CONTAMINATION ASSESSMENT REPORT
AMCHITKA ISLAND
ALEUTIAN ISLANDS, ALASKA

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1. INTRODUCTION

Pursuant to United States Army Corps of Engineers (USACE), Alaska District, Contract No. DACA85-91-D-0003 and Delivery Order No. 007, Ecology and Environment, Inc. (E & E) is conducting an environmental evaluation and preliminary remedial alternatives analysis of abandoned United States Department of Defense (DOD) debris, hazardous and toxic waste (HTW), and petroleum oil lubricants (POL) at Attu, Amchitka, Great Sitkin, and Kiska Islands in the Aleutian Island Chain, Alaska. The project was performed in response to a congressional mandate to USACE to evaluate potential hazards associated with previous DOD activities on the islands.

Although previous evaluations of environmental damage on the islands have been conducted, this project has been designated as a reconnaissance-level study because the scope of activities is restricted to confirming the existence and nature of previously identified hazards. Specific objectives of this study are included in the project scope of work, included in this report as Appendix F. This project is not intended to provide extensive or complete site characterization, contaminant fate determination, or quantitative risk assessment. Consequently, preliminary remedial alternatives developed during this project are intended for long-range planning purposes and are not based on information and data sufficient for remedial design preparation.

This document provides specific background information and a contamination assessment for Amchitka Island. Included are descriptions of site background (Section 2), environmental setting (Section 3), sampling procedures (Section 4), analytical results (Section 5), potential contaminant transport pathways and receptors (Section 6), and summary and conclusions (Section 7). This report augments the *Debris Inventory for* Amchitka Island delivered under a separate cover.

2. SITE BACKGROUND

2.1 HISTORY

The history of the lower Alaska Peninsula and the Aleutian Islands dates from 6,000 B.C. to the period of Russian colonization. Archaeological exploration has been conducted unevenly in the Aleutian region and large areas remain uninvestigated. The resulting lack of information does not reflect the absence of actual sites.

The native people of the Aleutians, the Aleuts, thrived in villages along the coasts of the Aleutian Islands for thousands of years. The Aleuts were seafaring people, traveling in kayak-like bidarkas and living in underground, sod-covered lodges known as barabaras.

The period of Russian colonization (1741-1867) had an overwhelming and permanent impact on every aspect of Aleut culture. When Russian explorers first arrived in the Aleutian Islands, approximately 16,000 Aleuts occupied the region. Discovery of the valuable sea otter pelt led to the exploitation of the animal and the Aleut people by the Russians. Whole villages were enslaved and forced to hunt the sea otter for the Russian captors. Diseases spread rapidly and the Aleut people were decimated. By the mid 1800s, the sea otter population had been greatly reduced and fewer than 1,000 Aleuts remained.

The American colonization period (1867-1940) began with the sale of Alaska to the United States in 1867, and the fur pillage was renewed in earnest. In 1911, stringent regulations were adopted to protect the nearly extinct sea otter. No extensive surveys for Russian period or American period buildings or foundations have been conducted in the Aleutian Islands, and few artifacts remain.

American troops first landed on Amchitka Island on January 12, 1943, to establish an airfield between Adak Island and the Japanese-held

Kiska Island. A fighter runway (Fox Runway), bomber runway (Baker Runway), and a cross runway (Charlie Runway) were constructed (see Figure 2-1). Quonset huts, administrative facilities, aircraft control and warning facilities, gun emplacements, hangers, dockage, and other ancillary structures were constructed to support the approximately 16,000 troops stationed on Amchitka Island during the war. The United States Armed Forces evacuated Amchitka Island in August 1950, and most of the remaining structures from the occupation were removed in 1986.

During the 1950s a Distant Early Warning network (DEW line) was established between Alaska and Canada. A DEW line relay station was constructed using a 30-foot-diameter satellite dish on Amchitka Island to bridge the 400 mile gap between Adak and the Shemya Islands. The DEW line relay station was taken out of operation in 1961.

The Atomic Energy Commission (AEC) performed three high-yield underground nuclear detonations at Amchitka Island. The tests were conducted on October 29, 1965; October 2, 1969; and November 6, 1971. The nuclear tests were conducted over a long period of time for three basic purposes: seismic testing, calibration, and warhead development. The three tests were: Project Long Shot, a test with an approximate strength of 80 kilotons detonated at 2,359 feet below ground surface; Project Milrow, a test with an approximate strength of 1 megaton at a depth of 4,000 feet below ground surface; and Project Cannikin, with an approximate strength of 5 megatons at a depth of 5,875 feet below ground surface.

Radioactive-contaminated liquids were generated during drillback operations at the Cannikin test site and were pumped back into the test cavity, and radioactive-contaminated soils were packaged and transported off site for disposal. The AEC demobilized and evacuated Amchitka island on September 8, 1973. In 1975, the AEC was disbanded and most of its activities were transferred to the Energy Research and Development Administration (ERDA). In 1979, ERDA became part of the Department of Energy (DOE). DOE representatives make annual trips to Amchitka Island to continue monitoring around the test sites.

Amchitka Island is currently owned by the United States Department of the Interior (DOI) and administered by the United States Fish and

Wildlife Service (USFWS) as part of the Alaska Maritime National Wildlife Refuge. The Naval Fleet Surveillance Support Command operates a Relocatable Over the Horizon Radar (ROTHR) System on Amchitka Island. The ROTHR is a forward deployed system used to detect aircraft and ships over the horizon. The system consists of a radar transmitter at the northwest end of Amchitka, a receiver located across from Crown Reefer Point, a base camp, and a camp (North Camp) at the transmitter site. As of December 1990, there were approximately 40 United States Navy (USN) personnel and 120 civilian workers on the island.

2.2 LAND OWNERSHIP HISTORY

Amchitka Island was part of the original Aleutian Islands National Wildlife Refuge established by Executive Order Number 1733 in 1913 (Naval Energy and Environmental Support Activity [NEESA] 1990). The island was then owned and managed by the DOI. In 1943, the United States Army occupied Amchitka for use as an advance base against Japanese forces in the Aleutian Islands. No formal withdrawal of land from the public domain occurred at that time.

In 1952, DOD relinquished Amchitka to DOI. The Air Force continued to use portions of the island under special use permits until 1961. The AEC used Amchitka from 1965 to 1973 for underground nuclear tests and follow-up studies. The Alaska National Interest Lands Conservation Act (ANILCA), approved December 2, 1980, included Amchitka Island in the Aleutian Islands Unit of the newly created Alaska Maritime National Wildlife Refuge. The entire island is currently under management by the USFWS (COE 1991). Under a memorandum of agreement between USFWS and USN dated April 9, 1986, the Naval Fleet Surveillance Support Command currently uses three parcels of land and a 100-foot corridor on each side of Infantry Road, which bisects the island (NEESA 1990).

2.3 PREVIOUS INVESTIGATIONS

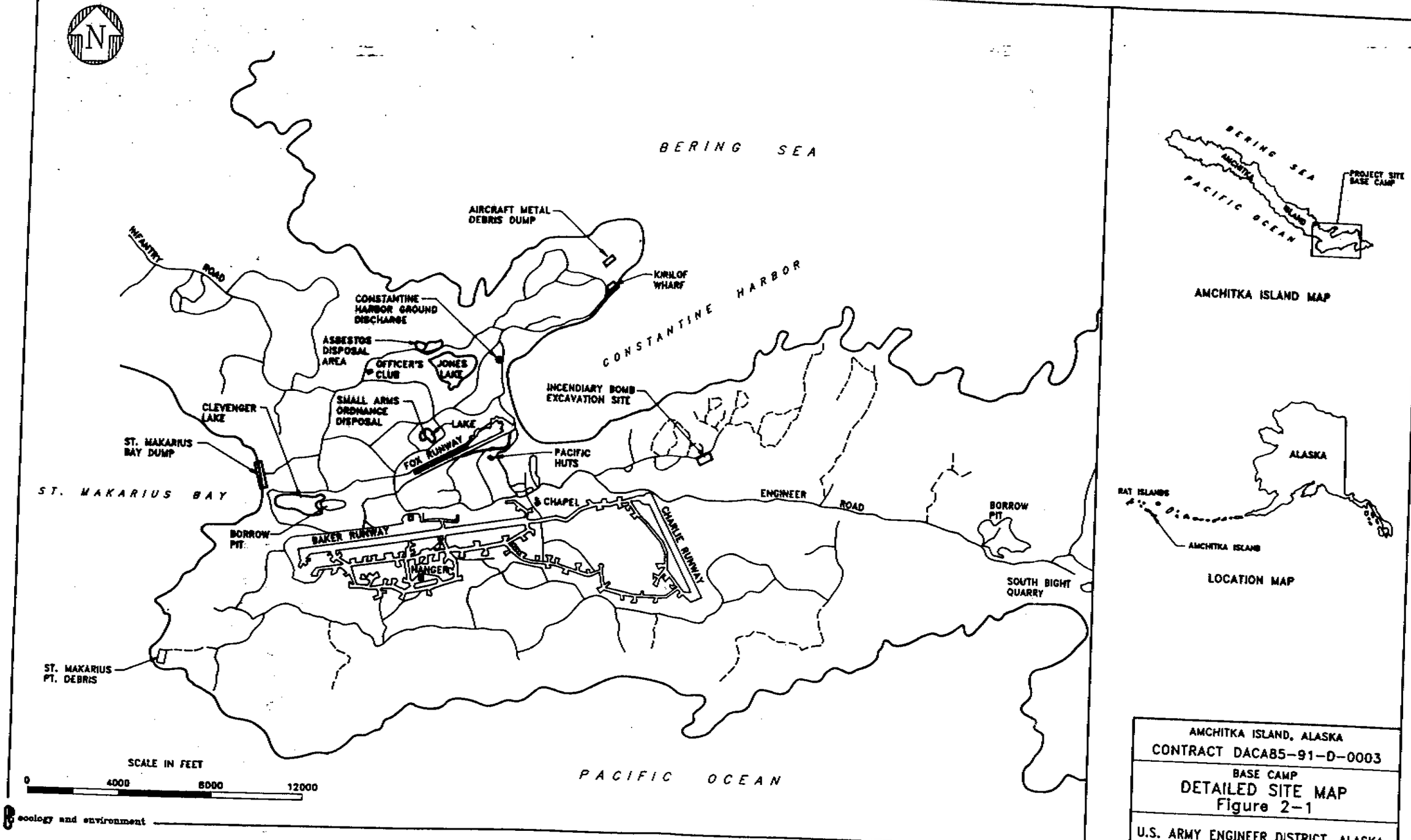
In 1977, the COE performed an inventory of debris at all Aleutian military installations where major World War II construction took place. As a result, detailed cost estimates were prepared for removals at Amchitka and other islands (COE 1977). An Environmental Impact Statement for the removal work was completed in 1979 (COE 1979).

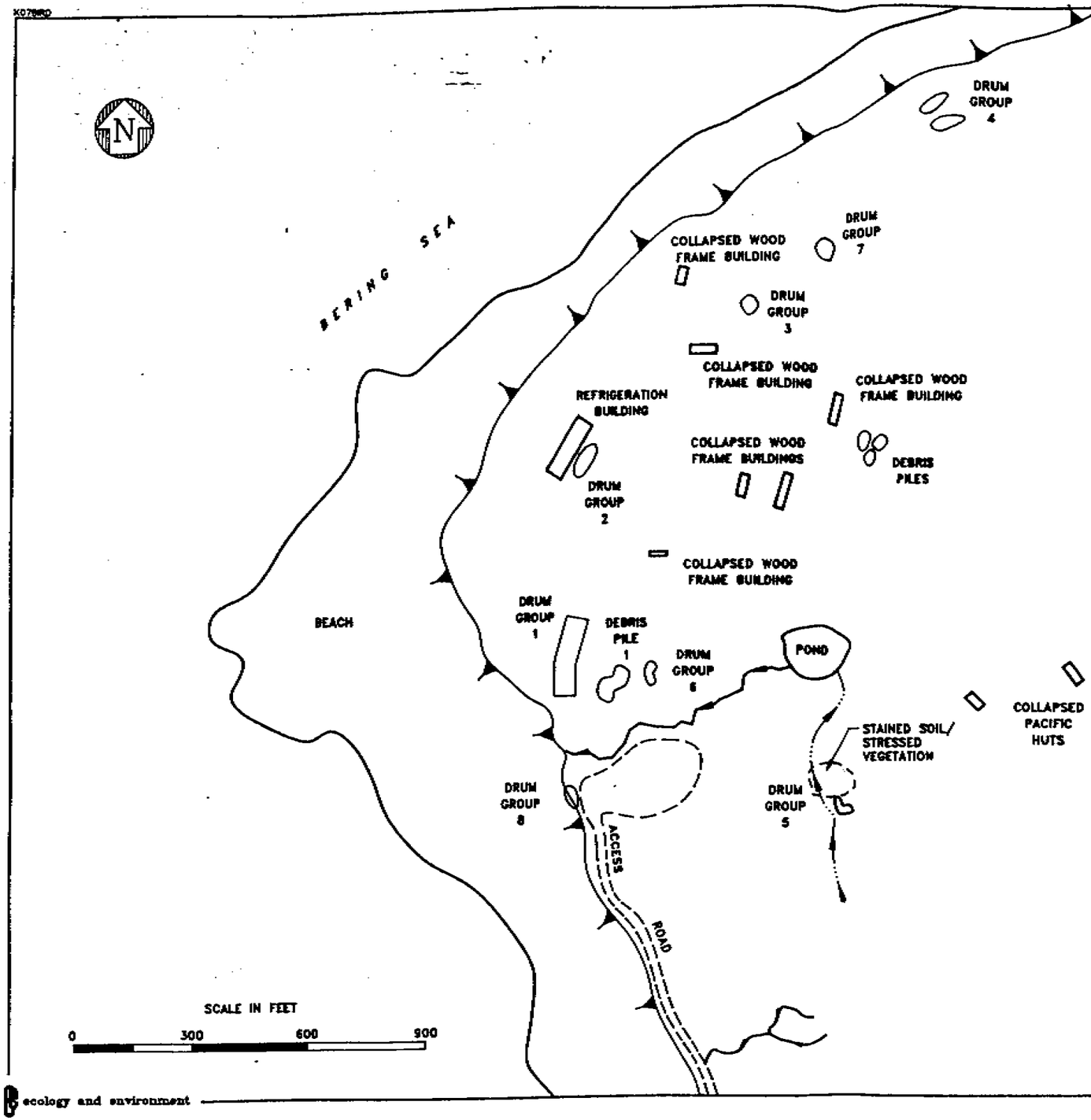
The COE performed an environmental assessment in 1985 in preparation for the removal and demolition of structures abandoned from World War II. The majority of structures were removed from the island by 1986. According to the contractor who performed the demolition work, 55-gallon drums in various stages of disintegration were found scattered throughout the island. The drums that were not corroded were crushed and buried on the island. The residue collected from some of the drums was burned on site.

