section 3.2 were located with his help. As described below, the burial site for the reported oil and grease drums was found to be co-located with a current-day civilian fuel storage area, and no military impact could be discerned at that time. The locations of the reported aviation fuel USTs and the buried aircraft engines could not be determined. Mr. Nevzoroff also offered much information about subsistence use of local plants for medicinal uses.

- Ms. Sally Swetzoff, mayor of Atka, met with the CEPOA team at the village offices. Ms. Swetzoff reiterated most of the concerns raised by Mr. Nevzoroff, and named several local men who had worked on the 1986 removal action. She also described the heavy dependence of Atka residents on subsistence hunting, fishing, and gathering. Salmon, trout, and steelhead are caught in nearby streams. Halibut, crab, sea urchins, sea cucumbers, sea anemones, chitons, and blue mussels are taken from coastal and nearshore areas. Ducks and seals are hunted along the coast, and imported reindeer are hunted in the island interior. Many local plants, including wild parsley and chocolate lily, are gathered for food and medicinal use.

- Mr. Mark Snigaroff, Atxam Corporation president, reiterated most of the issues described by Mr. Nevzoroff. Mr. Snigaroff particularly stressed the importance of an investigation of the Cape Kudugnak site.

- Mr. Nick Dirks worked on the 1986 removal action. He stated that tanks and drums were carefully emptied and removed from the WWII-era structures prior to demolition.

- Mr. Dennis Golodov worked on the 1986 removal action. He stated he remembered cutting off pipes at many building locations, and did not specifically remember any tanks being removed.

- Mr. Danny Snigaroff worked on the 1986 removal action as a truck driver. He stated that most of the tanks he saw taken from the WWII-era structures were converted 55-gallon drums, and that these were both removed from the buildings, or crushed and buried in-place. Mr. Snigaroff also stated that some metal and wood debris were buried in an area west of the city dock. He claimed that a large stream south of that location showed signs of petroleum contamination after heavy rains, prompting the sediment sampling described in Section 3.2.6.

3.1.3 Ecological Data: The ecological checklists proved to be difficult to fill out in the absence of a biologist, and was not attempted at such a complex area as

Atka. It is hoped that much necessary ecological information can be assembled from photographs and descriptions of the sites, and from interviews with local residents.

3.2 Site Descriptions and Sample Collection

3.2.1 Generator Building: A small concrete foundation was located near the roadway west of the airfield (see Figure 3a), thought to be the remains of a generator building designated "T-241" on the WWII-era site plans. The foundation was approximately 20 feet by 30 feet, and featured a low perimeter wall, and four square, 12-inch high concrete pillars situated within the south half of the foundation.

On the east (downgradient) side of the building, an obvious drainage pathway was noted, cutting through the existing berm surrounding the foundation and heading towards a small lake west of the airfield. A 1-inch diameter metal pipe was observed protruding from the soil south of the drainage pathway. The soil in the drainage pathway immediately east of the foundation appeared stained, and had a distinct diesel fuel odor. Samples 98ATKA01SL and -02SL (duplicate samples) were collected from surface soil in the drainage pathway adjacent to the foundation (see Figure 3a).

Immediately west of the foundation was a flat vegetation-free area, approximately 4 feet by 6 feet. There were numerous bung-caps from 55-gallon drums scattered about this area, suggesting that drums were emptied of their contents at this location (perhaps into a now-absent day-tank serving the generator building) and then discarded. The soil at this location appeared to be stained; soil an inch below ground surface had a distinct diesel fuel odor. Between the "bung area" and the foundation was an eroded area with dark-stained soil. Sample 98ATKA03SL was collected from surface soil at the flat "bung area" (see Figure 3a).

3.2.2 Motor Pool Building: A large concrete foundation, approximately 30 feet by 100 feet, was located near the roadway northwest of the airfield (see Figure 3b). This foundation was thought to be the remains of a former motorpool building designated "T-43" on WWII-era site plans. The foundation featured a rectangular service pit filled with debris and rainwater.

Off the northeast corner of the foundation was found a low mound of soil, and an area (approximately 10 feet in diameter) devoid of vegetation. The soil in the bare area appeared to be stained black, overlain by a layer of slippery reddish material. Sample 98ATKA06SL was collected from the stained soil.

A 4-foot diameter pit was found immediately north of the foundation. The pit was full of water to within a few inches of the ground surface, and the pit contained wood and metal debris; the depth of the pit could not be determined. The pit is thought to potentially be a former drywell. Sample 98ATKA07SL was collected from the wall of the pit just above the waterline. During sample collection, a strong fuel odor was noted, and a small sheen formed on the water's surface.

Approximately 500 feet east and downgradient of the foundation, a heavy sheen (possibly natural in origin) was noted on the surface of soil and water in a roadside culvert. Sample 98ATKA08SL was collected from soil overlain by the sheen (see Figure 2b).

3.2.3 Hospital Site/Disposal Site A: The main feature of interest at the Navy Hospital Site was the debris disposal site "A". At least a portion of the disposal cell was located, although the asbestos warning sign had been removed (a helpful local resident happened by and assured the CEPOA team that they were indeed at the disposal site, and the sign had only recently been removed). The visible constructed cell seemed to be smaller than that indicated in maps from its construction in 1986. The disposal site cover appeared to be in adequate condition. There was little sign of erosion of the cover, but vegetation on parts of the cover was sparse, and erosion could begin to attack the exposed soil in the future. Sample 98ATKA09SL was collected from exposed soil on the south side of the cap (see Figure 4)

A sample of sediment, 98ATKA11SL, was collected from a gravel bar in a stream draining the area of the landfill.

The concrete foundation of a small building was noted east of the 1986 disposal site. WWII-era site plans suggested that this building was a bathhouse. A small-diameter pipe protruded upwards several inches from the foundation; the pipe was full of water, and a heavy rust stain was observed on the foundation and adjacent soil. Sample 98ATKA12SL was collected from rust-stained surface soil adjacent to the foundation.

3.2.4 Disposal Sites B and C: Maps from the 1986 removal action show Disposal Site "B" occupying a strip of land between the airport hanger and the City of Atka school building (see Figure 2a). Parts of this disposal site were obvious, but it was difficult to determine the limits of the disposal site, or where the cap began and ended. The site is basically a long, wind-scoured strip of sand dunes, sparse vegetation, with debris exposed in low areas. The debris is predominantly rusted fragments of Marston matting, along with bits of wood and an occasional crushed, empty drum. The sharp-edged fragments of Marston matting are found throughout the area surrounding the airfield, and are a considerable nuisance to the local residents. No samples for chemical analysis were collected in the Disposal Site B area, as no plausible sources could be identified.

Disposal Site "C" was impossible to locate precisely, even with photographs from the Site Closure Report. Both Disposal Sites "B" and "C" appear to have been constructed in an active dune-building region; the caps of these sites have probably not so much eroded as migrated away as sand dunes. In the general area of "C", there were signs of more recent disposal, and of a possible WWII-era disposal site. Mr. Louis Nevzoroff, the Village Public Safety Officer, told the CEPOA team that the WWII-era disposal site had not been visible in 1986, but had been uncovered by the sand dunes only in recent years. These other disposal areas tended merge together and greatly confuse the assessment of the 1986 disposal area. A stream also crosses the site, and has cut through the area thought most likely to be "C", exposing more of the ubiquitous Marston matting,

and a number of empty drums. Most of the drums present had been welded together end-to-end for use as culverts. A sample, 98ATKA14SL, was collected from the muddy bottom of a large depression in the general location of "C". (see Figure 2b).

3.2.5 Cape Kudugnak Site: Following a lead from one of the village officials, the CEPOA team flew to Cape Kudugnak, at the north entrance to Nazan Bay approximately 5 miles northeast of Atka village (see Figure 1). A small but evidently contaminated site, presumably FUDS, was found there. The age and previous ownership of the site are uncertain to date; the site does not appear on the 1943 project plans. It was apparent that no environmental removal or restoration action had occurred there. The Cape Kudugnak site includes two camps, and much scattered debris (see Figure 5) The east camp consisted of two small, intact wood-frame buildings, six large radio masts (five collapsed, but one still standing), a large above-ground storage tank, and a large drum dump. The eastern-most building was largely empty, but a possible transformer was noted on the south side of that building (see Figure 6a). The western-most building contained another possible transformer, and a large number of batteries, some with cracked plastic cases (see Figure 6a). Samples were collected from:

-stained soil under the east building potential transformer (98ATKA15SL and -23SL);

-floor-scrapings around the west building potential transformer (98ATKA16SL);

-floor-scrapings around the west building batteries (98ATKA17SL);

-stained soil on south side of the drum pile (98ATKA18SL and -21SL).

The Cape Kudugnak west camp appeared to be the living quarters, and consisted of one large collapsed building, and a large above-ground storage tank. One transformer was noted on a pole near the north end of the collapsed building. A large refrigeration unit with exposed insulation was found south of the collapsed building. The west camp overlooks a coastal lagoon, which was seen to be ringed with drums and other debris (see Figure 6b). Samples were collected from:

-stained soil underneath the pole-mounted transformer (98ATKA19SL);

-insulation released from the refrigeration unit (98ATKA20SL).

3.2.6 Drainage Pathway Samples: The former "HQ Area" was selected as representative of WWII-era construction areas, and a walk-over was performed. The 1986 project appeared to have been rather effective in terms of general debris removal. At most former building locations, there was little sign of the structure other than the general outline of the building revetments. Very heavy vegetation growth around most of the former building footprints made the visual search for signs of USTs unproductive. Four local residents who participated in the 1986 cleanup were asked about the practices of removing tanks from the buildings before demolition. No consensus could be reached as to whether tanks had been removed from the structures and disposed of elsewhere, or were buried in place. A sediment sample (98ATKA05SL) was collected from a streambed downgradient of the "HQ Area" (see Figure 2a)

A possible additional military disposal site was reported near the village dock (see Figure 2). A nearby stream was said by a resident to be covered with a sheen and smell

of gasoline when the stream floods. The stream was investigated, and a heavy growth of yellow algae was observed, but no signs of contamination were noted at that time. A sample sediment (98ATKA13SL) was collected from a gravel bar in the stream just upstream from the bridge (see Figure 2b).

3.2.7 Background Samples: Two background soil samples were collected in the Atka area as part of this investigation. Sample 98ATKA04SL was collected from the streambank approximately 200 feet upgradient of the weir that collects water for the City of Atka water distribution system. Sample 98ATKA10SL was collected from a hilltop approximately 300 feet west of the Navy Hospital complex (see Figure 2a, 2b).

3.2.8 Other Sites: Several reports had been made to CEPOA and the U.S. Coast Guard of military drums containing "oil and grease", that had been found by local citizens and buried as a safety measure. The burial area shown to the CEPOA team turned out to be directly underneath one of the village's fuel handling facilities, just south of the village. Considerable surface staining and contaminated run-off was noted, but appeared to be most likely originating from the civilian fuel storage tanks and drums on the surface. No samples were collected at that time (see Figure 2a).

On a hillside northwest of the city dock are four circular depressions, that have been variously referred to as tank foundations or the remains of gun emplacements. The depressions have heavy revetments built around them, with entry-ways. Two of the four depressions were filled with water. The depressions were observed from the air, but rapidly deteriorating weather conditions prevented an investigation from the ground (see Figure 2b).

A site referred to as a "Navy Radar Area" was located on a ridge to the west of the airfield. Scattered debris and a possible collapsed building was noted on the barren ridge top, but rapidly deteriorating weather conditions prevented landing the helicopter and continuing the investigation on the ground (see Figure 2b).

3.3 Summaries of Analytical Results

The sections below give a brief overview of the analytical results from each sampled site. Tables of the complete analytical results are provided in Appendix A; discussions of the significance of the results will be deferred to the CEPOA-EN-EE-TE Site Investigation Report.

3.3.1 Generator Building: Up to 35,000 mg/kg RRO and 12,000 mg/kg DRO were detected in the surface soils near the generator foundation. Concentrations of GRO and BTEX compounds were very low, where detected. Naphthalene (up to 8.3 mg/kg) and 2-methylnaphthalene (up to 5.2 mg/kg) were the only PAH compounds reported. No PCBs, pesticides, or chlorinated solvents were detected. Metals concentrations appear to be within background concentration ranges.

3.3.2 Motor Pool Building: Up to 660 mg/kg RRO and 88 mg/kg DRO were detected in the surface soil and drywell wall near the former motorpool foundation. Concentrations of GRO and BTEX compounds were very low, where detected. Naphthalene (up to 0.35 mg/kg) and 2-methylnaphthalene (up to 0.1 mg/kg) were the only PAH compounds reported. No PCBs, pesticides, or chlorinated solvents were detected. Metals concentrations appear to be within background concentration ranges, except for a detection of 220 mg/kg lead at the "bare area" northeast of the foundation (sample 98ATKA06SL). Trace levels of RRO and DRO were reported in the sample from the downgradient ditch (98ATKA08SL), which may represent naturally-occurring organics. No PCBs or BTEX compounds were reported at this location.