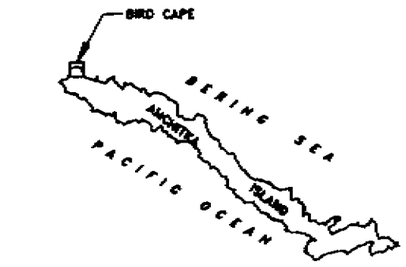
In 1988 the DOE performed an environmental assessment of the three underground nuclear tests which the AEC performed in the 1960s and early 1970s at Amchitka Island. Studies conducted by the AEC, the Batelle Memorial Institute, and several universities have also addressed the effects of the three nuclear tests. Test results show trace levels of tritium in water and soil samples in the immediate vicinity of the Long Shot site. According to the test results no other radionuclides had escaped from the underground sites. Annual inspections are conducted by DOE representatives at the test sites.

A study of petroleum contamination at Kirilof Wharf was performed in 1989. Eight boreholes were drilled at a proposed septic tank location. Soil samples were collected and some holes were completed as monitoring wells. Sample results showed Total Petroleum Hydrocarbons (TPH) at levels from 19.5 to 635 mg/kg.

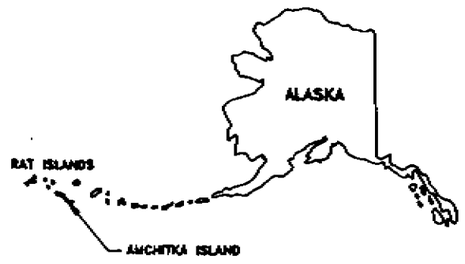
A Preliminary Assessment (PA) report was completed in 1990 by NEESA at the request of the Naval Facilities Engineering Command (NEESA 1990). The PA Report identified Bird Cape, Top Camp, Constantine Harbor, and an apparent petroleum seep near Constantine Harbor as areas of concern (see Figures 2-1, 2-2, and 2-3 for detailed site maps). It also mentioned the presence of an asbestos dump near Constantine Harbor, two areas of unexploded ordnance, and Saint Makarius Bay, Omega Point, and East Cape as areas of possible environmental damage.


N
BERING SEA
CONSTANTINE HARBOR
PACIFIC OCEAN
ST. MAKARIUS BAY
AIRCRAFT METAL DEBRIS DUMP
KINILOF WHARF
INFANTRY ROAD
CONSTANTINE HARBOR GROUND DISCHARGE
ASBESTOS DISPOSAL AREA
OFFICER'S CLUB
JONES LAKE
CLEVENGER LAKE
SMALL ARMS ORDNANCE DISPOSAL
LAKE
FOX RUNWAY
ST. MAKARIUS BAY DUMP
INCENDIARY BOMB EXCAVATION SITE
PACIFIC HUTS
ENGINEER ROAD
BORROW PIT
CHAPEL
BAKER RUNWAY
HANGER
CHARLIE RUNWAY
BORROW PIT
SOUTH BIGHT QUARRY
ST. MAKARIUS PT. DEBRIS
SCALE IN FEET
0
4000
8000
12000
ecology and environment
BERING SEA
AMCHITKA ISLAND
PACIFIC OCEAN
PROJECT SITE BASE CAMP
AMCHITKA ISLAND MAP
ALASKA
RAT ISLANDS
AMCHITKA ISLAND
LOCATION MAP
AMCHITKA ISLAND, ALASKA
CONTRACT DACA85-91-D-0003
BASE CAMP
DETAILED SITE MAP
Figure 2-1
U.S. ARMY ENGINEER DISTRICT, ALASKA





AMCHITKA ISLAND MAP



LOCATION MAP

AMCHITKA ISLAND, ALASKA
CONTRACT DACA85-91-D-0003
BIRD CAPE
DETAILED SITE MAP
Figure 2-2
U.S. ARMY ENGINEER DISTRICT, ALASKA

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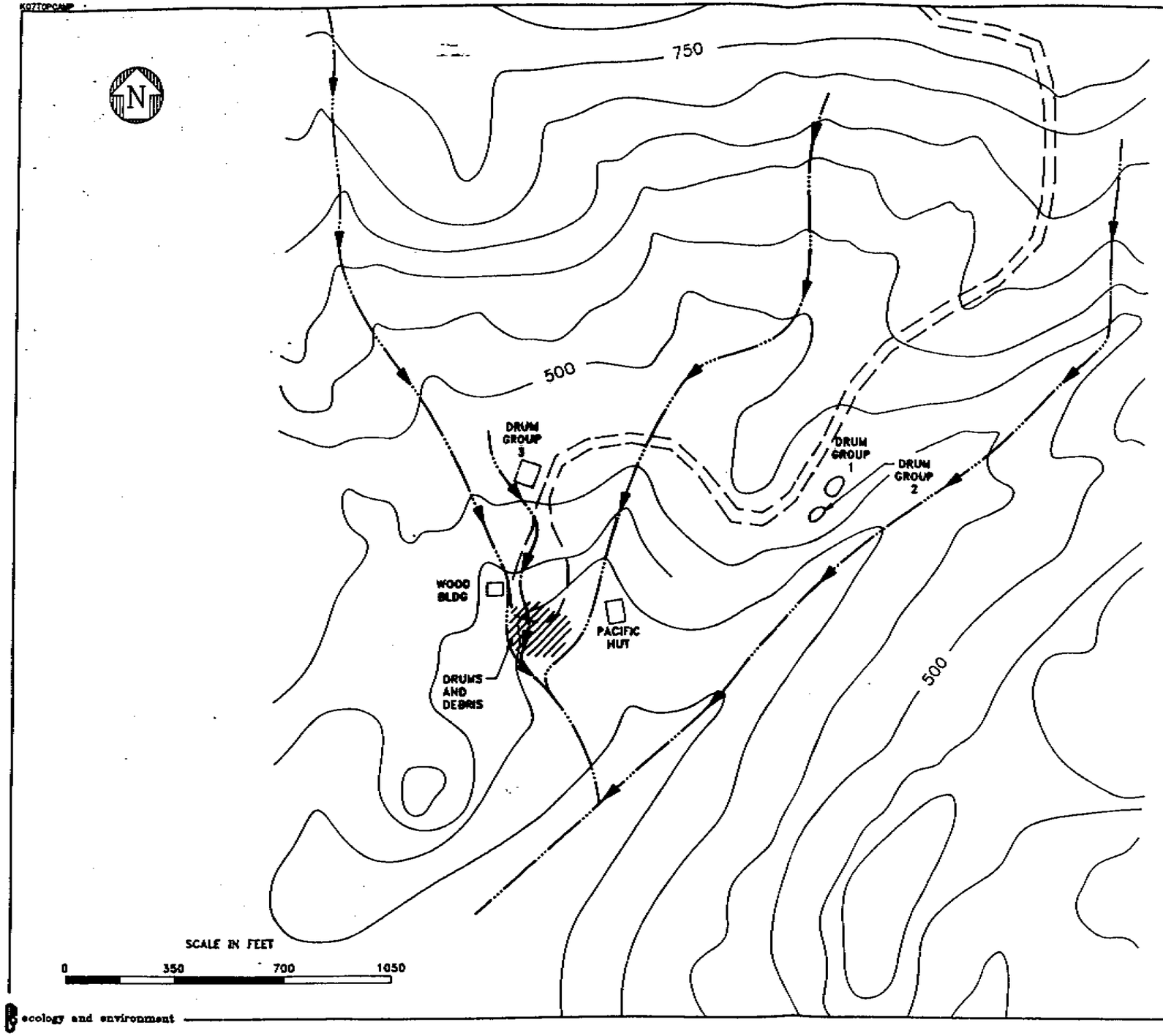
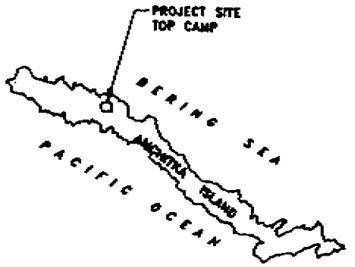
K07TOPCAMP





AMCHITKA ISLAND MAP

LOCATION MAP

ecology and environment

AMCHITKA ISLAND, ALASKA
CONTRACT DACA85-91-D-0003
TOP CAMP
DETAILED SITE MAP
Figure 2-3
U.S. ARMY ENGINEER DISTRICT, ALASKA

3. ENVIRONMENTAL SETTING

3.1 SITE DESCRIPTION

Amchitka Island, Alaska, lies approximately 1,340 miles west-southwest of Anchorage and is the southernmost of the Rat Island group of the Aleutian Islands. The other islands in the Rat Island group include Semisopochnoi, Little Sitkin, Segula, Rat Island, and three smaller islands. The entire group lies within a circle having a radius of approximately 40 miles. Amchitka Island is approximately 40 miles long and 3 to 5 miles wide, has an area of approximately 74,000 acres, and trends in a northwesterly direction.

Similar to the other Aleutian Islands, Amchitka Island is characterized by a rugged coastline with sea cliffs and grassy slopes up to 100 feet high nearly surrounding the island. Only a few beaches occur along the coastline and most of the island is fringed by a wave-cut beach of rock as wide as 330 feet. There is one harbor, Constantine Harbor, located on the Bering Sea side near the east end of the island. The harbor is extremely exposed during storms originating from the northeast.

The eastern portion of the island is characterized by gently rolling terrain dotted with many shallow ponds having little or no drainage connections. In the higher central portion of the island the area has more integrated drainage and wind erosion, with fewer lakes and patches of bare bedrock rubble on ridges over 200 feet high. West of Chitka Point, the island becomes more mountainous with a maximum elevation of 1,160 feet. The westernmost portion of the island consists of a rocky and windswept plateau at an elevation of approximately 800 feet.

Elevations on Amchitka Island range from sea level to 1,160 feet. The topography is varied, consisting of mountains, a high plateau, lower

plateaus, and an intertidal beach. Except for the steep-sided rugged mountains at the northwest end of the island, most of the land surface has a rich growth of alpine-zone mosses and grasses.

3.2 CLIMATE

The weather at Amchitka island is characterized by persistently overcast skies, strong winds, and violent storms. Temperatures are mild and their range is relatively small. In the coldest parts of winter, usually in January, average daily maximums range from mid to upper 30 degrees Fahrenheit (° F) while minimums fall to the 25 to 30° F range, with occasional temperatures into the teens. Extreme low temperatures range to about 8° F. Temperatures begin to moderate after February. July and August are usually the warmest months. Daytime highs from 55° to 60° F are common in these months (NEESA 1990). Temperature extremes are moderated by the influence of the surrounding Bering Sea. Heavy fog and gale-force winds are also common throughout the Aleutian Islands.

Precipitation occurs from 200 to more than 300 days per year. The mean annual precipitation at Amchitka Island is 32.6 inches. Snow is frequent from November through April, when 30 to 100 inches fall (NEESA 1990).

3.3 GEOLOGY

The Aleutian Islands were formed in the Quaternary and post-Tertiary periods as a result of volcanic activity along the Aleutian subduction zone. The islands represent the higher, exposed volcanic peaks of the curving Aleutian arc. Most of these volcanoes are still active. Glaciers sculpted much of the Aleutian Islands during the Pleistocene epoch.

Bedrock and soils throughout most of the Aleutian Islands are volcanic in origin. The soils of Amchitka Island contain large amounts of organic matter and volcanically derived material.

Three groundwater zones have been identified on Amchitka Island. These zones are hydraulically connected but exhibit differing rates of permeability, retention, and conductivity. The zones are:

- o Shallow vegetation mat, organic soils, and peat deposits (turf);
- o Upper weathered and fractured bedrock, including unconsolidated eolian, marine, lacustrine, and glacial deposits; and
- o Deep bedrock formations.

The shallow groundwater contained in the turf is often perched and is generally associated with surface water features. Groundwater in this layer accumulates in response to high water holding capacities and low vertical permeabilities. Within the perched zones, water flows through organic soils and peats and along the interface between these soils and bedrock. The flow paths in these areas are controlled by topographic relief and the groundwater appears as springs at lower elevations. In the low-lying areas there may be a hydraulic connection between the shallow groundwater zone and the underlying fractured bedrock zone.

The middle unconfined groundwater zone is found in upper weathered and fractured bedrock and other unconsolidated materials that overlie the less permeable bedrock formations. The groundwater zone may be extensive across the island.

The less weathered bedrock that underlies the fracture zone is geologically varied and exhibits variable hydraulic characteristics. Groundwater within this unit interfaces with sea water. The maximum depth of this interface has been estimated at 2,625 feet. The saltwater/freshwater interface is a mixing zone resulting from diffusion, ocean tides, and seasonal water table fluctuations.

Groundwater from wells is not utilized on Amchitka Island. Water is obtained from surface impoundments and springs.

3.4 SURFACE WATER

Most of the Aleutian Islands exhibit radial surface drainage emanating from the peaks of the islands and flowing seaward. Many small drainages serve to transport water only during high rainfall periods.