3.3.3 Hospital Site/Disposal Site A: Up to 320 mg/kg RRO and 82 mg/kg DRO were detected in surface soils from the disposal site cap and bathhouse foundations. A very low GRO concentration of 2.1 mg/kg was detected at the bathhouse foundation (sample 98ATKA12SL); no other detections of GRO or BTEX compounds were reported. No PCBs, pesticides, PAHs, chlorinated solvents, or asbestos were detected in any hospital area sample. Metals concentrations appear to be within background concentration ranges, except perhaps for the 46 mg/kg cadmium and 110 mg/kg lead reported at the bathhouse foundation, and 200 mg/kg vanadium at the disposal site cap (98ATKA09SL).

3.3.4 Disposal Sites B and C: Trace concentrations of RRO (16 mg/kg) and DRO (3.8 mg/kg) were detected in surface soil collected from a depression near the Disposal Site C area. No PCBs, pesticides, chlorinated solvents, or significant concentrations of metals were reported.

3.3.5 Cape Kudugnak Site: Up to 2,800 mg/kg RRO and 26,000 mg/kg DRO were reported in surface soil samples from Cape Kudugnak, these highest concentrations being from a small spill below an electrical assembly (98ATKA15SL). A sample collected from near the east camp drum dump (98ATKA18SL) contained relatively moderate concentrations: 520 mg/kg RRO, 140 mg/kg DRO, and 2.4 mg/kg GRO. Naphthalene (up to 1.0 mg/kg) and 2-methylnaphthalene (up to 0.53 mg/kg) were the only PAH compounds reported. PCBs were detected at concentrations of 0.30 to 2.30 mg/kg in soil or floor-scrapings near the east camp suspected transformers. No PCBs were detected in surface soil samples from below the west camp transformer. No pesticides or BTEX compounds were reported. Lead concentrations of 2,500 mg/kg were reported in sample 98ATKA15SL, and up to 49,000 mg/kg from within the building containing the batteries. The sample of insulation from the west camp refrigeration unit was reported to not contain asbestos.

3.3.6 Drainage Pathway Samples: Trace concentrations of RRO (12-14 mg/kg) were detected in the sediment samples from the "HQ Area" stream (98ATKA05SL) and the stream near the city dock (98ATKA13SL). No DRO was detected in either sample. No PCBs, pesticides, PAHs, or BTEX compounds were detected in either sample. Metal concentrations appear to be within background ranges.

3.3.7 Background Samples: Reported concentrations of RRO in the two background samples range from 15 to 99 mg/kg. No DRO, PAHs, PCBs, pesticides, or BTEX compounds were reported in the background samples. The ranges of reported metals concentrations are summarized below:

Table 3.3.7 - Background Metals Concentrations	
Metal	Concentrations, mg/kg
Arsenic	ND (78-170)
Barium	18 - 34
Cadmium	ND(16) - 20 J
Chromium	ND (4) - 1.8 J
Lead	ND (62) - 18 J
Mercury	ND (0.1) - 0.21 J
Nickel	ND (17) - 5.3 J
Vanadium	67 -150
ND: Not Detected. Value in parentheses is the Method Reporting Limit J: Estimated value.	

3.4 Data Quality Review

After sample analysis, the chemical data report generated by the laboratory was provided by CEPOA-EN-G-MI to a contract data review firm, *Ethix* of Modesto, CA. The review included an independent evaluation of sample handling and shipping conditions, holding times, travel and laboratory blank samples (to assess the potential for cross-contamination and laboratory contamination), duplicate samples (to assess sampling technique and laboratory precision), laboratory control samples (to assess laboratory accuracy), and matrix spike and surrogate recoveries (to assess the efficiency of analyte recoveries). The data review report is provided in Appendix B. The project data are adequate for most project objectives. Data quality issues that affect the usability of the data are discussed below.

3.4.1 Sample Temperatures: The data review report reports that all chemical data other than metals should be regarded as "estimated", because all samples arrived at the laboratory at a temperature of either 7 deg C or 'room temperature', and the data reviewers could not distinguish which samples arrived at which temperature.. The only Atka samples arriving at the laboratory at 'room temperature' were the methanol-preserved Gasoline-Range Organics (GRO) and Aromatic Volatile Organics (BTEX) samples, which were shipped as "hazardous material" in a UN 4G carton with plastic ice packs. Samples for all other analyses were shipped in a cooler, and arrived at the laboratory at 7 deg C.

i. GRO: Method AK-101 requires that the preserved samples be maintained at temperatures of less than 25 deg C (77 deg F). Since an attempt was made to chill the samples with ice packs, and the samples were in transit for only 24 hrs, it is

assumed that the 'room temperature' recorded at the laboratory was most probably less than 25 deg C; therefore, the GRO data do not require qualification for elevated temperature.

ii. BTEX: The Method 8021B analyses for BTEX were performed from the same sample volume as the GRO analyses. It is now understood that samples for Method 8021B should be maintained at 2-6 deg C, regardless of the type of sample preservation. All BTEX data should be regarded as estimated.

iii. All other analyses: The samples for fuels, PCBs, pesticides, metals, and low-level volatile analyses all arrived at the laboratory at 7 deg C. This is just outside the required temperature range of 2-6 deg C. It is the opinion of the project chemist that the data from these surface soil samples were not significantly affected by being at a temperature 1 degree outside of the required range, and that qualifying the entire data set as "estimated" because of this marginally elevated temperature is not justified.

3.4.2 Gasoline Range Organics: The associated AK-101 trip blank was found to contain 1.3 mg/kg of GRO. Low levels of GRO reported in some field samples (98ATKA01SL, -02SL, -03SL, -06SL, -08SL, -12SL, -13SL, and -18SL) should be regarded as the result of laboratory or post-sampling contamination, and have been flagged as "B".

3.4.3 BTEX: All Method 8021B analyses were performed within the method holding time of 14 days, but outside of an abbreviated holding time of 7 days recommended for samples with a temperature exceeding 6 deg C. The BTEX analyses are already flagged as "estimated" due to elevated temperature (Section 5(a)(ii) above).

The associated trip blank was found to contain 0.12 mg/kg toluene and 0.16 mg/kg m+p-xylenes. The low levels of m+p-xylenes in samples 98ATKA03SL and -07SL should be regarded as the result of laboratory or post-sampling contamination, and have been flagged as "B".

3.4.4 Diesel Range Organics: Samples 98ATKA03SL, -07SL, and -15SL were reanalyzed at a dilution, due to exceedance of calibration ranges. The data reviewer recommends that the results from the dilution reanalyses should be used as the final valid result.

3.4.5 Residual Range Organics: Most AK-103 analyses have been flagged "J" due to low surrogate recoveries. This primarily affects samples with concentrations well below any regulatory level.

3.1 mg/kg was reported in the associated method blank, and the very low concentrations of RRO detected in samples 98ATKA05SL, -10SL, and -15SL should be regarded as due to laboratory contamination.

Samples 98ATKA06SL, -07SL, and -12SL were reanalyzed at a dilution, due to exceedance of calibration ranges. The data reviewer recommends that the results from the dilution reanalyses should be used as the final valid result.

3.4.6 Chlorinated Volatile Compounds: All Method 8260B analyses were performed within the method holding time of 14 days, but outside of an abbreviated holding time of 7 days recommended for samples with a temperature exceeding 6 deg C. Since the sample temperature was only 1 deg C over this limit, and the samples were preserved with sodium bisulfate solution, the abbreviated holding-time criterion suggested by the data reviewer is thought to be unecessarily restrictive.

Due to field error, no sodium bisulfate trip blank was prepared. However, since no target analytes were detected in the field samples, this omission did not affect data usability.

3.4.7 Total metals: All mercury data should be regarded as estimated due to poor precision between the matrix spike and matrix spike duplicates.

Many low-level concentrations of cadmium, chromium, lead, and nickel should be regarded as estimates as they are below the laboratory reporting limits, these are flagged "J" in the data tables

3.4.8 PCBs: The field duplicate samples for Method 8082 (98ATKA16SL and -23SL) disagreed by more than a factor of 5. These samples were co-located rather than homogenized duplicates, and the discrepancy is most likely due to variability in contaminant distribution.

4. References

a. Meeting notes (Roe/Bethel/Floyd) dated 1 Dec 1998, subject: Draft Table of Contents for Aleutian PA/SI Reports.

b. E-mail message CEPOA-EN-G-MI (TeVrucht) dated 25 Nov 1998, subject: Aleutian SI reports.

c. E-mail message CEPOA-EN-EE-TE (Gagnon) dated 3 Sep 1998, subject: RE: Another InPR - Another SI.

d. Memorandum CEPOA-PM-E-F dated 25 Nov 97, subject: Work Request.

e. Ethix, Data Validation Report, Atka Island Soil Sampling, prepared for Army Corps of Engineers - Alaska District, Project # 98-056, 23 Sep 98.

f. Sound Analytical Services, Inc., Test Results, Project #98-056 Atka Island ERP-027, Report Number 73811, 30 Jul 1998.

g. Memorandum CEPOA-EN-EE-II dated 11 May 1998, subject: Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS), Draft Site Investigation Work Plans, Atka Island, Cape Yakak AWS Site, Ogliuga Island Landing Field, Cape Prominence, and Tigalda Island AWS Sites, Alaska.

h. Telephone conversation with George Dirks, Vice Mayor of Atka, 30 March 1998.

i. U.S. Army Corps of Engineers, ER 1110-1-263, Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities, 1 April 1996.

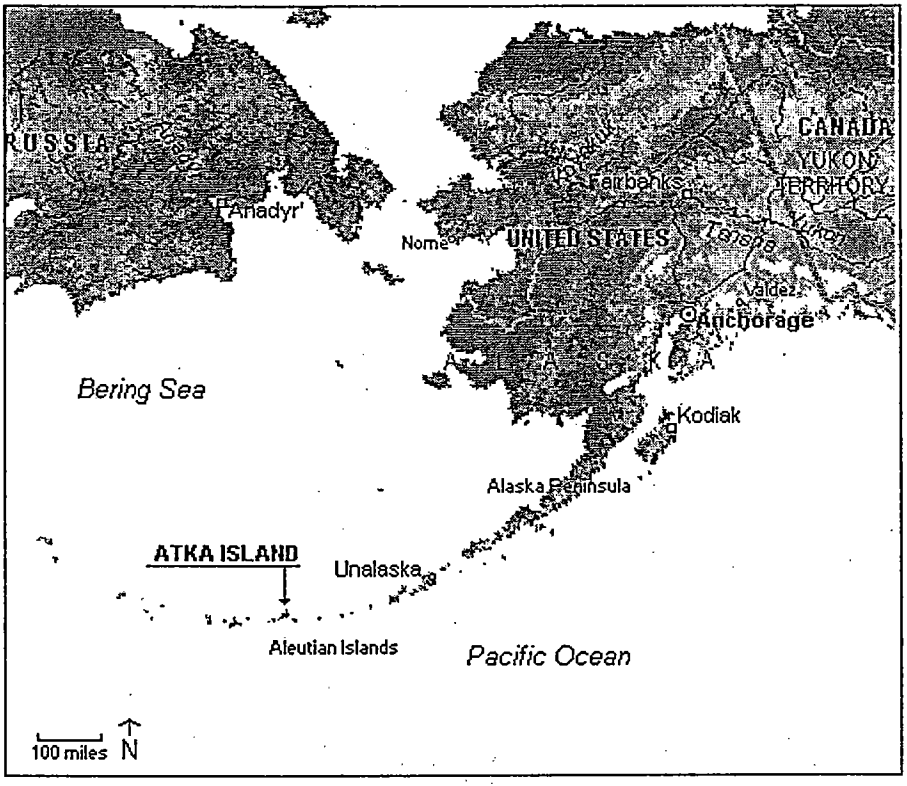
j. U.S. Army Corps of Engineers, EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans, 1 September 1994.

k. U.S. Army Corps of Engineers, EM 200-1-6, Chemical Quality Assurance for HTRW Projects, 10 October 1997.

l. U.S. Army Corps of Engineers, EM 200-1-2, Technical Project Planning Guidance for HTRW Data Quality Design, 31 July 1995.

m. U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 Third Edition, Final Update III, December 1996.

n. State of Alaska Department of Environmental Conservation, 18 AAC 75, Oil and Hazardous Substances, Pollution Control Regulations, Cleanup Standards, Public Review Draft, 12 November 1997.