Amchitka Island is drained principally by streams that carry direct runoff and sustained base flow. The base flow is discharged to the

streams and many lakes from a moderately permeable shallow groundwater reservoir. Because the water table is at or very near the land surface over most of the island, the shallow groundwater flow occurs within the tundra, soil, and peat, as well as within the upper few hundred meters of underlying volcanic rocks. The quality of the surface water and near surface water is good. Salt spray driven by wind over Amchitka Island from the adjacent ocean influences the composition of rainfall, as indicated by ratios of sodium to chloride in water of the surface and shallow subsurface systems.

Hundreds of small, shallow ponds cover Amchitka Island. There are generally two types of ponds: lowland ponds occupying depressions in the peat mat, generally found in the southeastern and central regions, and ponds perched in bedrock depressions, found mainly in the northwest region. Ponds are most plentiful in the southeast section of the island where there are roughly 26 ponds per square mile. The ponds range in width up to 330 feet and in depth from less than 3 feet to more than 10 feet.

The streams in the southeastern portion of Amchitka generally travel slowly through tundra-covered watersheds. Most streams are three to 10 feet wide and 8 to 12 inches deep at their outlets. Flow in the streams varies according to weather conditions and moisture level of the vegetation and soil. Generally, the streams are low in gradient and velocity.

Streams in the central region are mostly 6 to 13 feet wide and 8 to 12 inches deep. They also have changing flow characteristics dependent on weather and soil moisture.

Northwestern region streams flow through deep tundra-covered valleys. Most of these streams are 6 to 13 feet wide and 10 to 14 inches deep. They have a greater flow velocity and volume than streams in other areas.

Drinking water on Amchitka Island is supplied from three separate surface water sources. Water for the Base Camp is drawn from Constantine Spring north of Baker Runway. The water is retained in a concrete dam and stored in a pump house where it is treated with chlorine. Water for the North Camp is supplied from a hillside seep, and water for the receiver site is drawn from a lake. Both supplies are also treated with chlorine.

3.5 BIOTA

3.5.1 Avifauna

According to USFWS, 131 species of birds have been recorded on or near Amchitka Island. Evidence of breeding on the island has been found for 28 of these species. Species known to nest on Amchitka include bald eagles, gulls, ravens, rock ptarmigan, peregrine falcons, Lapland longspurs, and mallard ducks. Attempts at reintroduction of the Aleutian Canada goose by USFWS have failed to establish a breeding population thus far. Human disturbance of tundra on the southeastern end of the island has fostered the growth of distinctive localized grasses in and around bermed areas. These areas encircle much of the remaining debris or contamination, and are exploited by several bird species as nesting sites (COE 1985; NEESA 1990). During the 1991 fieldwork, bald eagles were observed nesting within 100 yards of the Saint Makarius Bay debris area.

3.5.2 Terrestrial Mammals

Amchitka Island has no indigenous species of terrestrial mammal. The Norway rat was apparently introduced to the island during World War II and still inhabits Amchitka. The arctic fox was introduced in 1921 for fox farming, decimating the bird population. Between 1950 and 1960, the USFWS extirpated the fox from Amchitka (COE 1985).

3.5.3 Marine Mammals

Various marine mammals occur in the coastal waters of Amchitka Island. These include sea otters, northern fur seal, harbor seal, and Steller sea lions. Steller sea lions are known to haul out at Saint Makarius Point. The field team also noted approximately one dozen sea lion and fur seal skeletons washed ashore at Saint Makarius Point during the 1991 field season.

The surrounding seas support numerous cetaceans, including Bairds beaked whale, blue whale, bowhead whale, Curviers beaked whale, Dolls porpoise, finback whale, gray whale, harbor porpoise, humpback whale, killer whale, minke whale, Pacific right whale, Pacific whitesided

dolphin, Sei whale, sperm whale, and Steynegers beaked whale. Many of these mammals are listed as threatened or endangered (COE 1985).

3.5.4 Freshwater Fish

Amchitka Island supports only six species of freshwater fish. Both the Dolly Varden char and the three-spine stickleback occur in land-locked and anadromous forms. The coast-range sculpin occurs in many of the bodies of fresh water on the island. Pink, red, and silver salmon spawn in various small streams on Amchitka (COE 1985).

3.5.5 Marine Fish

The marine fisheries of Amchitka Island are abundant, and many species are commercially exploited. Commercial vessels operating in the area harvest salmon (chum, pink, and red), king crab, Pacific halibut, Pacific ocean perch, Pacific cod, sablefish, and walleyed pollock (COE 1985).

3.5.6 Vegetation

Terrestrial vegetation on Amchitka is characterized as a maritime tundra having relatively few plant taxa. This tundra is extremely fragile and susceptible to physical or chemical damage. Beaches and disturbed areas around berms are dominated by grasses. Historically, secondary plant succession in disturbed areas on the island has been very slow (COE 1985).

Aquatic vegetation in the island is also of limited diversity. Streams are dominated by mosses and liverworts, with buttercup and water milfoil also present. The ponds and lakes are dominated by water milfoil. Other aquatic plant species found in the ponds and lakes include pondweed, buttercup, and blue-green algae (COE 1985).

3.5.7 Aquatic Invertebrates

The streams, ponds, and lakes of Amchitka Island also support a microinvertebrate population of low diversity. Four invertebrate phyla comprise a majority of the animal biomass in the aquatic environment. Soft mud environments on the island support annelids and nematodes,

while oligochaetes are found in gravel and sand stream bottoms. Mollusks, represented by clams and snails, are found in all ponds and lakes. Insects and crustaceans are also common in the ponds and lakes. Documented types include isopods, caddis flies, water boatman, diving beetles, blackflies, and midges.

3.5.8 Threatened and Endangered Species

Nine threatened or endangered species are associated with Amchitka Island. The waters surrounding the island support the following eight endangered species of whale: blue, bowhead, finback, gray, humpback, Pacific right, Sei, and sperm whales. These species are known to frequent the area around Amchitka Island, although the extent has not been well documented (COE 1985).

One threatened avian species, the Aleutian Canada goose, may frequent Amchitka. Attempts at reintroduction to the Island have been made since 1971 by the USFWS. Although no viable breeding population exists yet, both the goose and its habitat are protected under the Endangered Species Act (COE 1985).

The Steller sea lion, known to frequent Amchitka's waters and haul out on its beaches, has undergone a sharp population decline in recent years. At this time, it is listed as a threatened species.

3.6 LAND USE

Portions of Amchitka Island are currently used by the USN Fleet Surveillance Support Command as the site of a radar installation. The radar base has a staff of approximately 40 navy personnel and 120 civilian workers (E & E 1991). Access to the radar base is controlled by the USN and by Piquniq Management Corporation, the Navy's service contractor for the island. All other areas of the island are administered by the USFWS as part of the Alaska Maritime National Wildlife Refuge. Visits by DOE and USFWS representatives make up the remainder of the human use of the island.

Kirilof Wharf in Constantine Harbor makes Amchitka Island readily accessible by boat. All areas visited during this project can be accessed from established roadways.

4. SUMMARY OF SAMPLING ACTIVITIES

4.1 INTRODUCTION

Fieldwork was conducted from September 5 to 11, 1991. The field team consisted of:

Brian Miskill	E & E	Team Leader
Sheila Fleming	E & E	Engineer
Brad Ackman	E & E	Hydrogeologist
Chris Farmer	E & E	Environmental Scientist
Paul Laverty	COE	On-site Representative

All lodging, meals, and on-site transportation were obtained through Piquniq Management Corporation, the base operations contractor for USN on Amchitka Island.

The extensive road system on Amchitka Island has been maintained for use by standard two-wheel drive vehicles (primary roads) and four-wheel drive vehicles (secondary roads). The Bird Cape and Top Camp sites required four-wheel drive for access. All other sites were accessed with two-wheel drive vehicles.

A total of 33 samples were collected on Amchitka Island from September 7 through September 10, 1991: 17 surface soil samples, six drainage sediment samples, five water samples, and five drum product samples. Included in this total were one background surface soil sample, one QA and one QC rinsate sample, one QA and one QC soil sample, and one QA and one QC sediment sample, which were collected and submitted to the project and QA laboratories. Samples were analyzed for polynuclear aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), fuel identification (Fuel ID) and quantification by modified EPA method 8015, and the following Resource Conservation and Recovery Act (RCRA) metals: (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) (Metals) (Table 4-1).

4.2 OBJECTIVES

This project was primarily intended to serve as a preliminary reconnaissance of potential HTW and POL sources that may present a hazard to human health and/or the environment. Accordingly, the folloving specific sampling objectives were defined:

- o Determine the presence and nature of hazardous substances and contamination sources;
- o Approximate the extent of soil contamination at each identified waste source location where possible; and
- o Determine the presence of contaminants in surface water, runoff, and sediments near identified waste sources.

General field activities conducted to accomplish the objectives were as follows:

- o Collection of surface soil samples from HTW and POL disposal locations;
- o Measurement of visibly stained soil areas and inventory of potential waste containers;
- o Collection of samples from a percentage of representative potential waste containers; and
- o Collection of samples from surface runoff, streams, and/or stream sediments near identified waste sources.

4.3 METHODOLOGY

4.3.1 Sample Locations

In keeping with the project objectives, all sample locations were selected in a biased manner. Areas of potential HTW or POL containers, and stressed vegetation and stained soils were identified through a visual reconnaissance of the site. These locations were then sampled as they represented the most likely areas of contamination. In areas where a release to a drainage was apparent, samples were collected along the release path and drainage path to determine the extent of surface contaminant migration. Analytical parameters were chosen based on visual observations in the field and previously collected information. Fuel ID, PAH, and Metals analyses were selected for areas where POL

constituents were the only suspected source of contamination. PCB analysis was selected only for areas where the presence of electrical equipment was observed or likely, and in areas where contaminant sources were not readily identifiable.

4.3.2 Sample Types and Matrices

Sample types were determined by location and matrix. Grab samples were collected from HTW and POL containers whenever sufficient volumes of contents were present. All surface water samples were also grab samples. Surface soil grab and sediment grab samples were collected from 0 to 6 inches in stained areas or obvious releases. Composite surface soil and sediment samples were collected from 0 to 6 inches in areas not having distinct releases or those having stains covering large areas of soil. Composite samples were prepared by using three or four aliquots as determined by the team leader at the time of sampling.

4.3.3 Sample Collection Methods

All samples were collected in accordance with the Chemical Data Acquisition Plan (E & E 1991a). Precleaned, stainless steel trowels and bowls were utilized to collect surface soil samples from the 0- to 6-inch interval. Grab samples were placed directly into prelabeled sample containers. For composite samples, soil was collected from three to four representative locations. These four aliquots were thoroughly homogenized in a precleaned, stainless steel mixing bowl and transferred into prelabeled sample containers.

Surface water samples were collected by dipping prelabeled sample containers into the body of water.

Sediment grab samples were collected by using prelabeled sample containers as coring devices. Sediment grab samples were collocated with water samples and collected only after water sample collection to avoid unnecessary turbidity in water samples. Composite sediment samples were collected using aliquots from three to four representative locations. The aliquots were thoroughly homogenized in a precleaned stainless steel mixing bowl and transferred into prelabeled sample containers.

Containers of HTW or POL products were sampled by filling pre-labeled sample containers using dedicated glass thieving rods. Sorbent pads were placed around the bases of containers being sampled and beneath sample containers to collect any spills. Used thieving rods were broken and placed inside the container after sampling was completed. Sorbent pads were also placed inside the containers after sampling was completed.

Quality assurance/quality control (QA/QC) soil samples were collected using the same methods as other samples of similar matrix. Sampling equipment blank (rinsate) samples were prepared by rinsing a clean sampling device with organic-free deionized water and collecting the water in a prelabeled sample container.

4.3.4 Sample Handling and Shipment

All samples were preserved upon collection and stored under chain-of-custody procedures until shipment. All samples arrived at the project and QA laboratories in good condition and adequately preserved. All sample holding times were met with the following exceptions:

- Sample 029WA was analyzed using modified method 8015 one day after the maximum allowed holding time;
- Sample 032SD was reanalyzed 16 days after the maximum allowed holding time, due to internal QC failure; and
- Samples 017WA and 019WA were received at the project laboratory two days after the maximum allowed holding time.

See Appendix A for a complete discussion of these samples.

4.4 SAMPLING ACTIVITIES

The sampling activities conducted on Amchitka Island are detailed in the following paragraphs. Descriptions have been organized by site as defined in the Amchitka Island Debris Inventory (E & E 1991). All samples were collected and packaged in accordance with the Chemical Data Acquisition Plan (E & E 1991).

4.4.1 Base Camp Area Sampling Activities

At most locations in the Base Camp area, no evidence was found of HTW or POL containers or contamination. Therefore, the following Base Camp area locations were not sampled:

- Aircraft Debris Area,
- Constantine Harbor/Kirilof Wharf,
- Saint Makarius Bay Debris Area,
- Saint Makarius Point Debris Area,
- South Bight Quarry, and
- Submarine Netting Floats.

Descriptions of these locations may be found in the Amchitka Island Debris Inventory (E & E 1991).

Sampling of Base Camp locations occurred on September 10, 1991. Sampling locations were selected based on visual reconnaissance and discussions with base personnel. The following paragraphs provide details of all sampling activities in the Base Camp area and describe locations listed in the 1990 PA (NEESA 1990), but not sampled during this project. See Figure 4-1 for a summary of Base Camp area sampling locations.

The Asbestos Disposal Area near Constantine Harbor was listed in the PA. Based on observations made during the field team's visual reconnaissance, samples were collected in this area. The field team noted a distinct sheen on pooled water immediately downgradient of an area marked with signs indicating that it was an asbestos disposal area. Sediments underlying this water had a distinct rust color. One water sample (033WA) and one sediment grab sample (032SD) were collected.

The field team also performed sampling activities at the location of a ground discharge mentioned in the 1990 PA. Sediments at the discharge were rust colored and appeared to be centered around a small portion of steel pipe protruding from an embankment. The field team noted that algae was growing on the stained sediments. Upon further reconnaissance, the field team found that the pipe had been removed, leaving only a ditch and the portion visible in the embankment. One composite sediment sample (031SD) was collected at this location.

No samples were collected at the Constantine Harbor soil contamination location described in the 1990 PA report. Reconnaissance of the area indicated that boreholes and monitoring wells completed as part of a separate study were sufficient to provide adequate information on any POL contamination source in the area.

4.4.2 Bird Cape Area Sampling Activities

Sampling activities at the Bird Cape area were conducted on September 7, 1991. Sampling locations were selected based on a site reconnaissance conducted on September 6, 1991. See Figure 4-2 for a summary of Bird Cape area sampling locations.

4.4.2.1 Sampling at Bird Cape Area Drum Group Locations

The eight drum groups at the Bird Cape area presented the most likely locations of HTW and POL sources. All drum groups were extremely weathered and in fair to poor condition. Wherever possible, samples of drum contents were collected to characterize the wastes present. The following paragraphs detail the sampling activities at each of the drum groups. See Figure 4-2 for drum group locations.

Drum Group 1 consisted of 90 to 180 drums partially buried in a sand bluff. The drums appeared to have been stacked and subsequently buried by shifting sands. Many of the visible drums were corroded and decaying, with POL products visible in a small number. There was no stained soil or stressed vegetation apparent. Vegetative growth in this location was quite thick and consisted mostly of grasses. Two samples of drum contents (001DR, 002DR) were collected, along with two composite soil samples (003SL, 004SL), and one soil grab sample (005SL). The soil grab sample was collected adjacent to the drum from which the field team collected sample number 001DR.

Drum Group 2 consisted of 65 to 130 drums on the ground surface within a building revetment. The drums were arranged in rows and appear to have been stacked in two layers. Vegetation surrounding the drum group was thick, with some stained soil and stressed vegetation visible near the center of the group. One sample was collected of drum contents at this location (011DR). A composite soil sample was also collected from Drum Group 2 (007SL).

A total of nine drums were found at Drum Group 3. The drums were located in a barren, sandy area approximately 40 feet in diameter. Some staining of the soil was evident, as was a slight petroleum odor. A small amount of a gasoline-like product was found in one of the drums. A triplicate composite soil sample (008SL, 009SL, 010SL) was collected from stained soils surrounding this drum group.

Drum Group 4 consisted of approximately 200 drums in poor condition. The drums were arranged in rows on the ground surface and formed two distinct groups several meters apart. Vegetation at Drum Group 4 was thick, and no stained soil or stressed vegetation was evident. One composite soil sample was collected from soil at the bases of several intact drums (014SL).

At Drum Group 5, the field team encountered 14 drums lying in a wetland area. Oily sludge, stained sediments, and stressed vegetation were evident downgradient of the drums. A distinct sheen was visible on standing water near the drums. One sample of the contents of a drum that had released most of its contents to the surrounding sediments was collected (016DR). A soil grab sample was collected 10 feet downgradient of the drum group in an apparent migration route (015SL).

Drum Group 6 consisted of 45 to 150 drums partially buried in a sand dune. Vegetation at this location was thick, and no stained soil or stressed vegetation was evident. The drums were arranged in rows with many appearing to rest on an underlying layer of drums. The field team did not locate any drums containing product. One composite soil sample was collected from this location (018SL).

Drum Group 7 consisted of 11 drums in an area of short grasses. Two areas of stained soil (less than 10 square feet) were noted around the bases of the drums. The field team collected one sample of drum contents from a drum near one of the stained areas (012DR). A composite soil sample was collected from the stained areas (013SL).

An estimated 10 to 20 drums comprised Drum Group 8. These drums were noticed protruding slightly from a bluff at the parking area. The drum group is mostly buried within the bluff. The visible portions of the drums are in poor condition, and no evidence was noted of stained soil or stressed vegetation. No samples were collected at this location.

4.4.2.2 Sampling at Other Locations

An additional composite soil sample was collected at a debris pile approximately 20 meters south of Drum Group 1 (006SL). This debris pile contained remains of an amphibious vehicle, and miscellaneous wood and metal debris.

A water sample was collected from a stream on the north side of the parking area (017WA). This stream was selected because it drained a pond that appeared to collect runoff from much of the debris-containing area at Bird Cape.

4.4.2.3 Background Sampling

A background soil grab sample was also collected from an upgradient area one-quarter mile east of the parking area (021SL). The location of this sample was on a hillside upgradient from the military debris. The soil in this location was overlain by 6 inches of dense vegetative material.

4.4.3 Top Camp Area Sampling Activities

Sampling activities at the Top Camp area were conducted on September 8, 1991. Sampling locations were selected based on a site reconnaissance conducted on September 6, 1991. See Figure 4-3 for a summary of Top Camp area sampling locations.

4.4.3.1 Sampling at Top Camp Area Drum Group Locations

Samples were collected at three drum groups in the Top Camp area. These drum groups presented the most likely locations of HTW or POL contamination. No samples of drum contents were collected, as no drums containing product were found.

Drum Group 1 consisted of 120 drums in poor condition. Approximately 50% of the drums had decayed so that only drum rings remained. The drums were located on the northeast side of a rocky turnout along the access road to Top Camp. No stained soil or stressed vegetation was apparent. One composite soil sample was collected from soil at the downgradient side of the drum group (023SL).

Drum Group 2, consisting of 17 drums, was located at the southwest end of the turnaround. All drums in this group were in poor condition. No stained soil or stressed vegetation was noted. One composite soil sample was collected from the downgradient side of the drum group (022SL).

Drum Group 3 was located in Top Camp, north of the parking area at the terminus of the access road. Approximately 150 drums made up this group. The drums were arranged in rows and stacked upon other buried drums. The condition of the drums ranged from poor to fair. No stained soil or stressed vegetation was observed. One composite soil sample was collected from among the drums (025SL).

The Top Camp area also contained 63 scattered drums. The field team noted these drums in a stream adjacent to Drum Groups 1 and 2, in an area downgradient from the parking area, and partially buried in the parking area. One composite soil sample was collected from soils downgradient of the parking area (030SL). A triplicate sediment grab sample (026SD, 027SD, 028SD) was collected from a stream bed crossing the southwest side of the parking area. These sediments produced a distinct sheen when disturbed.

4.4.3.2 Sampling at Other Locations

In addition to the drum group samples, the field team collected a water sample (029WA) and a composite sediment sample (024SD) at Top Camp. The water sample was collected downgradient of the parking area in the stream that crossed the southwest side of the parking area. This sample location was several meters downstream of samples 026SD, 027SD, and 028SD.

The sediment sample, 024SD, was collected in a poorly drained area downgradient of the parking area. A sheen and layer of rust were noted on this sample.

Table 4-1

SAMPLE SUMMARY
AMCHITKA ISLAND, ALASKA

Sample Number	Date Collected	Location/ Duplicate of	Matrix/Type	Analyses	PID Reading (ppm)	Appearance
9136AMCH001DR	9/7/91	Bird Cape DG 1	Drum/Grab	Fuel ID, MET, PAH	ND(<1)	Amber Liquid
9136AMCH002DR	9/7/91	Bird Cape DG 1	Drum/Grab	Fuel ID, MET, PAH	ND(<1)	Brown Liquid
9136AMCH011DR	9/7/91	Bird Cape DG 2	Drum/Grab	Fuel ID, MET, PAH	ND(<1)	Gold Liquid
9136AMCH012DR	9/7/91	Bird Cape DG 7	Drum/Comp	Fuel ID, MET, PAH	ND(<1)	Brown Liquid
9136AMCH016DR	9/7/91	Bird Cape DG 5	Drum/Grab	Fuel ID, MET, PAH	ND(<1)	Amber Liquid/White Sludge
9137AMCH024SD	9/8/91	Top Camp	Sed/Grab	Fuel ID, MET, PAH, PCB	ND(<1)	Silty Sand w/Organics
9137AMCH026SD	9/8/91	Top Camp/027,028	Sed/Grab	Fuel ID, MET, PAH	5	Brown Silty Sand w/Sheen
9137AMCH031SD	9/10/91	BC Surface Release	Sed/Grab	Fuel ID, MET, PAH	ND(<1)	Dark Brown w/Sheen
9137AMCH032SD	9/10/91	BC ACM Disposal Area	Sed/Grab	Fuel ID, MET, PAH, PCB	ND(<1)	Silty Sand w/Organics, Sheen
9136AMCH003SL	9/7/91	Bird Cape DG 1	Soil/Comp	Fuel ID, MET, PAH, PCB	ND(<1)	Dark Volcanic Sand
9136AMCH004SL	9/7/91	Bird Cape DG 1	Soil/Comp	Fuel ID, MET, PAH, PCB	ND(<1)	Dark Volcanic Sand
9136AMCH005SL	9/7/91	Bird Cape DG 1	Soil/Comp	Fuel ID, MET, PAH, PCB	ND(<1)	Black, Oily Sand
9136AMCH006SL	9/7/91	Bird Cape DP 1	Soil/Comp	Fuel ID, MET, PAH, PCB	ND(<1)	Black Sand, Some Rust

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Key at end of table.

Table 4-1 (Cont.)

Sample Number	Date Collected	Location/ Duplicate of	Matrix/Type	Analyses	PID Reading (ppm)	Appearance
9136AMCH007SL	9/7/91	Bird Cape DG 2	Soil/Comp	Fuel ID, MET, PAH, PCB	1	Black Sand w/Organics
9136AMCH008SL	9/7/91	Bird Cape DG 3/009,010	Soil/Comp	Fuel ID, MET, PAH, PCB	10	Black Sand, Gasoline Odor
9136AMCH013SL	9/7/91	Bird Cape DG 7	Soil/Comp	Fuel ID, MET, PAH, PCB	ND(<1)	Dark Volcanic Sand,Stained Area
9136AMCH014SL	9/7/91	Bird Cape DG 4	Soil/Comp	Fuel ID, MET, PAH, PCB	3	Black Sand w/Organics
9136AMCH015SL	9/7/91	Bird Cape DG 5	Soil/Grab	Fuel ID, MET, PAH, PCB	ND(<1)	Oil Sand w/Organics
9136AMCH018SL	9/7/91	Bird Cape DG 6	Soil/Comp	Fuel ID, MET, PAH, PCB	10	Black Sand w/Organics
9136AMCH021SL	9/7/91	Bird Cape Bkgd.	Soil/Grab	Fuel ID, MET, PAH, PCB	ND(<1)	Sandy Soil w/Organics
9137AMCH022SL	9/8/91	Top Camp DG 1	Soil/Comp	Fuel ID, MET, PAH	ND(<1)	Silty Clay and Gravel
9137AMCH023SL	9/8/91	Top Camp DG 2	Soil/Comp	Fuel ID, MET, PAH	ND(<1)	Silty Soil w/Organics
9137AMCH025SL	9/8/91	Top Camp DG 3	Soil/Comp	Fuel ID, MET, PAH	ND(<1)	Silty Sand
9137AMCH030SL	9/8/91	Top Camp Pkg. Area	Soil/Comp	Fuel ID, MET, PAH	ND(<1)	Brown Clay
9136AMCH017WA	9/7/91	Bird Cape	Water/Grab	Fuel ID, MET, PAH	ND(<1)	Surface Water
9137AMCH029WA	9/8/91	Top Camp Pkg. Area	Water/Grab	Fuel ID, MET, PAH	ND(<1)	Surface Water

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Key at end of table.

Table 4-1 (Cont.)

Sample Number	Date Collected	Location/ Duplicate of	Matrix/Type	Analyses	PID Reading (ppm)	Appearance
9137AMCH033WA	9/10/91	BC ACM Disposal Area	Water/Grab	Fuel ID, MET	ND(<1)	Surface Water
9136AMCH009SL	9/7/91	Bird Cape DG 3/008,010	QC	MET,PAH,PCB,TPH	15	Black Sand, Gasoline Odor
9136AMCH010SL	9/7/91	Bird Cape DG 3/008,009	QA	MET,PAH,PCB,TPH	15	Black Sand, Gasoline Odor
9136AMCH019WA	9/8/91	Bird Cape/020	QC	MET,PAH,PCB,TPH	ND(<1)	Rinsate
9136AMCH020WA	9/7/91	Bird Cape/019	QA	Fuel ID, MET, PAH, PCB	ND(<1)	Rinsate
9137AMCH027SD	9/8/91	Top Camp/026,028	QC	MET,PAH,TPH	3	Brown Silty Sand w/Sheen
9137AMCH028SD	9/8/91	Top Camp/026,027	QA	MET,PAH,TPH	10	Brown Silty Sand w/Sheen