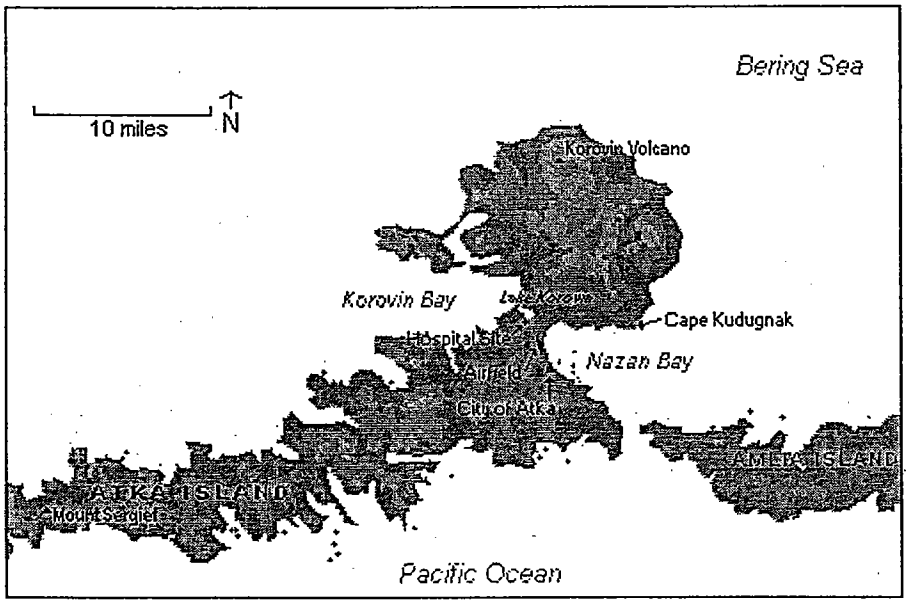


FIGURE 1

LOCATION MAP

Atka Island

Maps adapted from MicroSoft ExpediaMaps

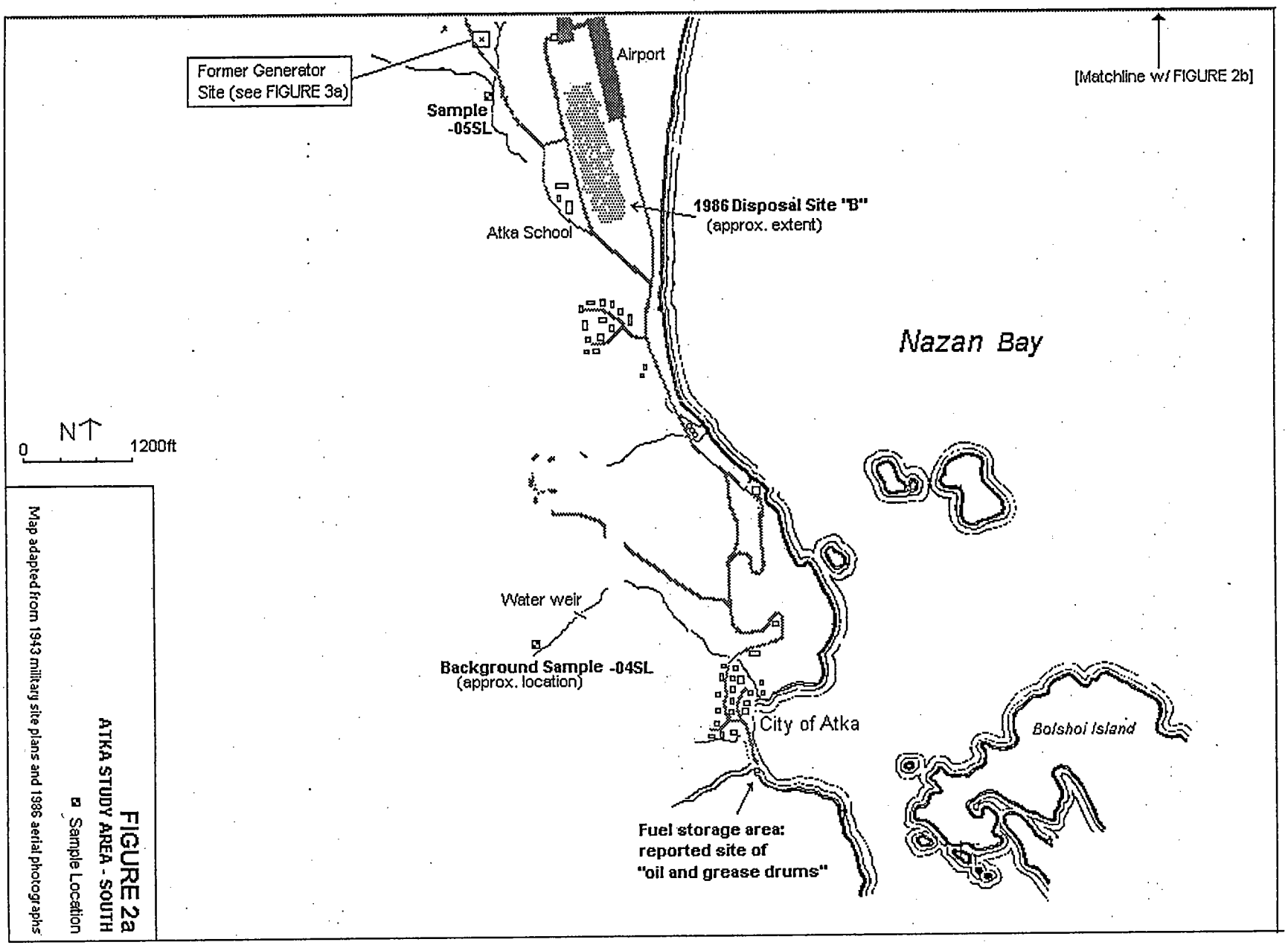
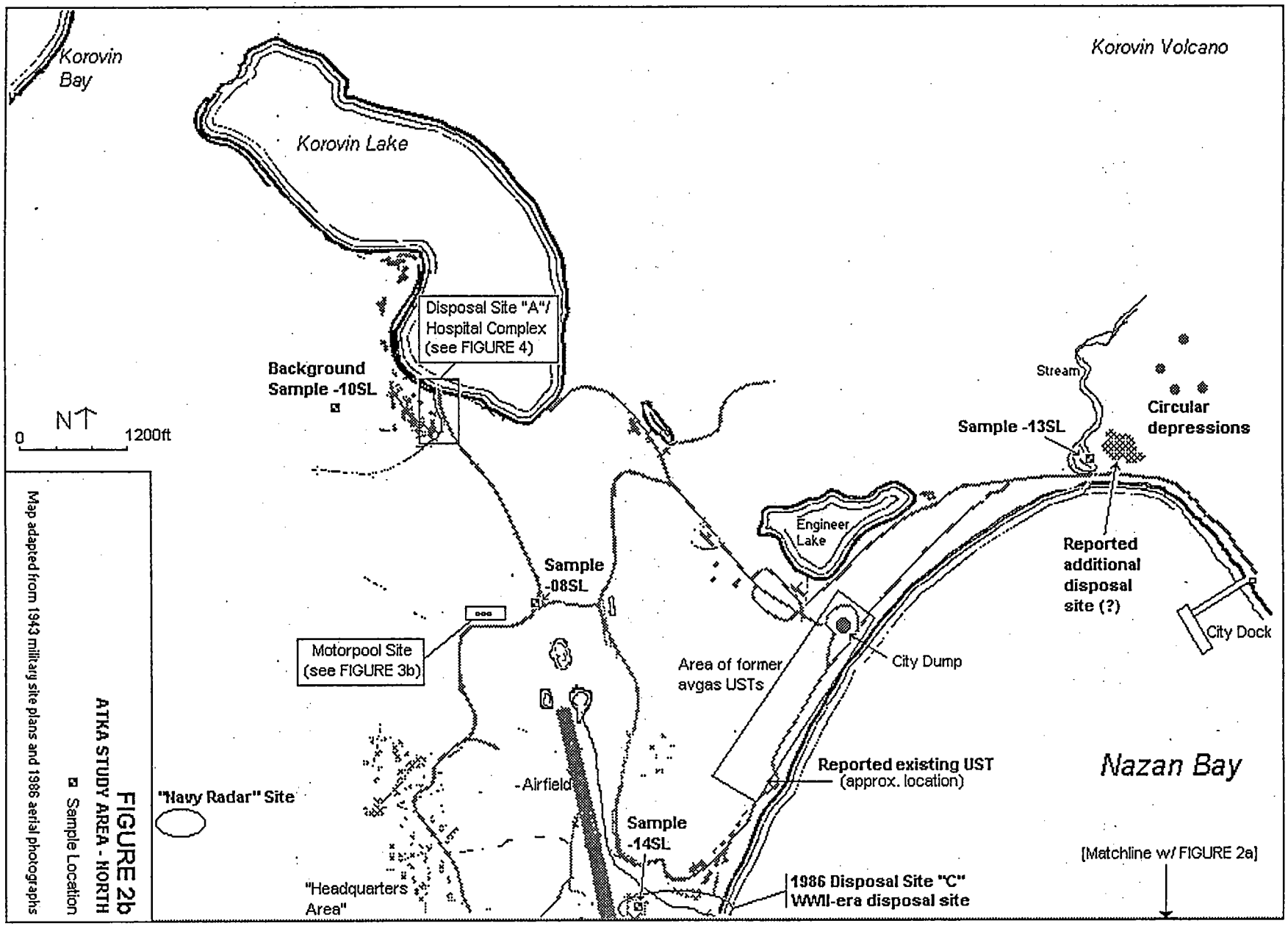
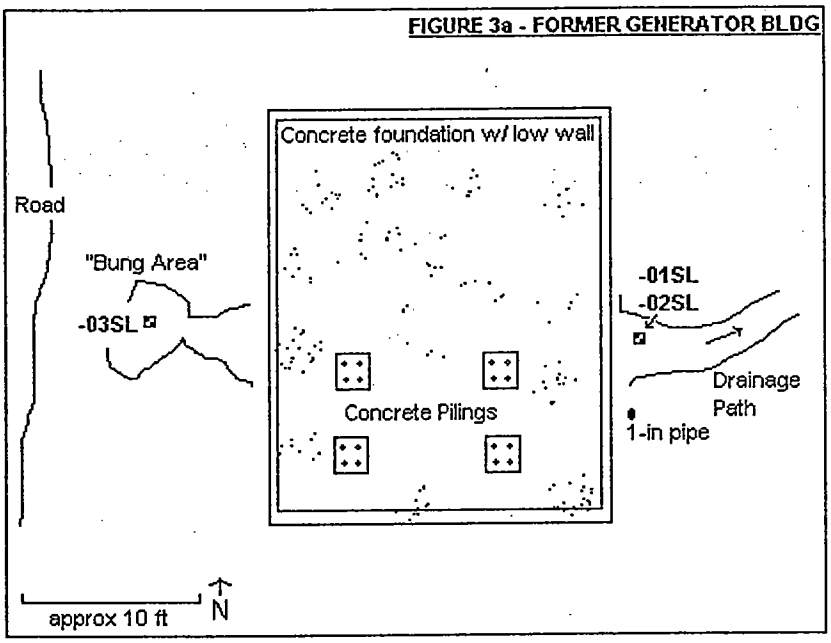


FIGURE 2a
ATKA STUDY AREA - SOUTH
Sample Location
Map adapted from 1943 military site plans and 1986 aerial photographs


Korovin Bay
Korovin Lake
Korovin Volcano
Disposal Site "A"/ Hospital Complex (see FIGURE 4)
Background Sample -10SL
N
0
1200ft
Stream
Circular depressions
Sample -13SL
Engineer Lake
Reported additional disposal site (?)
City Dock
Sample -08SL
Motorpool Site (see FIGURE 3b)
Area of former avgas USTs
City Dump
Reported existing UST (approx. location)
Nazan Bay
"Navy Radar" Site
Airfield
Sample -14SL
[Matchline w/ FIGURE 2a]
"Headquarters Area"
1986 Disposal Site "C" WWII-era disposal site
FIGURE 2b
ATKA STUDY AREA - NORTH
Sample Location
Map adapted from 1943 military site plans and 1986 aerial photographs