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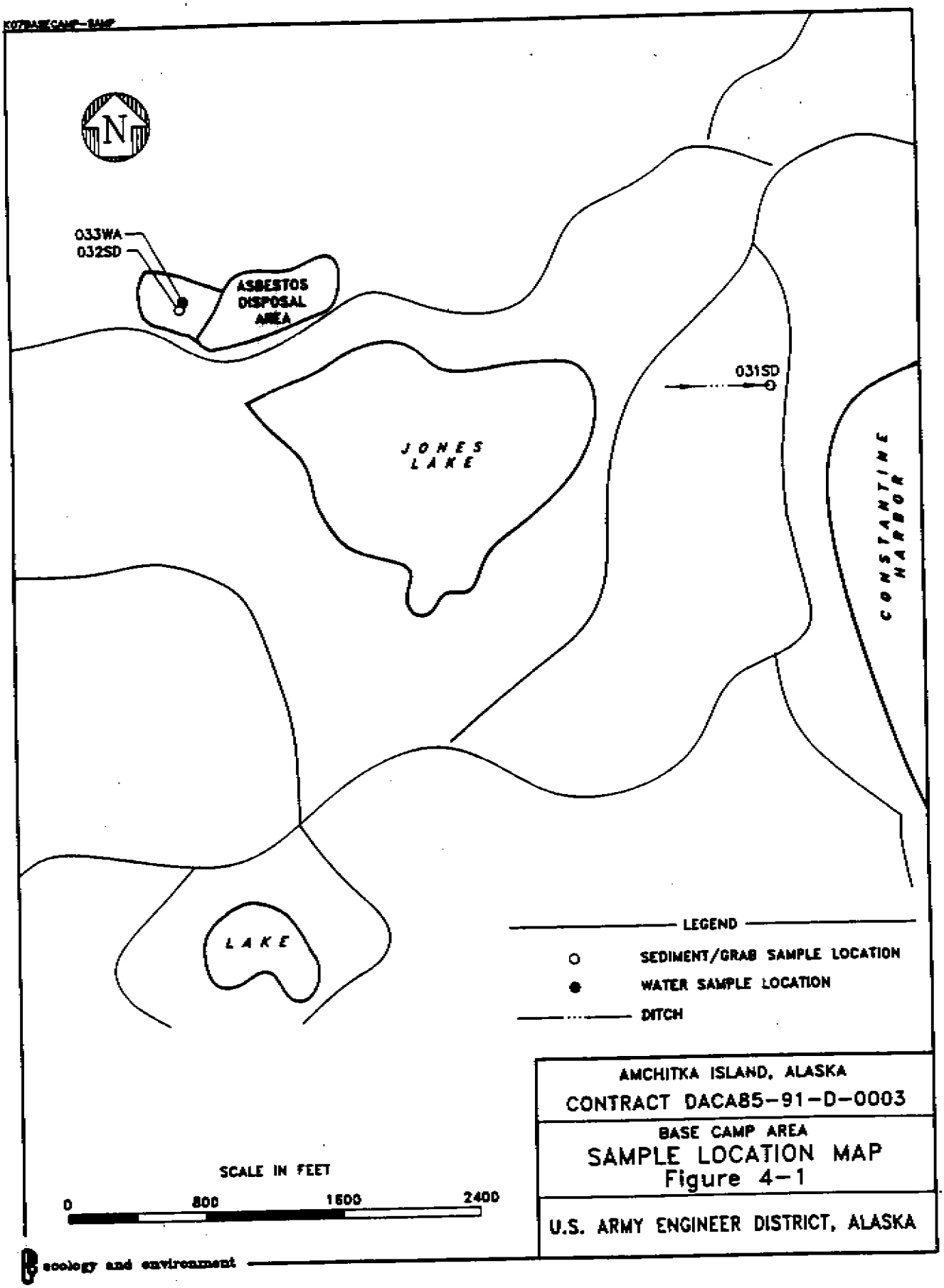
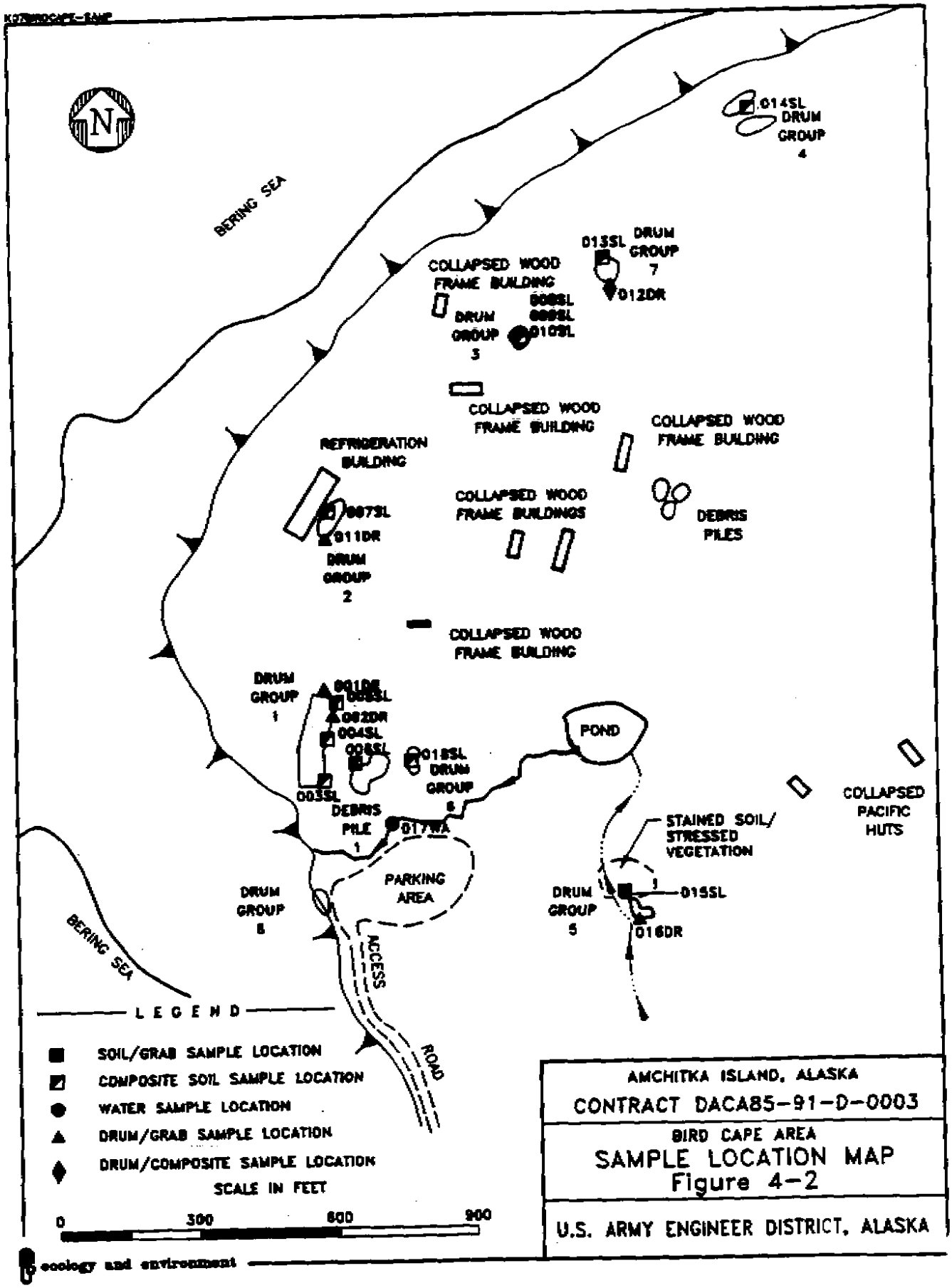
Key:

ACM = Asbestos-containing materials.
BC = Base Camp.
Bkg = Background.
Comp = Composite.
DG = Drum group.
DP = Debris Pile.
Fuel ID = Fuel identification and quantifications (8015 M).
MET = Metals.
ND = Non-detect.
PAH = Polynuclear aromatic hydrocarbons.
PCB = Polychlorinated biphenyls.
PID = Photoionization detector.
Pkg = Parking.
ppm = Parts per million.
QA = Quality assurance.
QC = Quality control
Sed = Sediment.

Source: Ecology and Environment, Inc. 1991.

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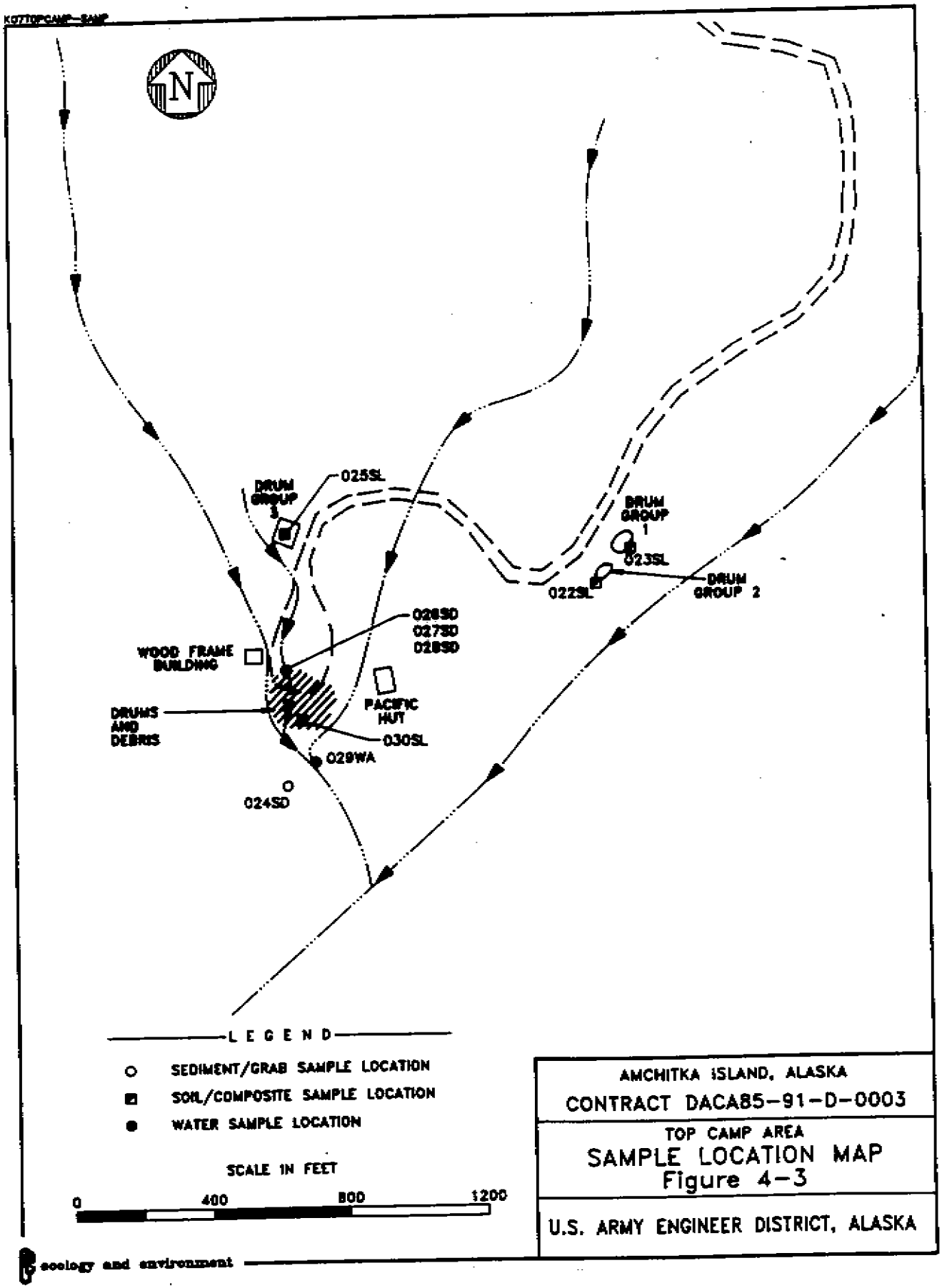
ecology and environment
AMCHITKA ISLAND, ALASKA
CONTRACT DACA85-91-D-0003
BIRD CAPE AREA
SAMPLE LOCATION MAP
Figure 4-2
U.S. ARMY ENGINEER DISTRICT, ALASKA



5. ANALYTICAL RESULTS AND DISCUSSION

5.1 INTRODUCTION

This section presents a discussion of the presence and nature of chemical contamination detected at Amchitka Island. Included as Appendix A of this document is a government "Chemical Quality Assurance Report" (CQAR) review prepared at the COE's North Pacific Division (CENPD) Materials Laboratory.

Analytical results are presented by site and the following information is included for each:

- o A physical description,
- o Background information,
- o A listing of contaminants,
- o Summary analytical result tables, and
- o A discussion of analytical results.

A total of 33 samples were collected from September 7 through September 10, 1991: 17 surface soil samples, six drainage sediment samples, five water samples, and five drum product samples. Included in this total were one background surface soil sample, one QA and one QC rinsate sample, one QA and one QC soil samples, and one QA and one QC sediment sample, which were collected and submitted to the project and QA laboratories.

The soil, sediment, drum, and water samples were analyzed for some or all of the following parameters: Fuel ID and quantification (EPA 8015 modified), RCRA metals (EPA 6000/7000 series), PCBs (EPA 8080), and PAHs (EPA 8100).

Contaminant concentrations are discussed as significantly elevated in this section if they are 10 times the detected background level or 10 times the detection limit for analytes not detected in the background sample. This level was arbitrarily selected as being indicative of analyte concentrations that are not naturally occurring.

5.2 QUALITY ASSURANCE/QUALITY CONTROL REVIEW

5.2.1 Data Validation

The analytical data were reviewed by the CENPD Materials Laboratory and this review (CQAR) is included as Appendix A. The CQAR is a discussion of the data validation based on QC criteria for the following QA/QC controls: surrogate spikes; matrix spike/matrix spike duplicates; laboratory duplicates and blanks; blind duplicates; rinsate blanks; detection limits; instrument calibrations; and sample holding times. Based on this review, E & E assumes that the data are valid for use in assessing contaminant levels at Amchitka Island. All Fuel ID and PCB, and most PAH and metals data were considered acceptable by CENPD. The following results for silver, chromium, and PAH analyses are considered questionable or estimated.

- The silver concentrations in oil should be considered a low estimate due to low matrix spike recoveries;
- PAH concentrations of samples 9136AMCH009SL and 9136AMCH018SL are questionable due to low surrogate recoveries; and
- The silver and chromium concentrations in soil samples reported by the QA laboratory should be considered estimated due to low surrogate recoveries.

All positive values for the data summarized above flagged "J" indicate an analyte is present but the quantitation is questionable. Negative results flagged "UJ" indicate that the value is estimated and that false negatives may exist in the data.

The method detection limits for many soil and sediment samples are elevated due to sample dilutions as a result of matrix interferences and, in some cases, low sample percent solids content. The project samples were analyzed by Columbia Analytical Services, Inc., Kelso,

Washington. The QA samples were analyzed by ARDL, Inc., Mount Vernon, Illinois.

5.2.1.1 Organic Data

The organic parameters analyzed for were Fuel ID, PCBs, and PAHs. All organic data were deemed acceptable by the CENPD with the exception of samples 9136AMCH009SL and 9136AMCH018SL as mentioned previously. Results have been flagged J or UJ accordingly.

5.2.1.2 Inorganic Data

The inorganic parameters analyzed for were the following TAL metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. All metals data were deemed acceptable by the CENPD with the exception of the silver results for oil samples and the silver and chromium results reported for soil samples by the QA laboratory. These results were flagged J or UJ.

5.2.2 Laboratory Controls

Several samples were analyzed after the recommended holding times; however, CENPD states that the data quality was not affected since samples were preserved at 4° C during storage.

5.2.2.1 Trip Blanks

No trip blanks were submitted for analysis.

5.2.2.2 Sampling Equipment Blanks

Sampling equipment blanks, or rinsate samples, are collected to determine potential contamination of samples resulting from samples collection devices (augers, mixing bowls, stainless steel trowels, etc.). An aqueous rinsate blank was prepared by rinsing the stainless steel soil sampling trowel and bowl with organic-free water and collecting the resulting liquid. A duplicate rinsate was also collected and submitted to the QA laboratory for analysis. The rinsate was analyzed for Fuel ID, metals, PCBs, and PAHs. Analytical results for the rinsate samples were below detection limits with the exception of 3.9 µg/L of lead detected in the QA duplicate sample. This level is

near the detection limit of 2 µg/L for lead in the project-analyzed rinsate sample and is considered comparable.

5.2.2.3 Field Duplicates

Of the 33 total soil, sediment, drum, and water samples collected, one blind duplicate soil and one blind duplicate sediment samples were collected and submitted to the project laboratory. Also included in this total were one QA soil sample, one QA sediment sample, and one QA rinsate sample, which were collected and submitted to the QA Laboratory for analysis. One QA/QC set of duplicates was collected out of 17 soil samples and one QA/QC set of duplicates was collected out of six sediment samples. One water QA duplicate (a rinsate sample) was collected. No duplicate drum samples or surface water samples were collected. Since 10% is the rate specified in the Chemical Data Acquisition Plan (CDAP) for duplicate sets, an insufficient number of duplicates was collected for soil, surface water, and drum samples for this project. All blind duplicate data agree, with the exception of the following:

- The project-blind duplicate PAH data for samples 9136AMCH008SL and 9136AMCH009SL disagree with the QA data for duplicate sample 9136AMCH010SL. CENPD considers the project data questionable, as high levels of fuel were also detected in the duplicates, which indicates the presence of PAHs.

- The project-blind duplicate PAH results for samples 9137AMCH026SD and 9137AMCH027SD do not agree with the QA laboratory data for sample 9137AMCH028SD. CENPD considers the project data questionable for the reasons stated above.

5.3 ANALYTICAL RESULTS

5.3.1 Background Conditions

One background surface soil sample (9136AMCH021SL) was collected at Amchitka Island. The sample was collected upgradient of the Bird Cape area in apparently undisturbed tundra. See Table 5-2 for a summary of analytical results for this sample. The project laboratory reported a hydrocarbon concentration of 1,310 mg/kg, quantitated as oil for this sample. The sample matrix consisted of moist soil dominated by peat and organic material with a laboratory-reported solids content of 34%. E & E believes the compounds identified are naturally occurring organics

that produce a chromatogram within the range of the oil standard (hydraulic oil) used by the project laboratory to quantify petroleum hydrocarbons. Not enough information was provided by the Fuel ID analysis (Modified 8015) to accurately identify the compounds that were quantitated as oil by the project laboratory. The background sample trace chromatograph and the oil standard chromatograph are included as Appendix C. Additional analysis by mass spectroscopy is suggested. All other detected analytes fall within normal concentration ranges for soils in the western United States.

5.3.2 Base Camp Area

The Base Camp area includes the entire southeastern end of the island (see Figure 2-1). Sampling occurred at the asbestos disposal area and at a reported petroleum seep along a roadway adjacent to Constantine Harbor.

The asbestos disposal area is a gently sloped landfill covering an area of approximately 2 acres. The landfill was apparently created during the 1986 removal action. At the downgradient end of the landfill was a pool of water with a visible sheen. Oil (290 µg/L) was detected in a water sample (033WA) collected at this location. A collocated sediment sample (032SD) also contained oil (490 mg/kg). These concentrations indicate the leaching of POL products from the landfill. Other analytes detected at this location were arsenic, barium, chromium, and lead. See Table 5-1 for sample analytical results. The seep near Constantine Harbor (Figure 2-1) consisted of a 3-foot by 2-foot rust-colored stain on an embankment above a drainage ditch. The stain emanated from what appeared to be a former underground POL pipeline. Upgradient of the pipeline was a former POL tank farm. A sediment sample (031SD) collected at this location contained oil at a concentration of 1,290 mg/kg. Other analytes detected at low levels were arsenic, barium, chromium, and lead.

5.3.3 Bird Cape Area

The Bird Cape area is located at the northern end of Amchitka Island (Figure 2-2). Major sampling locations at Bird Cape were drum groups, a debris pile, and a stream. The Bird Cape area was reportedly

used as an advance warning outpost during World War II. Facilities included housing, refrigeration, and motor pool areas.

Contaminants detected at concentrations at least 10 times their background concentrations included diesel fuel, oil, PAH, barium, chromium, and lead. See Table 5-2 for a summary of Bird Cape area sample analytical results.

Drum sample 011DR, collected at Drum Group 2, was reported by the project laboratory to contain 1,010,000 mg/kg of diesel fuel. Readings in excess of 100% are possible when the results are extrapolated from the analysis of a greatly diluted sample. This value is within the required QC criteria and is considered valid. Relatively high levels (5,400 to 270,000 mg/kg) of diesel fuel were reported in soil samples associated with Drum Groups 2, 3, 4, and 6. These findings indicate that POL drums at the drum groups have released diesel to the surrounding soil.

Drum product samples collected from Drum Groups 1, 5, and 7 contained oil at concentrations ranging from 1,030,000 to 1,270,000 mg/kg. While they again indicate concentrations in excess of 100%, the data are sufficiently reliable for product identification. Relatively high levels of oil were reported for soil samples collected from Drum Groups 1, 5, and 7 (22,000, 320,000, and 47,000 mg/kg in samples 005SL, 015SL, and 013SL, respectively). These findings indicate that POL drums at drum groups have released oil to the surrounding soil.

Significantly elevated concentrations (2.3 to 2,870 mg/kg) of PAHs were encountered in soil samples from Drum Groups 3, 4, 5, 6, and 7. These PAH concentrations are consistent with the presence of diesel fuel and oil found in drum product and soil samples at the same locations.

Individual compounds reported at high concentrations in soil were chrysene at Drum Group 4 in sample 014SL (2,870 mg/kg), and naphthalene at Drum Group 3, in sample 010SL (1,100 mg/kg). See Table 5-2 for a summary of sample analytical results.

Lead was detected at elevated levels in soil sample 007SL (102 mg/kg), and in soil sample 014SL (224 mg/kg), collected at Drum Groups 2 and 4, respectively. These levels may be high enough to qualify the soil as a RCRA waste. In addition, soil samples 007SL and 010SL contained chromium at levels of 37 and 39 mg/kg, respectively. No other

soil samples contained metals at concentrations significantly above background levels.

No contaminants were present above detection limits in the water sample collected at the Bird Cape area (017WA).

5.3.4 Top Camp Area

The Top Camp area is located on a ridge at the northern end of Amchitka Island (Figure 2-3). Top Camp was established during World War II and was also utilized by the AEC during underground nuclear testing.

Samples were collected at three drum groups, a parking area, and in a wetland dovngradient of the parking area. Contaminants detected at concentrations at least 10 times background concentrations included diesel fuel, oil, PAH, and lead. See Table 5-3 for a summary of Top Camp area sample analytical results.

Samples associated with Drum Groups 1, 2, and 3 (022SL, 023SL, and 025SL) were found to contain oil and diesel fuel. Oil concentrations in these samples ranged from 300 mg/kg to 570 mg/kg. Diesel fuel was found in sample 025SL, collected at Drum Group 3, at a concentration of 120 mg/kg. Sample 030SL, collected from soil surrounding drums at the base of the parking area, contained oil at a concentration of 110 mg/kg. Diesel fuel was also detected in this sample at a concentration of 50 mg/kg. These concentrations are significantly below the Alaska Department of Environmental Conservation (ADEC)-specified potential cleanup level of 2,000 mg/kg (ADEC 1991).

Diesel contamination was also detected in sediment samples collected in the parking area and the downgradient wetland. Triplicate sediment sample 026SD, 027SD, 028SD, collected from a stream within the parking area, contained diesel fuel at concentrations ranging from 5,000 to 11,000 mg/kg. Sample 026SD was also reported to contain oil at a concentration of 850 mg/kg. Sample 024SD contained diesel fuel (510 mg/kg) and oil (310 mg/kg).

PAH compounds were found in parking area sediments at concentrations ranging from 4 to 910 mg/kg. The compounds detected are frequently found in association with diesel fuel contamination.

Low levels of PAH were reported in soil samples 23SL and 030SL (0.2 mg/kg and 0.9 mg/kg, respectively). These samples also contained diesel fuel and oil.

Table 5-1

ANCHITKA ISLAND
BASE CAMP AREA
SAMPLE ANALYTICAL RESULTS

(soil, sediment, and drum sample units - mg/kg,
aqueous sample units - µg/L)

Sample I.D.:	9137ANCH031SD	9137ANCH032SD	9137ANCH033WA
Sample Type:	Sediment	Sediment	Surface Water
Date Collected:	9/10/91	9/10/91	9/10/91
Duplicate of:			
Fuel ID (Modified 8015)			
Bunker Oil	NA	NA	NA
Diesel	ND(10)	ND(10)	ND(50)
Gasoline	ND(10)	ND(10)	ND(50)
Jet Fuel	ND(10)	ND(10)	ND(50)
Jet Fuel (as Jet A)	NA	NA	NA
Jet Fuel (as JP4)	NA	NA	NA
Kerosene	ND(10)	ND(10)	ND(50)
Kerosene (K-1)	NA	NA	NA
Mineral Spirits	ND(10)	ND(10)	ND(50)
Oil[a]	1290	490	290
Metals			
Arsenic	2	4	ND(5)
Barium	120	87	19
Cadmium	ND(1)	ND(1)	ND(3)
Chromium	12	8	7
Lead	5	14	4
Mercury	ND(0.2)	ND(0.2)	ND(0.5)
Selenium	ND(1)	ND(1)	ND(5)
Silver	ND(2)	ND(2)	ND(10)
Polychlorinated Biphenyls			
Aroclor 1016	NA	ND(1)	NA
Aroclor 1221	NA	ND(1)	NA
Aroclor 1232	NA	ND(1)	NA
Aroclor 1242	NA	ND(1)	NA
Aroclor 1248	NA	ND(1)	NA
Aroclor 1254	NA	ND(1)	NA
Aroclor 1260	NA	ND(1)	NA
Polynuclear Aromatic Hydrocarbons			
Naphthalene	ND(1)	ND(0.1)	NA
Acenaphthylene	ND(1)	ND(0.1)	NA
Acenaphthene	ND(1)	ND(0.1)	NA
Fluorene	ND(1)	ND(0.1)	NA
Phenanthrene	ND(1)	ND(0.1)	NA
Anthracene	ND(1)	ND(0.1)	NA
Fluoranthene	ND(1)	ND(0.1)	NA
Pyrene	ND(1)	ND(0.1)	NA
Benzo(a)anathracene	ND(1)	ND(0.1)	NA
Chrysene	ND(1)	ND(0.1)	NA
Benzo(b)fluoranthene[b]	NA	NA	NA
Benzo(k)fluoranthene[b]	NA	NA	NA
Benzo(b+k)fluoranthene[c]	ND(2)	ND(0.2)	NA
Benzo(a)pyrene	ND(1)	ND(0.2)	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Dibenz(a,h)anthracene[b]	NA	NA	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(2)	ND(0.2)	NA
Benzo(g,h,i)perylene	ND(1)	ND(0.2)	NA

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Key at end of table.

Table 5-1 (Cont.)

aCAS quote: "Quantitated using hydraulic oil as a standard."
bARDL quote: "Coelutes with preceding compound."
cCAS quote: "These compounds coelute; therefore, the results are reported as the combined concentration."

Key:

CAS = Columbia Analytical Services, Inc.
J, UJ = The associated value is an estimated quantity based on unacceptable quality control results.
NA = Not analyzed. The listed analytes for Fuel I.D. analysis represent two separate laboratories using different standards for quantitation. Calibrations were not performed for all compounds identified; therefore, the NA designation is necessary.
ND = Not detected at the quantitation limit listed in parentheses.

Source: Ecology and Environment, Inc. 1991.