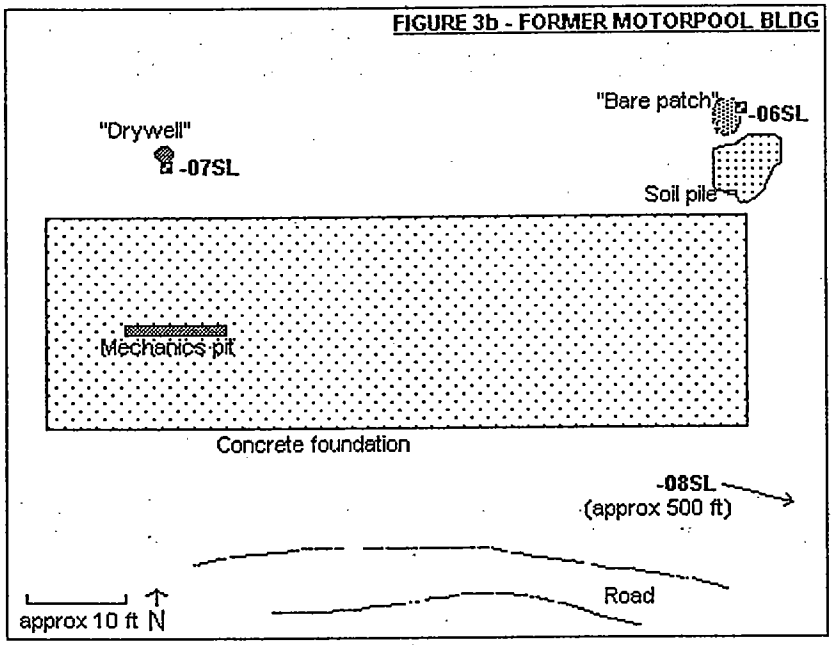


FIGURE 3

SAMPLING LOCATIONS

Former Generator Building
Former Motorpool Building
Atka Island

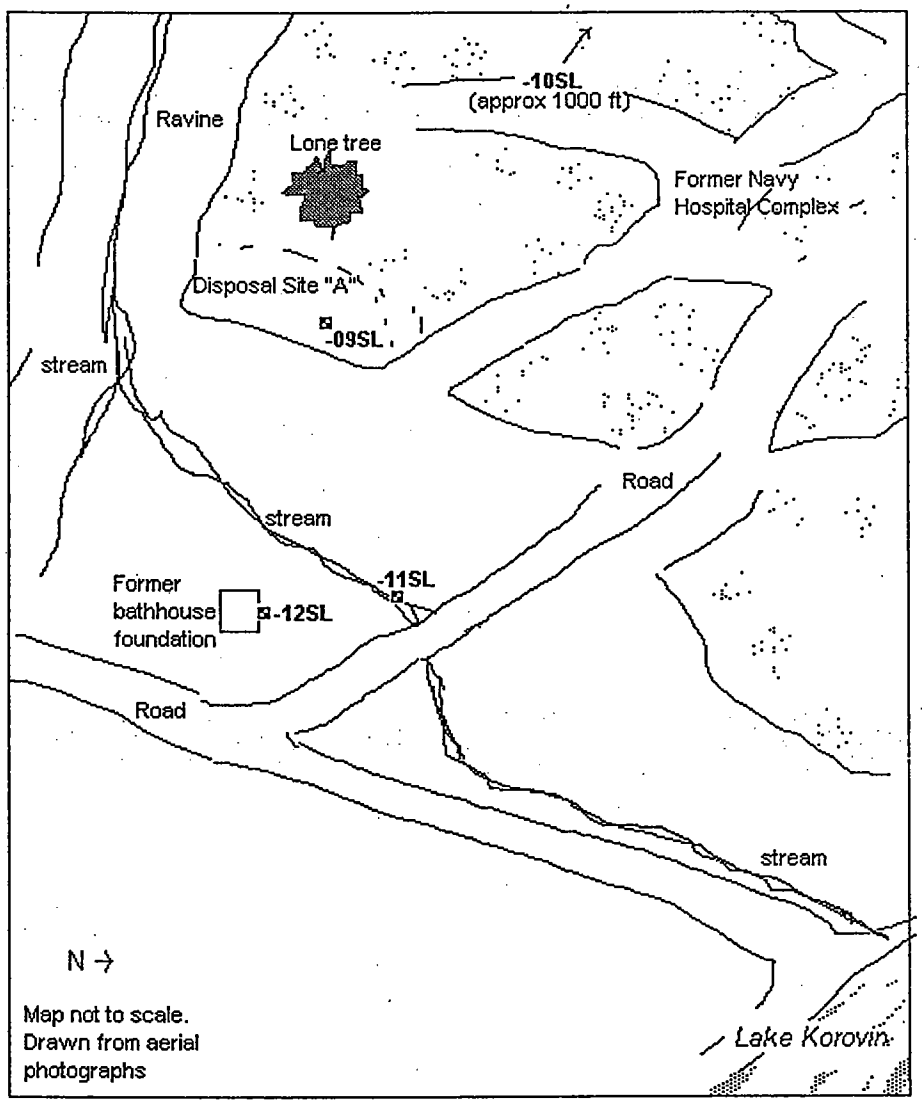
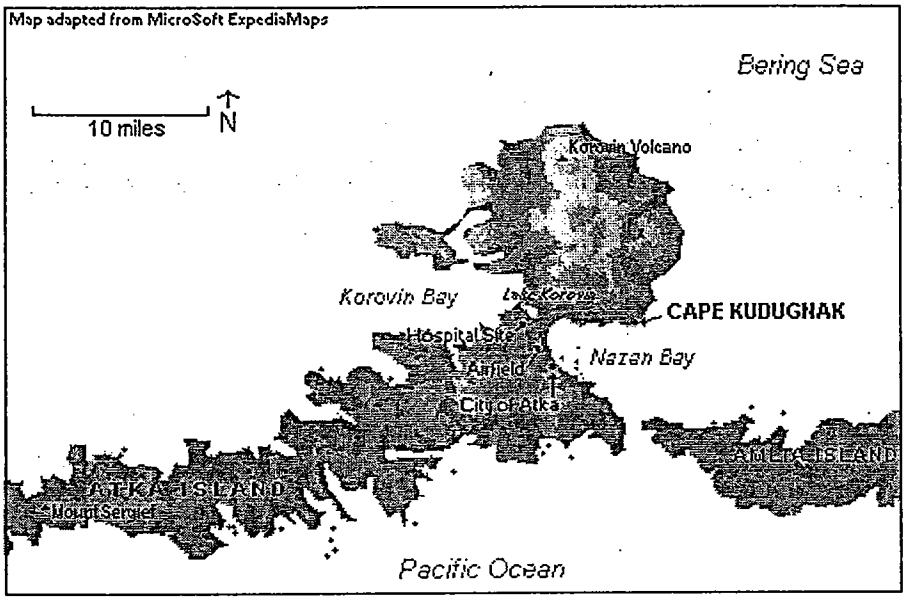


FIGURE 4

▣ SAMPLE LOCATIONS

Former Hospital/Disposal Site "A"

Atka Island



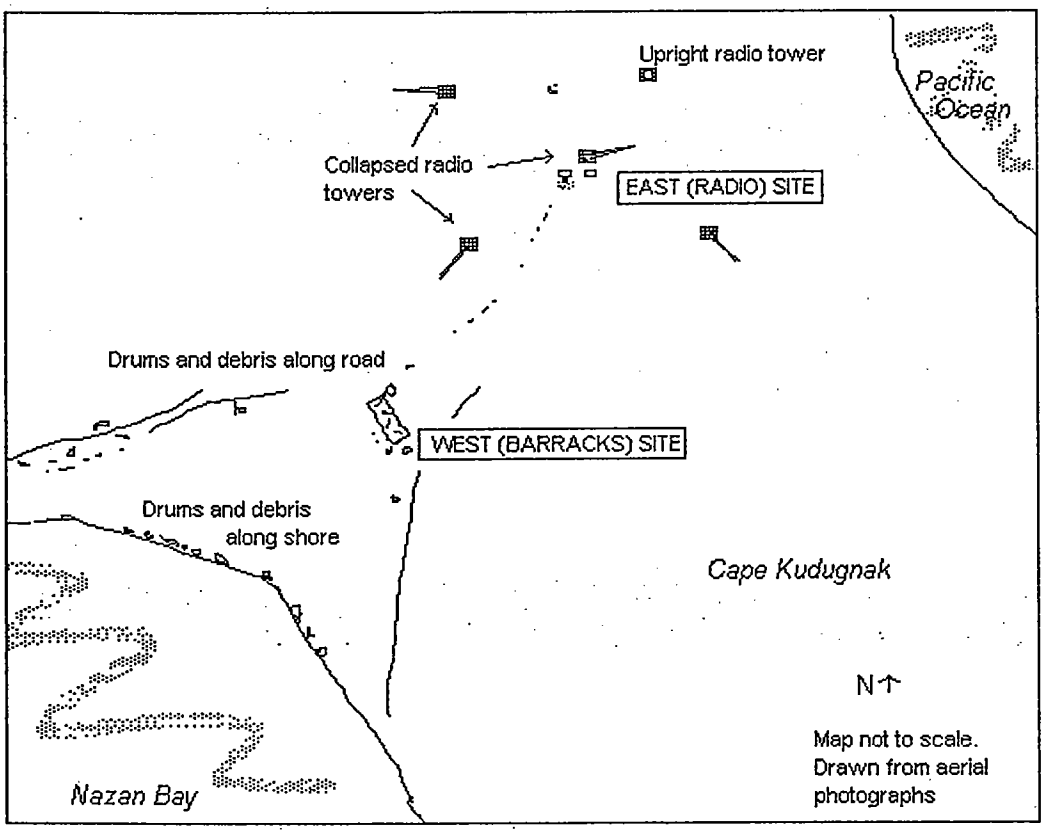
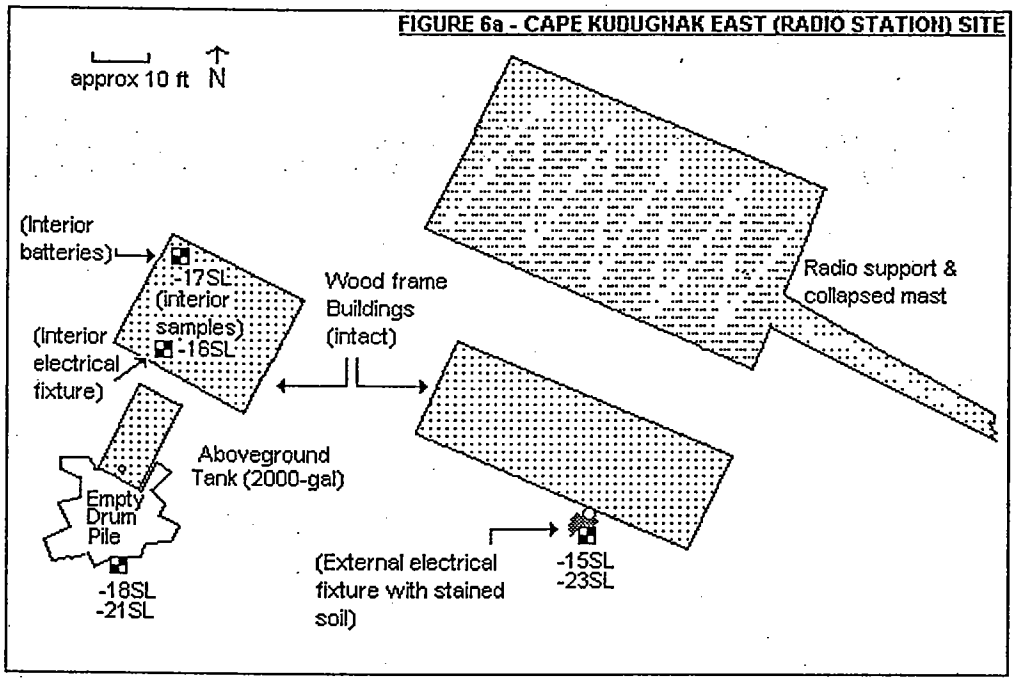


FIGURE 5

SITE LOCATION MAP

Cape Kudugnak
Atka Island



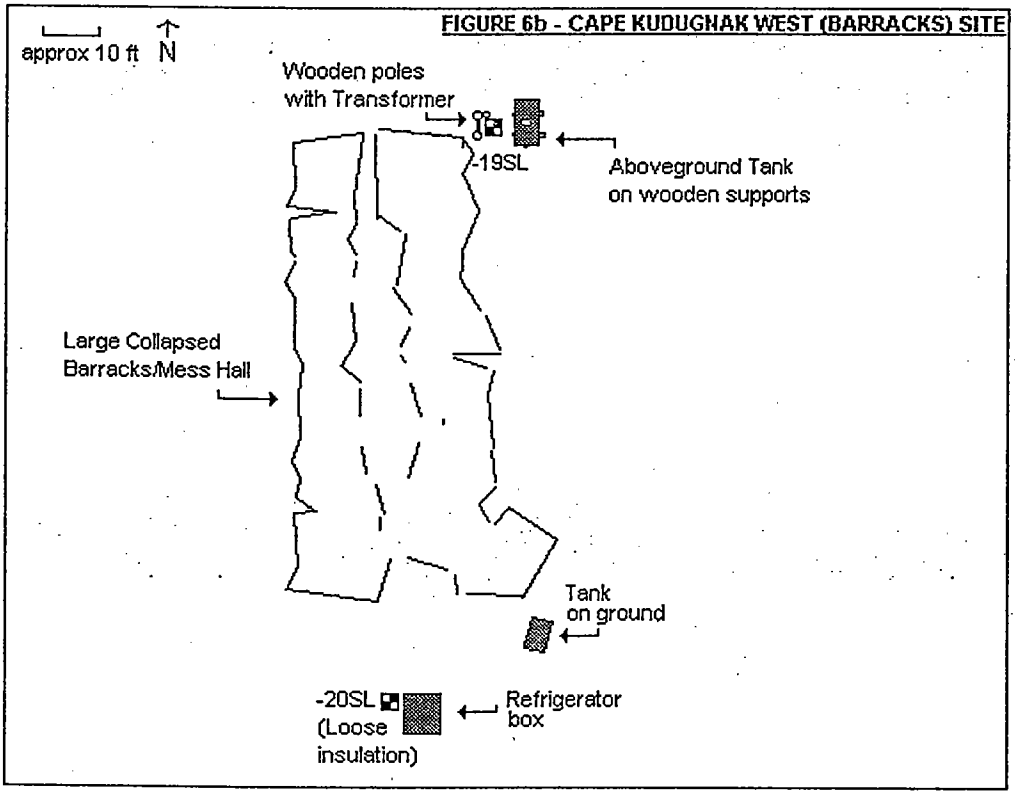


FIGURE 6

SAMPLE LOCATIONS

Cape Kudugnak Site

Atka Island

APPENDIX A

Chemical Data Tables

Table A-1 List of Samples and Analyses, Atka Island												
Sample # 98ATKA-		GRO	DRO	RRO	BTEX	VOCs	Pests	PCBs	PAHs	Metal	Asbst	
-01SL	Generator bldg foundation - E	x	x	x	x	x	x	x	x	x		
-02SL	field duplicate of -01SL	x	x	x	x	x	x	x	x	x		
-03SL	Generator bldg foundation - W	x	x	x	x			x	x			
-04SL	Background - city water weir		x	x			x			x		
-05SL	"HQ Area" creek		x	x			x	x	x	x		
-06SL	Motorpool - bare NE area	x	x	x	x	x	x	x	x	x		
-07SL	Motorpool - suspected drywell	x	x	x	x	x		x	x	x		
-08SL	Ditch w/ sheen	x	x	x	x			x				
-09SL	Hospital/Disposal Site A cap		x	x	x	x	x	x	x	x	x	
-10SL	Background - hospital area W		x	x					x	x		
-11SL	Hospital area creek				x			x		x	x	
-12SL	Hospital 'bathhouse'	x	x	x				x		x		
-13SL	Creek near city dock	x	x	x	x			x		x		
-14SL	Disposal Site C depression		x	x		x	x	x		x		
-15SL	C.Kudugnak radio bldg E		x	x				x	x	x		
-16SL	C. Kudugnak radio bldg W							x		x		
-17SL	C. Kudugnak radio bldg W									x		
-18SL	C. Kudugnak radio drum pile	x	x	x	x		x	x	x			
-19SL	C. Kudugnak E site transformer							x				
-20SL	C. Kudugnak refrig. insulation										x	
-21SL	field duplicate of -18SL		x	x								
-22SL	trip blank	x			x							
-23SL	field duplicate of -15SL							x				