Table 5-2

AMCHITKA ISLAND
BIRD CAPE AREA
SAMPLE ANALYTICAL RESULTS

(soil, sediment, and drum sample units - mg/kg, aqueous sample units - µg/L)

Sample I.D.:	9136AMCH001DR	9136AMCH002DR	9136AMCH011DR	9136AMCH012DR	9136AMCH016DR
Sample type:	Drum	Drum	Drum	Drum	Drum
Date Collected:	9/7/91	9/7/91	9/7/91	9/7/91	9/7/91
Duplicate of:					
Fuel ID (Modified 8015)					
Bunker Oil	NA	NA	NA	NA	NA
Diesel	ND(2500)	ND(2500)	1,010,000	ND(2500)	ND(2500)
Gasoline	ND(2500)	ND(2500)	ND(2500)	ND(2500)	ND(2500)
Jet Fuel	ND(2500)	ND(2500)	ND(2500)	ND(2500)	ND(2500)
Jet Fuel (as Jet A)	NA	NA	NA	NA	NA
Jet Fuel (as JP4)	NA	NA	NA	NA	NA
Kerosene	ND(2500)	ND(2500)	ND(2500)	ND(2500)	ND(2500)
Kerosene (K-1)	NA	NA	NA	NA	NA
Mineral Spirits	ND(2500)	ND(2500)	ND(2500)	ND(2500)	ND(2500)
Oil[a]	1,030,000	1,270,000	ND(10,000)	1,160,000	1,200,000
Metals					
Arsenic	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Barium	17	ND(0.5)	ND(0.5)	1	3D[1] UJ
Cadmium	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Chromium	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Lead	0.6	0.8	0.2	1.6	1.9
Mercury	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)
Selenium	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Silver	ND(1)UJ	ND(1)UJ	ND(1)UJ	ND(1)UJ	ND(1)UJ
Polychlorinated Biphenyls					
Aroclor 1016	NA	NA	NA	NA	NA
Aroclor 1221	NA	NA	NA	NA	NA
Aroclor 1232	NA	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA	NA
Aroclor 1248	NA	NA	NA	NA	NA
Aroclor 1254	NA	NA	NA	NA	NA
Aroclor 1260	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons					
Naphthalene	ND(100)	ND(100)	5,330	ND(100)	ND(100)
Acenaphthylene	ND(100)	ND(100)	776	ND(100)	ND(100)
Acenaphthene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Fluorene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Phenanthrene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Anthracene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Fluoranthene	ND(100)	ND(100)	ND(100)	258	865
Pyrene	ND(100)	ND(100)	ND(100)	215	ND(100)
Benzo(a)anathracene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chrysene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Benzo(b)fluoranthene[b]	NA	NA	NA	NA	NA
Benzo(k)fluoranthene[b]	NA	NA	NA	NA	NA
Benzo(b+k)fluoranthene[c]	ND(200)	ND(200)	ND(200)	ND(200)	293
Benzo(a)pyrene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Indeno(1,2,3-cd)pyrene[b]	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene[b]	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)
Benzo(g,h,i)perylene	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)

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Key at end of table.

Table 5-2 (Cont.)

Sample I.D.:	9136AMCH003SL	9136AMCH004SL	9136AMCH005SL	9136AMCH006SL	9136AMCH007SL
Sample type:	Soil	Soil	Soil	Soil	Soil
Date Collected:	9/7/91	9/7/91	9/7/91	9/7/91	9/7/91
Duplicate of:					
Fuel ID (Modified 8015)					
Bunker Oil	NA	NA	NA	NA	NA
Diesel	ND(10)	ND(10)	ND(200)	20	5400
Gasoline	ND(10)	ND(10)	ND(200)	ND(10)	ND(100)
Jet Fuel	ND(10)	ND(10)	ND(200)	ND(10)	ND(100)
Jet Fuel (as Jet A)	NA	NA	NA	NA	NA
Jet Fuel (as JP4)	NA	NA	NA	NA	NA
Kerosene	ND(10)	ND(10)	ND(200)	ND(10)	ND(100)
Kerosene (K-1)	NA	NA	NA	NA	NA
Mineral Spirits	ND(10)	ND(10)	ND(200)	ND(10)	ND(100)
Oil[a]	ND(40)	ND(40)	22,000	420	ND(400)
Metals					
Arsenic	3	3	3	3	5
Barium	10	8	12	39	16
Cadmium	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Chromium	15	13	21	23	37
Lead	2	2	4	14	102
Mercury	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
Selenium	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Silver	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
Polychlorinated Biphenyls					
Aroclor 1016	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1221	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1232	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1242	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1248	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1254	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Aroclor 1260	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Polynuclear Aromatic Hydrocarbons					
Naphthalene	0.4	ND(0.1)	ND(1)	0.3	0.2
Acenaphthylene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	1.8
Acenaphthene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	0.3
Fluorene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Phenanthrene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Anthracene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Fluoranthene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Pyrene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Benzo(a)anathracene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Chrysene	ND(0.1)	ND(0.1)	63	ND(0.1)	ND(0.1)
Benzo(b)fluoranthene[b]	NA	NA	NA	NA	NA
Benzo(k)fluoranthene[b]	NA	NA	NA	NA	NA
Benzo(b+k)fluoranthene[c]	ND(0.2)	ND(0.2)	ND(2)	ND(0.2)	ND(0.2)
Benzo(a)pyrene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)
Indeno(1,2,3-cd)pyrene[b]	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene[b]	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(0.2)	ND(0.2)	ND(2)	ND(0.2)	ND(0.2)
Benzo(g,h,i)perylene	ND(0.1)	ND(0.1)	ND(1)	ND(0.1)	ND(0.1)

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Key at end of table.

Table 5-2 (Cont.)

Sample I.D.:	9136AMCH008SL	9136AMCH009SL	9136AMCH010SL	9136AMCH013SL	9136AMCH014SL
Sample type:	Soil	Soil	Soil	Soil	Soil
Date Collected:	9/7/91	9/7/91	9/7/91	9/7/91	9/7/91
Duplicate of:	-009SL,-010SL	-008SL,-010SL	-008SL,-009SL		
Fuel ID (Modified 8015)					
Bunker Oil	NA	NA	ND(4900)	NA	NA
Diesel	18,000	18,000	24,000	ND(200)	270,000
Gasoline	ND(200)	ND(200)	ND(980)	ND(200)	ND(200)
Jet Fuel	ND(200)	ND(200)	NA	ND(200)	ND(200)
Jet Fuel (as Jet A)	NA	NA	ND(980)	NA	NA
Jet Fuel (as JP4)	NA	NA	ND(980)	NA	NA
Kerosene	ND(200)	ND(200)	NA	ND(200)	ND(200)
Kerosene (K-1)	NA	NA	ND(980)	NA	NA
Mineral Spirits	ND(200)	ND(200)	NA	ND(200)	ND(200)
Oil[a]	ND(800)	ND(800)	NA	47,000	5,900
Metals					
Arsenic	2	2	2.4	4	2
Barium	19	16	16	12	15
Cadmium	ND(1)	ND(1)	ND(0.57)	ND(1)	ND(1)
Chromium	26	21	39J	27	22
Lead	5	4	6.3	2	224
Mercury	ND(0.2)	ND(0.2)	ND(0.079)	ND(0.2)	0.5
Selenium	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)
Silver	ND(2)	ND(2)	ND(1.1)UJ	ND(2)	ND(2)
Polychlorinated Biphenyls					
Aroclor 1016	ND(1)	ND(1)	ND(.092)	ND(1)	ND(1)
Aroclor 1221	ND(1)	ND(1)	ND(.092)	ND(1)	ND(1)
Aroclor 1232	ND(1)	ND(1)	ND(.092)	ND(1)	ND(1)
Aroclor 1242	ND(1)	ND(1)	ND(.092)	ND(1)	ND(1)
Aroclor 1248	ND(1)	ND(1)	ND(.092)	ND(1)	ND(1)
Aroclor 1254	ND(1)	ND(1)	ND(.18)	ND(1)	ND(1)
Aroclor 1260	ND(1)	ND(1)	ND(.18)	ND(1)	ND(1)
Polynuclear Aromatic Hydrocarbons					
Naphthalene	ND(1)	ND(1)UJ	1100	NA	ND(1)
Acenaphthylene	ND(1)	ND(1)UJ	390	NA	ND(2)
Acenaphthene	ND(1)	ND(1)UJ	170	NA	ND(1)
Fluorene	ND(1)	ND(1)UJ	260	NA	ND(1)
Phenanthrene	ND(1)	5.2J	110	NA	ND(1)
Anthracene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)
Fluoranthene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)
Pyrene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)
Benzo(a)anathracene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)
Chrysene	ND(1)	ND(1)UJ	ND(98)	NA	2870
Benzo(b)fluoranthene	NA	NA	ND(98)	NA	NA
Benzo(k)fluoranthene	NA	NA	ND(98)	NA	NA
Benzo(b+k)fluoranthene[c]	ND(2)	ND(2)UJ	NA	NA	ND(2)
Benzo(a)pyrene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)
Indeno(1,2,3-cd)pyrene[b]	NA	NA	ND(98)	NA	NA
Dibenz(a,h)anthracene[b]	NA	NA	ND(98)	NA	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(2)	ND(2)UJ	NA	NA	ND(2)
Benzo(g,h,i)perylene	ND(1)	ND(1)UJ	ND(98)	NA	ND(1)

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Key at end of table.

Table 5-2 (Cont.)

Sample I.D.:	9136AMCH015SL	9136AMCH018SL	9136AMCH021SL	9136AMCH017WA	9136AMCH019WA
Sample type:	Soil	Soil	Soil	Surface Water	Rinsate
Date Collected:	9/7/91	9/7/91	9/7/91	9/7/91	9/7/91
Duplicate of:					
Fuel ID (Modified 8015)					
Bunker Oil	NA	NA	NA	NA	NA
Diesel	ND(5000)	12,000	ND(10)	ND(50)	ND(50)
Gasoline	ND(5000)	ND(200)	ND(10)	ND(50)	ND(50)
Jet Fuel	ND(5000)	ND(200)	ND(10)	ND(50)	ND(50)
Jet Fuel (as Jet A)	NA	NA	NA	NA	NA
Jet Fuel (as JP4)	NA	NA	NA	NA	NA
Kerosene	ND(5000)	ND(200)	ND(10)	ND(50)	ND(50)
Kerosene (K-1)	NA	NA	NA	NA	NA
Mineral Spirits	ND(5000)	ND(200)	ND(10)	ND(50)	ND(50)
Oil[a]	320,000	ND(800)	1310	ND(200)	ND(200)
Metals					
Arsenic	3	4	1	ND(5)	ND(5)
Barium	154	11	13	ND(5)	ND(5)
Cadmium	ND(1)	ND(1)	ND(1)	ND(3)	ND(3)
Chromium	28	18	14	ND(5)	ND(5)
Lead	4	13	3	ND(2)	ND(2)
Mercury	ND(0.2)	ND(0.2)	0.3	ND(0.5)	ND(0.5)
Selenium	ND(1)	ND(1)	4	ND(5)	ND(5)
Silver	ND(2)	ND(2)	ND(0.2)	ND(10)	ND(10)
Polychlorinated Biphenyls					
Aroclor 1016	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1221	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1232	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1242	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1248	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1254	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Aroclor 1260	ND(10)	ND(1)	ND(1)	NA	ND(0.1)UJ
Polynuclear Aromatic Hydrocarbons					
Naphthalene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Acenaphthylene	ND(1)	15J	ND(0.1)	ND(1)UJ	ND(1)UJ
Acenaphthene	ND(1)	6.6J	ND(0.1)	ND(1)UJ	ND(1)UJ
Fluorene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Phenanthrene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Anthracene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Fluoranthene	31	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Pyrene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Benzo(a)anathracene	159	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Chrysene	699	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Benzo(b)fluoranthene[b]	NA	NA	NA	NA	NA
Benzo(k)fluoranthene[c]	NA	NA	NA	NA	NA
Benzo(b+k)fluoranthene	174	ND(1)UJ	ND(0.2)	ND(2)UJ	ND(2)UJ
Benzo(a)pyrene	372	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ
Indeno(1,2,3-cd)pyrene[d]	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene[d]	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[e]	ND(2)	ND(2)UJ	ND(0.2)	ND(2)UJ	ND(2)UJ
Benzo(g,h,i)perylene	ND(1)	ND(1)UJ	ND(0.1)	ND(1)UJ	ND(1)UJ

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Key at end of table.

Table 5-2 (Cont.)

Sample I.D.:	9136AMCH020WA
Sample type:	Rinsate
Date Collected:	9/7/91
Duplicate of:	-019WA
Fuel ID (Modified 8015)	
Bunker Oil	ND(360)
Diesel	ND(71)
Gasoline	ND(71)
Jet Fuel	NA
Jet Fuel (as Jet A)	ND(71)
Jet Fuel (as JP4)	ND(71)
Kerosene	NA
Kerosene (K-1)	ND(71)
Mineral Spirits	NA
Oil[a]	NA
Metals	
Arsenic	ND(4.5)
Barium	ND(90)
Cadmium	ND(5.0)
Chromium	ND(10)
Lead	3.9
Mercury	ND(0.20)
Selenium	ND(4.5)
Silver	ND(10)
Polychlorinated Biphenyls	
Aroclor 1016	ND(0.71)
Aroclor 1221	ND(0.71)
Aroclor 1232	ND(0.71)
Aroclor 1242	ND(0.71)
Aroclor 1248	ND(0.71)
Aroclor 1254	ND(1.4)
Aroclor 1260	ND(1.4)
Polynuclear Aromatic Hydrocarbons	
Naphthalene	ND(7.1)
Acenaphthylene	ND(7.1)
Acenaphthene	ND(7.1)
Fluorene	ND(7.1)
Phenanthrene	ND(7.1)
Anthracene	ND(7.1)
Fluoranthene	ND(7.1)
Pyrene	ND(7.1)
Benzo(a)anathracene	ND(7.1)
Chrysene	ND(7.1)
Benzo(b)fluoranthene[b]	ND(7.1)
Benzo(k)fluoranthene[b]	ND(7.1)
Benzo(b+k)fluoranthene[c]	NA
Benzo(a)pyrene	ND(7.1)
Indeno(1,2,3-cd)pyrene[b]	ND(7.1)
Dibenz(a,h)anthracene[b]	ND(7.1)
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	NA
Benzo(g,h,i)perylene	ND(7.1)

02[IL]KO7030:D087(A)/1793/8

[a]CAS quote: "Quantitated using hydraulic oil as a standard."
[b]ARDL quote: "Coelutes with preceding compound."
[c]CAS quote: "These compounds coelute; therefore, the results are reported as the combined concentration."

Key:

CAS = Columbia Analytical Services, Inc.
J, UJ = The associated value is an estimated quantity based on unacceptable quality control results.
NA = Not analyzed. The listed analytes for Fuel I.D. analysis represent two separate laboratories using different standards for quantitation. Calibrations were not performed for all compounds identified; therefore, the NA designation is necessary.
ND = Not detected at the quantitation limit listed in parentheses.

Source: Ecology and Environment, Inc. 1991.