GRO: Gasoline Range Organics by Method AK-101
DRO: Diesel Range Organics by Method AK-102
RRO: Residual Range Organics by Method AK-103
BTEX: Aromatic Volatile Hydrocarbons by Method 8021B
VOCs: Selected chlorinated Volatile Organic Compounds by Method 8260B
Pests: Pesticides by Method 8081A
PCBs: Polychlorinated Biphenyls by Method 8082
PAHs: Selected Polyaromatic Hydrocarbons by Method 8270C
Metal: Arsenic, barium, cadmium, chromium, lead, mercury, nickel, and vanadium, by various methods
Asbest: Asbestos by Method 9002

Table 1
ATKA Island
Method AK101 - Gasoline Range Organics
Method AK102 - Diesel Range Organics
Method AK103 - Residual Range Organics
June, 1998

LOCATION OF SAMPLE:	Gen Bldg	Field Dup Gen Bldg	Gen Bldg	Weir Bkgd	HQ Creek
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	01SL	02SL	03SL	04SL	05SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-01	73811-02	73811-03	73811-04	73811-05
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3 - 13/98	7/3 - 17/98	7/14 - 17/98	7/13/98	7/14/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	2.9 J,B	1.1 J,B	4.8 B	NT	NT
Diesel Range Organics	12000	12000	4500	16	ND (5)
Residual Range Organics	15000 B	35000 B	220 B	99 B,J	12 B,J

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
B: Analyted was detected in the associated method blank.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 1
ATKA Island
Method AK101 - Gasoline Range Organics
Method AK102 - Diesel Range Organics
Method AK103 - Residual Range Organics
June, 1998

LOCATION OF SAMPLE:	Motor Pool	Motor Pool	Culvert	Hospital	Hospital Bkgd
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	06SL	07SL	08SL	09SL	10SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-06	73811-07	73811-08	73811-09	73811-10
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3 - 13/98	7/15 - 17/98	7/3 - 13/98	7/13/98	7/15/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	0.93 J,B	9	0.63 J,B	NT	NT
Diesel Range Organics	81	88	23	18	ND (5.2)
Residual Range Organics	380 B	660 B	70 B,J	180 B,J	15 B,J

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
B: Analyted was detected in the associated method blank.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 1
ATKA Island
Method AK101 - Gasoline Range Organics
Method AK102 - Diesel Range Organics
Method AK103 - Residual Range Organics
June, 1998

LOCATION OF SAMPLE:	Hospital Bldg	Dock Creek	Site C	Kudugnak	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	12SL	13SL	14SL	15SL	18SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-12	73811-13	73811-14	73811-15	73811-18
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/4 - 13/98	7/4 - 13/98	7/15/98	7/15/98	7/4 - 17/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	2.1 J	0.44 J,B	NT	NT	2.4 J,B
Diesel Range Organics	82	ND (4.9)	3.8 J	26000	140
Residual Range Organics	320 B	14 B,J	16 B,J	2800 B	520 B,J

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
B: Analyted was detected in the associated method blank.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 1
ATKA Island
Method AK101 - Gasoline Range Organics
Method AK102 - Diesel Range Organics
Method AK103 - Residual Range Organics
June, 1998

LOCATION OF SAMPLE:	Kudugnak
DATE OF SAMPLE:	6/21/98
TYPE OF SAMPLE:	Soil
FIELD SAMPLE ID: 98ATKA-	21SL
TESTING LABORATORY:	SAS
LABORATORY SAMPLE ID:	73811-21
DATE RECEIVED:	6/25/98
DATE ANALYZED:	7/15 - 17/98
CONCENTRATION UNITS:	mg/Kg
Gasoline Range Organics	NT
Diesel Range Organics	120
Residual Range Organics	550 B

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
B: Analyted was detected in the associated method blank.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 2
ATKA Island
Method 8021A, Volatile Aromatic Hydrocarbons
Method 8260B, Volatile Organic Compounds
June, 1998

LOCATION OF SAMPLE:	Gen Bldg	Field Dup Gen Bldg	Gen Bldg	Motor Pool	Motor Pool
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	01SL	02SL	03SL	06SL	07SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-01	73811-02	73811-03	73811-06	73811-07
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/3/98	7/3/98	7/3/98	7/3/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	ND (0.078)	ND (0.048)	ND (0.051)	ND (0.033)	ND (0.062)
Toluene	ND (0.078)	ND (0.048)	ND (0.051)	ND (0.033)	ND (0.062)
Ethylbenzene	ND (0.078)	ND (0.048)	0.03 J	ND (0.033)	ND (0.062)
m,p-Xylene (Sum of Isomers)	ND (0.16)	ND (0.095)	0.08 J,B	ND (0.065)	0.077 J,B
o-Xylene	ND (0.078)	ND (0.048)	0.038 J	ND (0.033)	ND (0.062)
Carbon tetrachloride	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
Chlorobenzene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
1,2-Dichlorobenzene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
cis-1,2-Dichloroethene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
trans-1,2-Dichloroethene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
1,1,2,2-Tetrachloroethane	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
1,1,1-Trichloroethane	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
Trichloroethene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
Tetrachloroethene	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)
Vinyl chloride	ND (0.62)	ND (0.29)	NT	ND (0.32)	ND (0.57)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
B: Analyte was detected in the method blank.
NT: Not Tested
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 2
ATKA Island
Method 8021A, Volatile Aromatic Hydrocarbons
Method 8260B, Volatile Organic Compounds
June, 1998

LOCATION OF SAMPLE:	Culvert	Hospital	Hosp Bkgd	Dock Creek	Site C
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	08SL	09SL	12SL	13SL	14SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-08	73811-09	73811-12	73811-13	73811-14
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/3/98	7/4/98	7/4/98	7/3/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	ND (0.029)	ND (0.077)	ND (0.077)	ND (0.018)	NT
Toluene	ND (0.029)	ND (0.077)	ND (0.077)	ND (0.018)	NT
Ethylbenzene	ND (0.029)	ND (0.077)	ND (0.077)	ND (0.018)	NT
m,p-Xylene (Sum of Isomers)	ND (0.059)	ND (0.15)	ND (0.15)	ND (0.037)	NT
o-Xylene	ND (0.029)	ND (0.077)	ND (0.077)	ND (0.018)	NT
Carbon tetrachloride	NT	ND (0.73)	NT	NT	ND (0.52)
Chlorobenzene	NT	ND (0.73)	NT	NT	ND (0.52)
1,2-Dichlorobenzene	NT	ND (0.73)	NT	NT	ND (0.52)
cis-1,2-Dichloroethene	NT	ND (0.73)	NT	NT	ND (0.52)
trans-1,2-Dichloroethene	NT	ND (0.73)	NT	NT	ND (0.52)
1,1,2,2-Tetrachloroethane	NT	ND (0.73)	NT	NT	ND (0.52)
1,1,1-Trichloroethane	NT	ND (0.73)	NT	NT	ND (0.52)
Trichloroethene	NT	ND (0.73)	NT	NT	ND (0.52)
Tetrachloroethene	NT	ND (0.73)	NT	NT	ND (0.52)
Vinyl chloride	NT	ND (0.73)	NT	NT	ND (0.52)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 2
ATKA Island
Method 8021A, Volatile Aromatic Hydrocarbons
Method 8260B, Volatile Organic Compounds
June, 1998

LOCATION OF SAMPLE:	Kudugnak
DATE OF SAMPLE:	6/21/98
TYPE OF SAMPLE:	Soil
FIELD SAMPLE ID: 98ATKA-	18SL
TESTING LABORATORY:	SAS
LABORATORY SAMPLE ID:	73811-18
DATE RECEIVED:	6/25/98
DATE ANALYZED:	7/4/98
CONCENTRATION UNITS:	mg/Kg
Benzene	ND (0.095)
Toluene	ND (0.095)
Ethylbenzene	ND (0.095)
m,p-Xylene (Sum of Isomers)	ND (0.19)
o-Xylene	ND (0.095)
Carbon tetrachloride	NT
Chlorobenzene	NT
1,2-Dichlorobenzene	NT
cis-1,2-Dichloroethene	NT
trans-1,2-Dichloroethene	NT
1,1,2,2-Tetrachloroethane	NT
1,1,1-Trichloroethane	NT
Trichloroethene	NT
Tetrachloroethene	NT
Vinyl chloride	NT

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 3
ATKA Island
Method 8270 SIMS
Polyaromatic Hydrocarbons (PAH's)
June, 1998

LOCATION OF SAMPLE:	Gen Bldg	Field Dup Gen Bldg	Gen Bldg	HQ Creek	Motor Pool
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	01SL	02SL	03SL	05SL	06SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-01	73811-02	73811-03	73811-05	73811-06
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/3/98	7/3/98	7/3/98	7/3/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	6100	8300	ND (14)	ND (9.5)	150
2-Methylnaphthalene	3700	5200	ND (27)	ND (19)	100
Acenaphthylene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Acenaphthene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Fluorene	ND (1100)	ND (1300)	ND (27)	ND (19)	ND (29)
Phenanthrene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Anthracene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Fluoranthene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Pyrene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Benzo(a)anthracene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Chrysene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Benzo(b)fluoranthene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Benzo(k)fluoranthene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Benzo(a)pyrene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Indeno(1,2,3-cd)pyrene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Dibenzo(a,h)anthracene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)
Benzo(g,h,i)perylene	ND (540)	ND (670)	ND (14)	ND (9.5)	ND (14)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 3
ATKA Island
Method 8270 SIMS
Polyaromatic Hydrocarbons (PAH's)
June, 1998

LOCATION OF SAMPLE:	Motor Pool	Hospital	Hosp Bkgd	Kudugnak	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	07SL	09SL	10SL	15SL	18SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-07	73811-09	73811-10	73811-15	73811-18
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/3/98	7/3/98	7/4/98	7/4/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	350	ND (25)	ND (9.2)	1000	220
2-Methylnaphthalene	150	ND (50)	ND (18)	530	150
Acenaphthylene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Acenaphthene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Fluorene	ND (22)	ND (50)	ND (18)	ND (110)	ND (44)
Phenanthrene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Anthracene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Fluoranthene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Pyrene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Benzo(a)anthracene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Chrysene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Benzo(b)fluoranthene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Benzo(k)fluoranthene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Benzo(a)pyrene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Indeno(1,2,3-cd)pyrene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Dibenzo(a,h)anthracene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)
Benzo(g,h,i)perylene	ND (11)	ND (25)	ND (9.2)	ND (55)	ND (22)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 4
ATKA Island
Method 8081A & 8082
Organochlorine Pesticides & PCB'S
June, 1998

LOCATION OF SAMPLE:	Gen Bldg	Field Dup Gen Bldg	Gen Bldg	Weir Bkgd	HQ Creek
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	01SL	02SL	03SL	04SL	05SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-01	73811-02	73811-03	73811-04	73811-05
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/3/98	7/3/98	7/3/98	7/3/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Aldrin	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
alpha-BHC	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
beta-BHC	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
delta-BHC	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
gamma-BHC (Lindane)	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
Chlordane	ND (680)	ND (800)	NT	ND (21)	ND (12)
4,4'-DDD	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
4,4'-DDE	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
4,4'-DDT	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Dieldrin	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Endosulfan I	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
Endosulfan II	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Endosulfan sulfate	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Endrin	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Endrin aldehyde	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Heptachlor	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
Heptachlor epoxide	ND (68)	ND (80)	NT	ND (2.1)	ND (1.2)
Methoxychlor	ND (680)	ND (800)	NT	ND (21)	ND (12)
Endrin ketone	ND (140)	ND (160)	NT	ND (4.2)	ND (2.4)
Toxaphene	ND (6800)	ND (8000)	NT	ND (210)	ND (120)
PCB-1016 (Aroclor 1016)	ND (140)	ND (150)	ND (150)	NT	ND (130)
PCB-1221 (Aroclor 1221)	ND (280)	ND (300)	ND (300)	NT	ND (250)
PCB-1232 (Aroclor 1232)	ND (140)	ND (150)	ND (150)	NT	ND (130)
PCB-1242 (Aroclor 1242)	ND (140)	ND (150)	ND (150)	NT	ND (130)
PCB-1248 (Aroclor 1248)	ND (140)	ND (150)	ND (150)	NT	ND (130)
PCB-1254 (Aroclor 1254)	ND (140)	ND (150)	ND (150)	NT	ND (130)
PCB-1260 (Aroclor 1260)	ND (140)	ND (150)	ND (150)	NT	ND (130)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 4
ATKA Island
Method 8081A & 8082
Organochlorine Pesticides & PCB'S
June, 1998

LOCATION OF SAMPLE:	Motor Pool	Motor Pool	Culvert	Hospital	Hospital Creek
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	06SL	07SL	08SL	09SL	11SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-06	73811-07	73811-08	73811-09	73811-11
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/3/98	7/17/98	7/17/98	7/3/98	7/17/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Aldrin	ND (1.7)	NT	NT	ND (2.5)	NT
alpha-BHC	ND (1.7)	NT	NT	ND (2.5)	NT
beta-BHC	ND (1.7)	NT	NT	ND (2.5)	NT
delta-BHC	ND (1.7)	NT	NT	ND (2.5)	NT
gamma-BHC (Lindane)	ND (1.7)	NT	NT	ND (2.5)	NT
Chlordane	ND (17)	NT	NT	ND (25)	NT
4,4'-DDD	ND (3.4)	NT	NT	ND (4.9)	NT
4,4'-DDE	ND (3.4)	NT	NT	ND (4.9)	NT
4,4'-DDT	ND (3.4)	NT	NT	ND (4.9)	NT
Dieldrin	ND (3.4)	NT	NT	ND (4.9)	NT
Endosulfan I	ND (1.7)	NT	NT	ND (2.5)	NT
Endosulfan II	ND (3.4)	NT	NT	ND (4.9)	NT
Endosulfan sulfate	ND (3.4)	NT	NT	ND (4.9)	NT
Endrin	ND (3.4)	NT	NT	ND (4.9)	NT
Endrin aldehyde	ND (3.4)	NT	NT	ND (4.9)	NT
Heptachlor	ND (1.7)	NT	NT	ND (2.5)	NT
Heptachlor epoxide	ND (1.7)	NT	NT	ND (2.5)	NT
Methoxychlor	ND (17)	NT	NT	ND (25)	NT
Endrin ketone	ND (3.4)	NT	NT	ND (4.9)	NT
Toxaphene	ND (170)	NT	NT	ND (250)	NT
PCB-1016 (Aroclor 1016)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)
PCB-1221 (Aroclor 1221)	ND (320)	ND (280)	ND (310)	ND (480)	ND (280)
PCB-1232 (Aroclor 1232)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)
PCB-1242 (Aroclor 1242)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)
PCB-1248 (Aroclor 1248)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)
PCB-1254 (Aroclor 1254)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)
PCB-1260 (Aroclor 1260)	ND (160)	ND (140)	ND (150)	ND (240)	ND (140)

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 4
ATKA Island
Method 8081A & 8082
Organochlorine Pesticides & PCB'S
June, 1998

LOCATION OF SAMPLE:	Hospital Bldg	Dock Creek	Site C	Kudugnak	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	12SL	13SL	14SL	15SL	16SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-12	73811-13	73811-14	73811-15	73811-16
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/17/98	7/17/98	7/15 - 17/98	7/4/98	7/17/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Aldrin	NT	NT	ND (1.2)	NT	NT
alpha-BHC	NT	NT	ND (1.2)	NT	NT
beta-BHC	NT	NT	ND (1.2)	NT	NT
delta-BHC	NT	NT	ND (1.2)	NT	NT
gamma-BHC (Lindane)	NT	NT	ND (1.2)	NT	NT
Chlordane	NT	NT	ND (12)	NT	NT
4,4'-DDD	NT	NT	ND (2.3)	NT	NT
4,4'-DDE	NT	NT	ND (2.3)	NT	NT
4,4'-DDT	NT	NT	ND (2.3)	NT	NT
Dieldrin	NT	NT	ND (2.3)	NT	NT
Endosulfan I	NT	NT	ND (1.2)	NT	NT
Endosulfan II	NT	NT	ND (2.3)	NT	NT
Endosulfan sulfate	NT	NT	ND (2.3)	NT	NT
Endrin	NT	NT	ND (2.3)	NT	NT
Endrin aldehyde	NT	NT	ND (2.3)	NT	NT
Heptachlor	NT	NT	ND (1.2)	NT	NT
Heptachlor epoxide	NT	NT	ND (1.2)	NT	NT
Methoxychlor	NT	NT	ND (12)	NT	NT
Endrin ketone	NT	NT	ND (2.3)	NT	NT
Toxaphene	NT	NT	ND (120)	NT	NT
PCB-1016 (Aroclor 1016)	ND (170)	ND (110)	ND (110)	ND (600)	ND (100)
PCB-1221 (Aroclor 1221)	ND (350)	ND (230)	ND (230)	ND (1200)	ND (210)
PCB-1232 (Aroclor 1232)	ND (170)	ND (110)	ND (110)	ND (600)	ND (100)
PCB-1242 (Aroclor 1242)	ND (170)	ND (110)	ND (110)	ND (600)	ND (100)
PCB-1248 (Aroclor 1248)	ND (170)	ND (110)	ND (110)	ND (600)	ND (100)
PCB-1254 (Aroclor 1254)	ND (170)	ND (110)	ND (110)	ND (600)	ND (100)
PCB-1260 (Aroclor 1260)	ND (170)	ND (110)	ND (110)	760 C1	300 C1

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 4
ATKA Island
Method 8081A & 8082
Organochlorine Pesticides & PCB'S
June, 1998

LOCATION OF SAMPLE:	Kudugnak	Kudugnak	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	18SL	19SL	23SL
TESTING LABORATORY:	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-18	73811-19	73811-23
DATE RECEIVED:	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/4/98	7/17/98	7/4/98
CONCENTRATION UNITS:	ug/Kg	ug/Kg	ug/Kg
Aldrin	ND (2.7)	NT	NT
alpha-BHC	ND (2.7)	NT	NT
beta-BHC	ND (2.7)	NT	NT
delta-BHC	ND (2.7)	NT	NT
gamma-BHC (Lindane)	ND (2.7)	NT	NT
Chlordane	ND (27)	NT	NT
4,4'-DDD	ND (5.5)	NT	NT
4,4'-DDE	ND (5.5)	NT	NT
4,4'-DDT	ND (5.5)	NT	NT
Dieldrin	ND (5.5)	NT	NT
Endosulfan I	ND (2.7)	NT	NT
Endosulfan II	ND (5.5)	NT	NT
Endosulfan sulfate	ND (5.5)	NT	NT
Endrin	ND (5.5)	NT	NT
Endrin aldehyde	ND (5.5)	NT	NT
Heptachlor	ND (2.7)	NT	NT
Heptachlor epoxide	ND (2.7)	NT	NT
Methoxychlor	ND (27)	NT	NT
Endrin ketone	ND (5.5)	NT	NT
Toxaphene	ND (270)	NT	NT
PCB-1016 (Aroclor 1016)	ND (270)	ND (230)	ND (570)
PCB-1221 (Aroclor 1221)	ND (550)	ND (460)	ND (1100)
PCB-1232 (Aroclor 1232)	ND (270)	ND (230)	ND (570)
PCB-1242 (Aroclor 1242)	ND (270)	ND (230)	ND (570)
PCB-1248 (Aroclor 1248)	ND (270)	ND (230)	ND (570)
PCB-1254 (Aroclor 1254)	ND (270)	ND (230)	ND (570)
PCB-1260 (Aroclor 1260)	ND (270)	ND (230)	2300 C1

SAS: Sound Analytical Services, Inc., Tacoma, WA.
NT: Not Tested.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 5
ATKA Island
Total Metals
June, 1998

LOCATION OF SAMPLE:	Gen Bldg	Field Dup Gen Bldg	Weir Bkgd	HQ Creek	Motor Pool
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	01SL	02SL	04SL	05SL	06SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-01	73811-02	73811-04	73811-05	73811-06
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/7/98	7/7/98	7/7/98	7/7/98	7/7/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Arsenic	ND (110)	ND (120)	ND (170)	ND (84)	ND (130)
Barium	41	43	18	25	41
Cadmium	ND (21)	ND (24)	20 J	5.9 J	ND (26)
Chromium	13	12	ND (4.1)	1.7 J	6
Lead	61	87	ND (62)	10 J	220
Mercury	0.23 J	ND (0.15) UJ	0.21 J	ND (0.1) UJ	ND (0.15) UJ
Nickel	11	20	ND (17)	ND (8.4)	ND (13)
Vanadium	83	85	150	67	49

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
UJ: Method Reporting Limit value is estimated.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 5
ATKA Island
Total Metals
June, 1998

LOCATION OF SAMPLE:	Motor Pool	Hospital	Hosp Bkgd	Hosp Creek	Hosp Bldg
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	07SL	09SL	10SL	11SL	12SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-07	73811-09	73811-10	73811-11	73811-12
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/7/98	7/7/98	7/7/98	7/7/98	7/7/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Arsenic	ND (110)	ND (200)	ND (78)	ND (83)	ND (140)
Barium	13	13	42	34	30
Cadmium	ND (23)	ND (40)	ND (16)	ND (17)	46
Chromium	5.8	3.1 J	1.8 J	1.1 J	ND (3.5)
Lead	24 J	46 J	18 J	28 J	110
Mercury	ND (0.1) UJ	0.34 J	ND (0.1) UJ	0.091 J	0.18 J
Nickel	ND (11)	ND (20)	5.3 J	ND (8.3)	ND (14)
Vanadium	51	200	67	54	11 J

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
UJ: Method Reporting Limit value is estimated.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 5
ATKA Island
Total Metals
June, 1998

LOCATION OF SAMPLE:	Dock Creek	Site C	Kudugnak	Kudugnak	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Soil	Soil	Soil
FIELD SAMPLE ID: 98ATKA-	13SL	14SL	15SL	16SL	17SL
TESTING LABORATORY:	SAS	SAS	SAS	SAS	SAS
LABORATORY SAMPLE ID:	73811-13	73811-14	73811-15	73811-16	73811-17
DATE RECEIVED:	6/25/98	6/25/98	6/25/98	6/25/98	6/25/98
DATE ANALYZED:	7/7/98	7/7/98	7/7/98	7/7/98	7/7/98
CONCENTRATION UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Arsenic	ND (69)	ND (87)	ND (470)	ND (81)	ND (76)
Barium	11	13	63	86	350
Cadmium	ND (14)	ND (17)	46 J	45	38
Chromium	ND (1.7)	1.8 J	39	53	56
Lead	18 J	15 J	2500	2000	49000
Mercury	ND (0.081) J	ND (0.098) J	47 J	0.11 J	0.11 J
Nickel	3.1 J	ND (8.7)	ND (47)	37	ND (7.6)
Vanadium	19	45	87	6.9 J	14

SAS: Sound Analytical Services, Inc., Tacoma, WA.
J: Estimated Value.
ND: Not Detected. (The number in parentheses is the Method Reporting Limit (MRL)).

Table 6
ATKA Island
Asbestos
June, 1998

LOCATION OF SAMPLE:	Hospital	Hospital Creek	Kudugnak
DATE OF SAMPLE:	6/21/98	6/21/98	6/21/98
TYPE OF SAMPLE:	Soil	Soil	Insulation
FIELD SAMPLE ID: 98ATAK-	09SL	11SL	20SL
TESTING LABORATORY:	CEC	CEC	CEC
LABORATORY SAMPLE ID:	73811-09	73811-11	73811-20
DATE RECEIVED:	6/30/98	6/30/98	6/30/98
DATE ANALYZED:	7/6/98	7/6/98	7/6/98
Abestos	Non Detected	Non Detected	Non Detected

CEC: Clayton Engironmental consultants, Seattle, WA.

APPENDIX B

Data Quality Review Report

Appendix C

Field Notes

20 JUN 98 DUTCH HARBOR

Flight to Attu leaving early

Hurry to DH Airport ~ arrive 1100

Board Plane 1150 take off 1156

Arrive 1235

Louis Meets us at Airport - takes us to apartment

Talk

1986 - Salmon disappeared / returned in 15 years

Fishing - August / Late July

Depend on freshwater fishing / reindeer hunting

Mark Smigaroff 839-2221 Fisheries

F.

Will meet Sally Sweteoff at 1900 at apartments

see for Gits map

meet Mark Smigaroff

Oil and grease drums - some fall for end pitch

Untouched Site - towers on point

LOUIS' TOUR

Disposal Site "B"

Powerplant across from Airport

Maintenance Bldg

Gary and Heather take off for Sequam Is ~ 1330

Return ~ 1730

No samples collected

10 JUN 98 ATKA

Met Michael Dirks on roadside 1450
Matthew -

1459 Henry Green (Corporic?) & Calvert ...

Construction workers - call after 6:

Mark Snigaroff
Edward Nevaroff
Jeffrey Thompson gone
Martin ? gone
Victor Kalmakoff gone

Danny Snigaroff - brother
Dennis Goledoff ?

Meet 1900 w/ Sally Swetzoff

- Map of area ?
How to pay for rooms, truck lease ?

Danny Snigaroff Nick Dirks - fish plant office 1000

1986 - metal, wood debris dumped near dock

Tanks pulled, and buried, & crushed in place
most - were 55 gallon day tanks

Hondo DeBaker
Amigo

Mark Snigaroff - map of roadways

Subsistence
salmon, trout, steelhead
tanner crab, sea urchins, chitons, sea cucumbers
sea anemones, blue mussels
reindeer, seals
clams
Halibut

1940
End of day

wild parsely
roots -
wild rice (chocolate lily)

Atka - Reports of Problems

1. Stacked oil + grease drums at old village site, near river. buried by village to protect children (unburn)
2. Land fill cover damage - exposed debris Marston matting
3. "4TH" landfill between school + airport
4. AVGAS USTs between village + city dump
5. Former tanks near docks, heavy equipment buried near docks
6. Aircraft engines buried between school + new village
7. Radio tower above Nazan Bay
8. Radio station on Cape Quigimale

Aleutian Island Site Investigations, June 1998
Preliminary Trip Notes

1. Tigalda Island (17 June)

a. Source Areas: The 1943 site plans for this site proved more accurate than E&E's 1993 map, and structures identified as van shelters, a power plant, a radio building, a mess hall, a bath house, and a barracks were investigated and sampled. A partially-buried UST at the power plant was found to be empty; the reported UST at the mess hall (identifiable only by a crooked-top standpipe) is completely buried within the mess hall revetment, and no access could be found. As E&E reported in 1993, no obvious signs of chemical contamination were noted anywhere on the site.

b. Radar Site: The "Van Shelters" indicated on the 1943 site plans almost certainly refer to the support vans for the mobile SCR-270 radar. The two shelters shown on the plans appeared to have been joined into a single large (perhaps 30x70 ft), very heavily-reveted structure. The radar antenna would have either poked up above the shelters, or sat on the narrow ledge between the shelters and the edge of the sea cliff; either way, any transformers or other heavy electrical support equipment was most likely located within the shelters or at the power plant. The floor of the shelters was almost entirely covered with very heavy wood debris, which limited opportunities for systematic soil sampling within the shelters; however, three soil samples were collected from the floor of the shelters, and one from an apparent drainage ditch leading from near the shelter entrance to the edge of the sea cliff. A heavy electrical cable and a 2-inch steel pipe or conduit was found that apparently linked the shelters to the nearby power plant; the soil samples collected from within the shelters were concentrated where these features entered the shelters.

2. Atka Island (20-21 June)

a. 1986 Disposal Areas: Disposal Site "A" is the site at the old Navy Hospital area near Korovin Lake, that also served as the asbestos cell. The site was located easily, although the wooden asbestos warning sign has been removed (a helpful passerby informed us that we were indeed at the right spot, and that the sign had disappeared only recently). The disposal site cover appeared to be in adequate condition with no signs of obvious erosion. However, the vegetation on parts of the cover was sparse, and erosion could start to attack the exposed soil in the future. A couple rolls of seed-mat could probably eliminate the problem. A soil sample was collected from exposed soil at the cap, and sediment was collected from a stream draining the area of the landfill.

Disposal Site "B" occupies a long strip of land between the airport hanger and the village school. Parts of this disposal site were obvious, but it was difficult to determine the limits of the disposal site, or where the cap began and ended. The site is basically a long, wind-scoured strip of sand dunes, sparse vegetation, with debris exposed in low areas. The debris is predominantly rusted fragments of Marston matting, along with bits of wood and an occasional crushed drum. No samples were collected here.

Disposal Site "C" was very difficult to locate precisely, even with photographs from the Site Closure Report. Both Disposal Sites "B" and "C" appear to have been constructed in an active dune-building region; the caps of these sites have probably not so much eroded as migrated away as sand dunes. In the general area of "C", there were signs of more recent disposal, and of a possible WWII-era disposal site. Mr. Louis Nevzoroff, the Village Public Safety Officer, told us that the WWII-era disposal site had not been visible in 1986, but had been uncovered by the sand dunes only in recent years. These other disposal areas tended to greatly confuse our assessment of the 1986 disposal area. A stream also crosses the site, and has cut through the area thought most likely to be "C", exposing more of the ubiquitous Marston matting, and a number of drums. Most of the drums present had been welded together end-to-end for use as culverts. A sample was collected from the bottom of a large depression in the general location of "C".

b. WWII Facilities: The 1986 project appears to have been rather effective in terms of general debris removal. At most former building locations, there is little sign of the structure other than the general outline of the building revetments. Very heavy vegetation growth around most of the former building footprints made the search for signs of USTs unproductive.

Four local citizens who participated in the 1986 cleanup were asked about the practices of removing tanks from the buildings before demolition. No consensus could be reached as to whether tanks were removed from the structures, or were buried in place.

A number of concrete building foundations were found left in place. Three foundations were identified as having been a powerplant, a motorpool building, and a bathhouse, using WWII-era site plans. Evident soil contamination was found at the powerplant and motorpool building sites, in the form of soil smelling distinctly of diesel fuel. Soil samples were collected to characterize this contamination. The sources of contamination at these sites were no longer present.

c. Other Features: Several reports had been heard of military drums containing "oil and grease", that had been buried by local citizens as a safety measure. The burial area we were shown turned out to be directly underneath one of the village's fuel handling facilities, just south of the village. Considerable surface staining and contaminated run-off was noted, but appeared to be most likely originating from the civilian fuel storage tanks and drums on the surface. No samples were collected.

A possible additional military disposal site was reported near the village dock. A nearby stream was said to be covered with a sheen and smell of gasoline when the stream floods. The stream was investigated, and a sample of sediment collected, but no signs of contamination were noted at that time.

d. "New" Site: Following a lead from one of the village officials, the SI team flew to Cape Kudugnak, at the north entrance to Nazan Bay, approximately 10 miles northeast of Atka village. A small but heavily contaminated site (presumably FUDS) was found there. The site consists of an east camp, consisting of two small buildings (still standing), six large radio (?) masts (five collapsed, but one still standing), a large AST, and a large drum dump; a west camp 200 ft away appeared to be the living quarters, and consisted of one large collapsed building, and a large AST. One definite transformer was noted at the west camp, and two probable transformers were noted at the east camp. One east camp building also contained numerous batteries with cracked casings. A number of samples were collected.

3. Ogliuga Island (22 June)

a. Fuel Drums: The 90+ galvanized steel 55-gallon drums with product reported by E&E in 1993 are clearly military in origin. All have "Property US Air Force/US Army" embossed on their lids. Most of the full drums have metal seal caps crimped over the bungs, suggesting that the drums contain their original intended contents (and have not been reused by other parties).

One drum with its seals intact was opened during the site visit. The contents were a water-clear, light-end petroleum product that contained a blue dye. The contents lacked the characteristic sharp benzene odor I associate with modern gasoline, and are probably a slightly heavier fuel product more similar to JP-4. A sample was collected of the fuel for characterization, including lead content.

No actively leaking galvanized drums were noted. However, many empty drums still have their bung-seals intact, suggesting that they have indeed leaked their contents onto the ground (the bodies of the drums are galvanized and intact, but the sealing bands and the crimped edges of the bodies and lids are not). No obvious distressed vegetation was noted around these empty drums. It is probable that once a drum rusted through, it voided the low-viscosity fuel rather quickly, and the fuel in turn quickly evaporated or migrated straight down through the porous peat mat and coarse sand below (thus limiting the areal extent of environmental impact, at least at the ground surface). Soil samples were collected from beneath one such empty but sealed drum.

Appendix D

Photographs

Figure 1.- Collecting soil samples at the Motor Pool Site on Atka Island.

Figure 2.- The foundation of the former Generator Building.

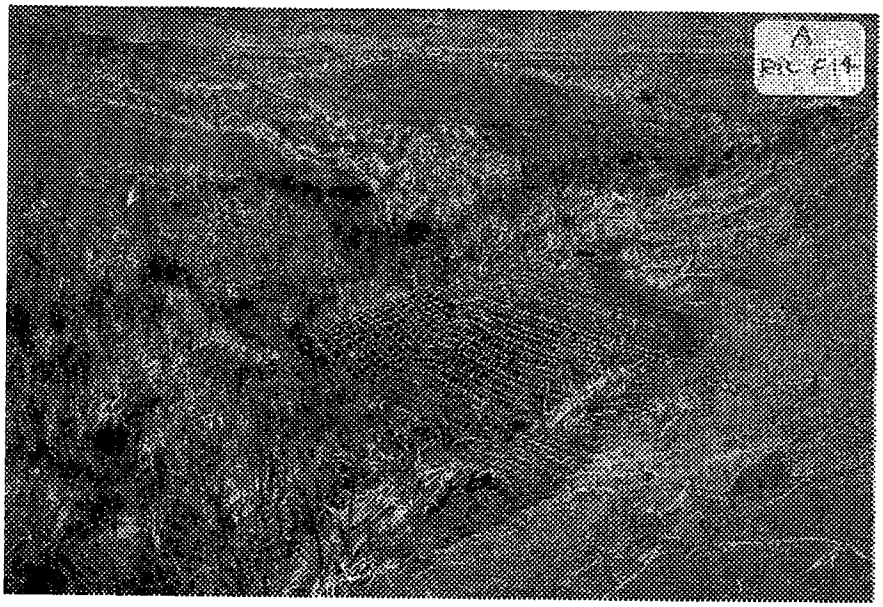


Figure 3.- Exposed debris at one of the Atka landfills.

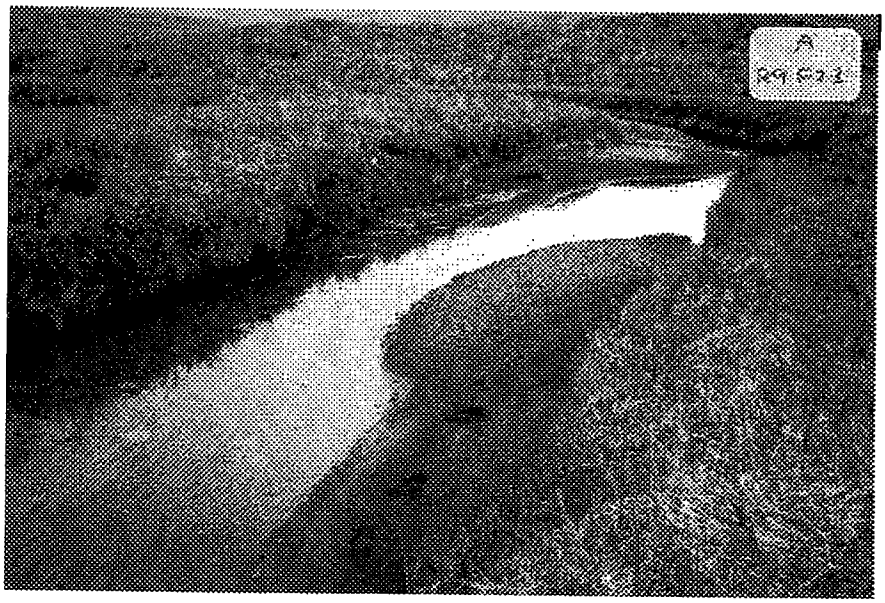


Figure 4.- Discolored stream near one of the landfills.

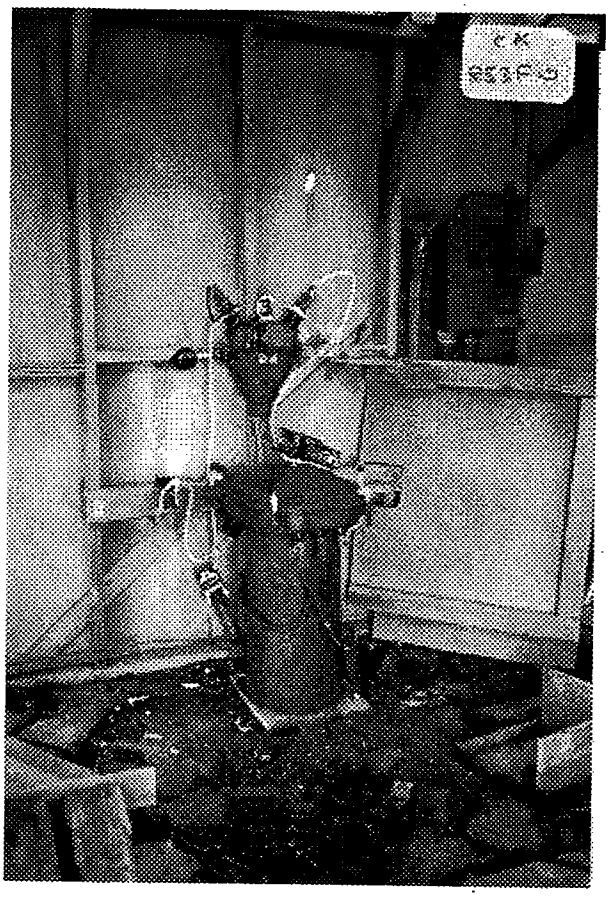


Figure 5.- An abandoned transformer at the Cape Kudugnak Site.

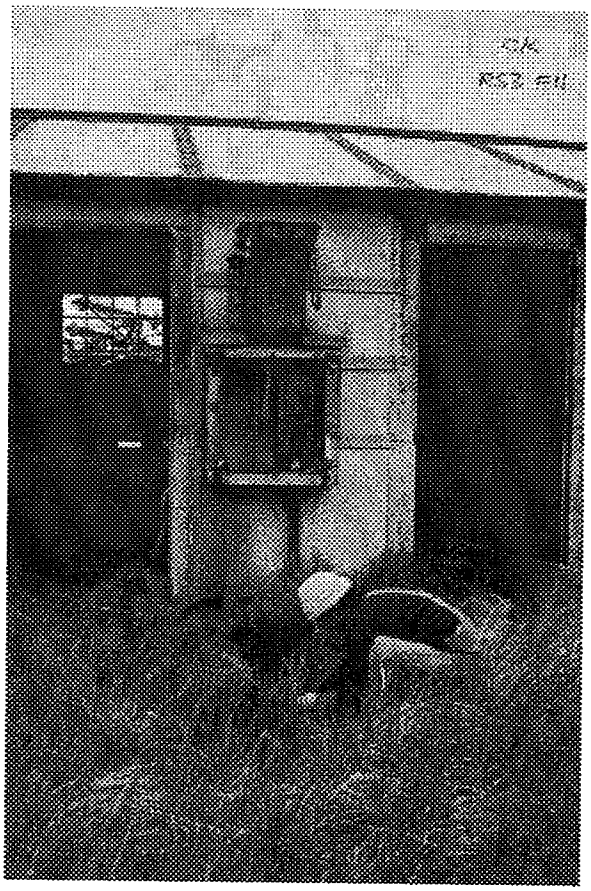


Figure 6.- Collecting a soil sample at the Cape Kudugnak Site.

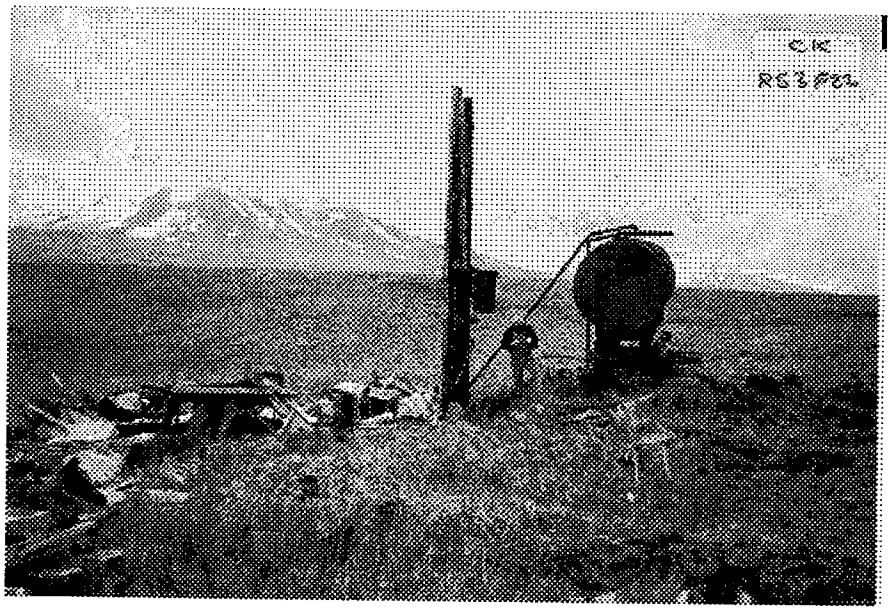


Figure 7.- A transformer and AST at the Cape Kudugnak Site.

Appendix E

Site Ecological Checklist

Appendix IA-2

Site Ecological Checklist

Atka Island

Figure B.1 ECOLOGICAL CHECKLIST #1: GENERAL

1. SITE NAME: Atka Island FUDS

ADEC LC: _____

2. LOCATION: Atka Island, AK

3. LATITUDE: N 52° 12'
4. LONGITUDE: W 174° 12'

5. APPROXIMATE SITE AREA: 10 sq mi

6 DATES OF SITE VISITS:
20-21 June 1998

☐ ATTACH USGS TOPOGRAPHIC MAP
☐ ATTACH AVAILABLE PHOTOS

7. LAND USE ON THE SITE

10 % RESIDENTIAL
_____ % RURAL
_____ % URBAN
10 % INDUSTRIAL/COMMERCIAL
_____ % AGRICULTURAL
_____ % RECREATIONAL
_____ % FOREST/WOODED
_____ % WETLANDS
_____ % UNDISTURBED
80 % OTHER Formerly used Defense site

8. LAND USE SURROUNDING THE SITE

_____ % RESIDENTIAL
100 % RURAL
_____ % URBAN
_____ % INDUSTRIAL/COMMERCIAL
_____ % AGRICULTURAL
_____ % RECREATIONAL
_____ % FOREST/WOODED
_____ % WETLANDS
_____ % UNDISTURBED

_____% OTHER

9. DESCRIBE MOVEMENT OF SOIL ON THE SITE

- ☐ AGRICULTURAL USE
- ☒ NATURAL EVENTS
- ☒ EROSION
- ☐ HEAVY EQUIPMENT
- ☐ MINING
- ☐ OTHER

10. IDENTIFY SENSITIVE ENVIRONMENTS
(PLEASE SEE SECTION 4.2.4.2 State Sensitive Environments AND 4.2.4.3 Federal Sensitive Environments)

Unknown

11. POTENTIAL ROUTES OF OFF-SITE MIGRATION

- ☒ SWALES
- ☒ RUNOFF
- ☒ DEPRESSIONS
- ☒ WINDBLOWN PARTICULATES
- ☒ DRAINAGE DITCHES
- ☐ VEHICULAR TRAFFIC
- ☐ OTHER_____

12. DEPTH OF WATER TABLE Unknown

13. IDENTIFY WATER BODIES ON THE VICINITY OF THE SITE
Kodiak Lake

14. EVIDENCE OF FLOODING
- ☐ YES
- ☒ NO

Figure B.2 ECOLOGICAL CHECKLIST #2: TERRESTRIAL

A. WOODED AREAS

1. ARE THERE WOODED AREAS AT THE SITE
   - ☐ YES
   - ☒ NO

2. PERCENTAGE OF SITE WOODED
   - 0 %
   - 0 acres

3. DOMINANT TYPE OF VEGETATION
   - ☐ DECIDUOUS
   - ☐ MIXED
   - ☐ OTHER _____ N/A

4. DOMINANT TREE SIZE BY DIAM ETER
   - ☐ 0-6 INCH
   - ☐ 6-12 INCH
   - ☐ > 12 INCH N/A

B. SHRUB/SCRUB

1. IS THERE SHRUB/SCRUB VEGETATION PRESENT AT THE SITE
   - ☒ YES
   - ☐ NO

2. PERCENTAGE OF SITE COVERED WITH SHRUB/SCRUB
   - 95 %
   - _____ acres

3. DOMINANT TYPE OF VEGETATION
   - ☒ Grasses
   - ☐

4. DOMINANT HEIGHT OF SHRUB/SCRUB VEGETATION
   - [X] 0-2 FEET
   - [ ] 2-5 FEET
   - [ ] > 5 FEET

5. SHRUB/SCRUB DENSITY
   - [ ] DENSE
   - [X] PATCHY
   - [ ] SPARSE

C. OPEN AREAS

1. ARE THERE OPEN (BARE, BARREN) FIELD AREAS PRESENT AT THE SITE
   - [X] YES
   - [ ] NO

2. PERCENTAGE OF SITE OPEN FIELD
   5 %
   _____ acres

3. DOMINANT TYPE OF PLANT
   - [X] grasses
   - [ ]
   - [ ]

4. DOMINANT HEIGHT OF DOMINANT PLANT
   - [X] 0-2 FEET
   - [ ] 2-5 FEET
   - [ ] > 5 FEET

5. SHRUB/SCRUB DENSITY
   - [ ] DENSE
   - [X] PATCHY
   - [ ] SPARSE

Figure B.3 ECOLOGICAL CHECKLIST #3: AQUATIC-FLOWING SYSTEMS

1. TYPE OF FLOWING WATER SYSTEMS PRESENT AT SITE
   - ☐ RIVER
     - __ PERENNIAL
     - __ INTERMITTENT
   - ☐ STREAM
     - __ PERENNIAL
     - __ INTERMITTENT
   - ☒ CREEK
   - ☐ BROOK
   - ☐ DRY WASH
   - ☐ MAN-MADE (DITCH, ETC.)
   - ☐ ARROYO
   - ☐ INTERMITTENT STREAM
   - ☐ CHANNELING SPARSE
   - ☒ LAKE OR POND
   - ☒ TIDAL STREAM
     - __ BAY
     - __ESTUARY
   - ☐ OTHER

2. GENERAL COMPOSITION OF SUBSTRATE
   - ☐ BEDROCK
   - ☒ SAND
   - ☒ SILT
   - ☐ BOULDER
   - ☐ COBBLE
   - ☐ GRAVEL
   - ☐ MARL
   - ☐ CLAY
   - ☐ MUCK
   - ☐ DEBRIS
   - ☐ MUCK
   - ☐ CONCRETE
   - ☐ OTHER

3. CONDITION OF THE BANK - HEIGHT, SLOPE, ETC.

   Bank height 2-3 feet, vertical

4. FLOW INTERMITTENT
   - ☐ YES

☒ NO

5. DISCHARGE FROM SITE TO WATER BODY
   - ☒ YES
   - ☐ NO

6. DISCHARGE FROM WATER BODY
   - ☒ YES
   - ☒ NO

7. TYPE OF AQUATIC VEGETATION PRESENT
   - ☒ EMERGENT
   - ☐ SUBMERGENT
   - ☐ FLOATING
   - ☐ NONE

8. OTHER ORGANISMS PRESENT
   - ☐ BENTHIC MACRO INVERTEBRATES
   - ☒ FISH
   - ☐ BIRDS
   - ☐ MAMMALS
   - ☐ OTHER
   - ☐ NONE

Figure B.4 ECOLOGICAL CHECKLIST #4: AQUATIC NON-FLOWING SYSTEMS

1. TYPE OF OPEN WATER NON-FLOWING SYSTEMS PRESENT AT SITE
   FLOWING WATER SYSTEMS PRESENT AT SITE
   - [x] NATURAL
   - [ ] MAN MADE

2. KNOWN USES OF WATER BODY
   - [x] RECREATIONAL
   - [ ] NAVIGATIONAL
   - [x] SUBSISTENCE
   - [ ] OTHER

3. APPROXIMATE SIZE OF WATER BODY
   75 ACRES

4. TYPE OF AQUATIC VEGETATION PRESENT
   - [x] EMERGENT
   - [ ] SUBMERGENT
   - [ ] FLOATING

5. DEPTH OF WATER
   _____FEET Unknown

6. GENERAL COMPOSITION OF SUBSTRATE
   - [ ] BEDROCK
   - [x] SAND
   - [x] SILT
   - [ ] BOULDER
   - [ ] COBBLE
   - [ ] GRAVEL
   - [ ] MARL
   - [ ] CLAY
   - [ ] MUCK
   - [ ] DEBRIS
   - [ ] MUCK
   - [ ] CONCRETE
   - [ ] OTHER

7. SOURCE OF WATER IN THE WATER BODY
- ☐ RIVER/STREAM/CREEK
- ☒ GROUNDWATER
- ☒ SURFACE RUNOFF
- ☐ INDUSTRIAL DISCHARGE
- ☐ OTHER

8. DISCHARGE FROM SITE TO WATER BODY
- ☒ YES
- ☐ NO

9. DISCHARGE FROM WATER BODY Unknown

☐	RIVER STREAM	☐ ON-SITE	☐ OFF-SITE
☐	GROUNDWATER	☐ ON-SITE	☐ OFF-SITE
☐	WETLAND	☐ ON-SITE	☐ OFF-SITE
☐	IMPOUNDMENT	☐ ON-SITE	☐ OFF-SITE

Figure B.5 ECOLOGICAL CHECKLIST #5: WETLANDS

1. ANY DESIGNATED OR KNOWN W ETLANDS AT THE SITE

   ☐ YES
   ☒ NO

2. ARE WETLAND HABITATS EXPECTED

   ☒ YES
   ☐ NO

3. TYPES OF VEGETATION PRESENT

   ☒ EMERGENT
   ☐ SUBMERGENT
   ☐ SCRUB/SHRUB
   ☐ WOODED
   ☐ OTHER

4. DISCHARGE FROM SITE TO WETLANDS

   ☐ YES Unknown
   ☐ NO

5. DISCHARGE FROM WETLAND Unknown

   ☐ RIVER STREAM ☐ ON-SITE ☐ OFF-SITE
   ☐ GROUNDWATER ☐ ON-SITE ☐ OFF-SITE
   ☐ LAKE/POND ☐ ON-SITE ☐ OFF-SITE
   ☐ MARINE ☐ ON-SITE ☐ OFF-SITE