Table 5-3

ANCHITKA ISLAND
TOP CAMP
SAMPLE ANALYTICAL RESULTS

(soil, sediment, and drum sample units - mg/kg, aqueous sample units - µg/L)

Sample I.D.:	9137AMCH024SD	9137AMCH026SD	9137AMCH027SD	9137AMCH028SD	9137AMCH022SL
Sample Type:	Sediment	Sediment	Sediment	Sediment	Soil
Date Collected:	9/8/91	9/8/91	9/8/91	9/8/91	9/8/91
Duplicate of:		-027SD,028SD	-026SD,028SD	-026SD,-027SD	
Fuel ID (Modified 8015)					
Bunker Oil	NA	NA	NA	ND(14,000)	NA
Diesel	510	10,000	11,000	5,000	ND(10)
Gasoline	ND(10)	ND(100)	ND(100)	ND(2800)	ND(10)
Jet Fuel	ND(10)	ND(100)	ND(100)	NA	ND(10)
Jet Fuel (as Jet A)	NA	NA	NA	ND(2800)	NA
Jet Fuel (as JP4)	NA	NA	NA	ND(2800)	NA
Kerosene	ND(10)	ND(100)	ND(100)	NA	ND(10)
Kerosene (K-1)	NA	NA	NA	ND(2800)	NA
Mineral Spirits	ND(10)	ND(100)	ND(100)	NA	ND(10)
Oil[a]	310	850	ND(400)	NA	380
Metals					
Arsenic	ND(1)	ND(1)	ND(1)	0.49	2
Barium	44	12	12	13	73
Cadmium	ND(1)	ND(1)	ND(1)	1.6	ND(1)
Chromium	28	22	22	41J	42
Lead	4	1	1	6.2	13
Mercury	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.10)	ND(0.2)
Selenium	ND(1)	ND(1)	ND(1)	ND(0.39)	ND(1)
Silver	ND(2)	ND(2)	ND(2)	ND(1.1)UJ	ND(2)
Polychlorinated Biphenyls					
Aroclor 1016	ND(1)	NA	NA	NA	NA
Aroclor 1221	ND(1)	NA	NA	NA	NA
Aroclor 1232	ND(1)	NA	NA	NA	NA
Aroclor 1242	ND(1)	NA	NA	NA	NA
Aroclor 1248	ND(1)	NA	NA	NA	NA
Aroclor 1254	ND(1)	NA	NA	NA	NA
Aroclor 1260	ND(1)	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons					
Naphthalene	0.2	ND(1)	ND(1)	ND(140)	ND(0.1)
Acenaphthylene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Acenaphthene	ND(0.1)	ND(1)	ND(1)	370	ND(0.1)
Fluorene	ND(0.1)	ND(1)	ND(1)	370	ND(0.1)
Phenanthrene	ND(0.1)	4.0	6.4	170	ND(0.1)
Anthracene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Fluoranthene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Pyrene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Benzo(a)anathracene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Chrysene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Benzo(b)fluoranthene[b]	NA	NA	NA	ND(140)	NA
Benzo(k)fluoranthene[b]	NA	NA	NA	ND(140)	NA
Benzo(b+k)fluoranthene[c]	ND(0.2)	ND(2)	ND(2)	NA	ND(0.2)
Benzo(a)pyrene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)
Indeno(1,2,3-cd)pyrene[b]	NA	NA	NA	ND(140)	NA
Dibenz(a,h)anthracene[b]	NA	NA	NA	ND(140)	NA
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(0.2)	ND(2)	ND(2)	NA	ND(0.2)
Benzo(g,h,i)perylene	ND(0.1)	ND(1)	ND(1)	ND(140)	ND(0.1)

02[IL]KO7030:D087(A)/1794/8

Key at end of table.

Table 5-3 (Cont.)

Sample I.D.:	9137AMCH023SL	9137AMCH025SL	9137AMCH030SL	9137AMCH029WA
Sample Type:	Soil	Soil	Soil	Surface Water
Date Collected:	9/8/91	9/8/91	9/8/91	9/8/91
Duplicate of:				
Fuel ID (Modified 8015)				
Bunker Oil	NA	NA	NA	NA
Diesel	ND(10)	120	50	ND(50)UJ
Gasoline	ND(10)	ND(10)	ND(10)	ND(50)UJ
Jet Fuel	ND(10)	ND(10)	ND(10)	ND(50)UJ
Jet Fuel (as Jet A)	NA	NA	NA	NA
Jet Fuel (as JP4)	NA	NA	NA	NA
Kerosene	ND(10)	ND(10)	ND(10)	ND(50)UJ
Kerosene (X-1)	NA	NA	NA	NA
Mineral Spirits	ND(10)	ND(10)	ND(10)	ND(50)UJ
Oil[a]	570	300	110	ND(200)UJ
Metals				
Arsenic	7	2	ND(1)	ND(5)
Barium	37	26	56	5
Cadmium	ND(1)	ND(1)	ND(1)	ND(3)
Chromium	30	33	25	ND(5)
Lead	34	6	3	ND(2)
Mercury	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.5)
Selenium	2	2	ND(1)	ND(5)
Silver	ND(2)	ND(2)	ND(2)	ND(10)
Polychlorinated Biphenyls				
Aroclor 1016	NA	NA	ND(1)	NA
Aroclor 1221	NA	NA	ND(1)	NA
Aroclor 1232	NA	NA	ND(1)	NA
Aroclor 1242	NA	NA	ND(1)	NA
Aroclor 1248	NA	NA	ND(1)	NA
Aroclor 1254	NA	NA	ND(1)	NA
Aroclor 1260				
Polynuclear Aromatic Hydrocarbons				
Naphthalene	NA	NA	0.2	ND(1)
Acenaphthylene	NA	NA	ND(0.1)	ND(1)
Acenaphthene	NA	NA	ND(0.1)	ND(1)
Fluorene	NA	NA	ND(0.1)	ND(1)
Phenanthrene	NA	NA	ND(0.1)	ND(1)
Anthracene	NA	NA	ND(0.1)	ND(1)
Fluoranthene	NA	NA	ND(0.1)	ND(1)
Pyrene	NA	NA	ND(0.1)	ND(1)
Benzo(a)anathracene	NA	NA	ND(0.1)	ND(1)
Chrysene	NA	NA	ND(0.1)	ND(1)
Benzo(b)fluoranthene[b]	NA	NA	NA	NA
Benzo(k)fluoranthene[b]	NA	NA	NA	NA
Benzo(b+k)fluoranthene[c]	NA	NA	ND(0.2)	ND(2)
Benzo(a)pyrene	NA	NA	NA(0.1)	ND(1)
Indeno(1,2,3HAcd)pyrene[b]	NA	NA	NA	NA
Dibenz(a,h)anthracene[b]	NA	NA	NA	NA
Indeno(1,2,3HAcd)pyrene and Dibenz(a,h)anthracene[c]	NA	NA	ND(0.2)	ND(2)
Benzo(g,h,i)perylene	NA	NA	ND(0.1)	ND(1)

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[b] ARDL quote: "Coelutes with preceding compound."
[a] CAS quote: "Quantitated using hydraulic oil as a standard."
[c] CAS quote: "These compounds coelute; therefore, the results are reported as the combined concentration."

Key:
CAS = Columbia Analytical Services, Inc.
J, UJ = The associated value is an estimated quantity based on unacceptable quality control results.
NA = Not analyzed. The listed analytes for Fuel I.D. analysis represent two separate laboratories using different standards for quantitation. Calibrations were not performed for all compounds identified; therefore, the NA designation is necessary.
ND = Not detected at the quantitation limit listed in parentheses.

Source: Ecology and Environment, Inc. 1991.

Table 5-4

AMCHITKA ISLAND
RINSATE
SAMPLE ANALYTICAL RESULTS

(soil, sediment, and drum sample units - mg/kg,
aqueous sample units - µg/L)

Sample I.D.:	9136AMCH019WA	9136AMCH020WA
Sample Type:	Rinsate-QC	Rinsate-QA
Date Collected:	9/7/91	9/7/91
Location:	Bird Cape	Bird Cape
Fuel ID (Modified 8015)		
Bunker Oil	NA	ND(360)
Diesel	ND(50)	ND(71)
Gasoline	ND(50)	ND(71)
Jet Fuel	ND(50)	NA
Jet Fuel (as Jet A)	NA	ND(71)
Jet Fuel (as JP4)	NA	ND(71)
Kerosene	ND(50)	NA
Kerosene (K-1)	NA	ND(71)
Mineral Spirits	ND(50)	NA
Oil[a]	ND(200)	NA
Metals		
Arsenic	ND(5)	ND(4.5)
Barium	ND(5)	ND(50)
Cadmium	ND(3)	ND(5.0)
Chromium	ND(5)	ND(10)
Lead	ND(2)	3.9
Mercury	ND(0.5)	ND(0.20)
Selenium	ND(5)	ND(4.5)
Silver	ND(10)	ND(10)
Polychlorinated Biphenyls		
Aroclor 1016	ND(0.1)UJ	ND(0.71)
Aroclor 1221	ND(0.1)UJ	ND(0.71)
Aroclor 1232	ND(0.1)UJ	ND(0.71)
Aroclor 1242	ND(0.1)UJ	ND(0.71)
Aroclor 1248	ND(0.1)UJ	ND(0.71)
Aroclor 1254	ND(0.1)UJ	ND(1.4)
Aroclor 1260	ND(0.1)UJ	ND(1.4)
Polynuclear Aromatic Hydrocarbons		
Naphthalene	ND(1)UJ	ND(7.1)
Acenaphthylene	ND(1)UJ	ND(7.1)
Acenaphthene	ND(1)UJ	ND(7.1)
Fluorene	ND(1)UJ	ND(7.1)
Phenanthrene	ND(1)UJ	ND(7.1)
Anthracene	ND(1)UJ	ND(7.1)
Fluoranthene	ND(1)UJ	ND(7.1)
Pyrene	ND(1)UJ	ND(7.1)
Benzo(a)anathracene	ND(1)UJ	ND(7.1)
Chrysene	ND(1)UJ	ND(7.1)
Benzo(b)fluoranthene[b]	NA	ND(7.1)
Benzo(k)fluoranthene[b]	NA	ND(7.1)
Benzo(b+k)fluoranthene[c]	ND(2)UJ	NA
Benzo(a)pyrene	ND(1)UJ	ND(7.1)
Indeno(1,2,3-cd)pyrene[b]	NA	ND(7.1)
Dibenz(a,h)anthracene[b]	NA	ND(7.1)
Indeno(1,2,3-cd)pyrene and Dibenz(a,h)anthracene[c]	ND(2)UJ	NA
Benzo(g,h,i)perylene	ND(1)UJ	ND(7.1)

02(IL)KO7030:D087(A)/1772/28

Key at end of table.

Table 5-4 (Cont.)

02[IL]KO7030:D0871A)/1772/28

[a]CAS quote: "Quantitated using hydraulic oil as a standard."
[b]ARDL quote: "Coelutes with preceding compound."
[c]CAS quote: "These compounds coelute; therefore, the results are reported as the combined concentration."

Key:
CAS = Columbia Analytical Services, Inc.
J, UJ = The associated value is an estimated quantity based on unacceptable quality control results.
NA = Not analyzed. The listed analytes for Fuel I.D. analysis represent two separate laboratories using different standards for quantitation. Calibrations were not performed for all compounds identified; therefore, the NA designation is necessary.
ND = Not detected at the quantitation limit listed in parentheses.

Source: Ecology and Environment, Inc. 1991.

6. POTENTIAL CONTAMINANT TRANSPORT PATHWAYS AND RECEPTORS

6.1 CONTAMINANT IDENTIFICATION AND CHARACTERISTICS

6.1.1 Contaminants of Concern

Designation of contaminants of concern for Amchitka Island are based on the following criteria:

- For petroleum hydrocarbons in soils, concentrations exceeding the least restrictive cleanup level stipulated by ADEC (2,000 mg/kg) shall be considered a contaminant of concern. ADEC will be consulted concerning soil cleanup levels prior to cleanup activities;
- PAHs are constituents commonly associated with fuels. For PAHs in soil, concentrations exceeding 10 times the background analyte concentrations, or 10 times the detection limit of undetected background analytes, shall be considered a contaminant of concern. This is an arbitrarily selected level that identifies these constituents as not naturally occurring and potentially in need of further study;
- For heavy metals in soil, target metal concentrations exceeding 20 times their respective TCLP limits shall be considered a contaminant of concern. This action level is based on a 20:1 dilution employed in the TCLP method, and is the level required to detect a quantity above the regulatory limit, assuming 100% is extracted/leached during the procedure;
- For petroleum hydrocarbons and PAHs in water, any detected concentration shall be a contaminant of concern; and
- For heavy metals in water, concentrations exceeding federal maximum contaminant levels (MCLs) for drinking water shall be a contaminant of concern.

It should be noted that these criteria are not proposed action levels for cleanup or remediation. The criteria represent contaminant concentrations that should be further evaluated with regard to off-site migration, human or wildlife exposure, and the consequent need for

cleanup. Based on the criteria listed above, Table 6-1 summarizes the contaminants of concern and the affected areas at Amchitka Island.

Of the analytes detected at Amchitka Island, the following occur at sufficient concentrations to be considered contaminants of concern: diesel fuel (5,000 to 270,000 mg/kg); oil (22,000 to 320,000 mg/kg); naphthalene (1,100 mg/kg); acenaphthylene (1.8 to 370 mg/kg); acenaphthene (8 to 370 mg/kg); fluorene (260 to 370 mg/kg); phenanthrene (4 to 170 mg/kg); fluoranthene (27 to 31 mg/kg); benzo(a)anthracene (199 to 237 mg/kg); chrysene (63 to 2,870 mg/kg); benzo(b+k)fluoranthene (61 to 293 mg/kg); benzo(a)pyrene (372 mg/kg); and lead (102 to 224 mg/kg). These compounds/elements are further evaluated in the following subsections and will be addressed in the Amchitka Island Remedial Alternatives Report.

6.1.2 Contaminant Characteristics

The following paragraphs summarize characteristics of the contaminants listed in section 6.1.1. Both petroleum contaminants (diesel fuel, oil) have similar transport characteristics. These high molecular weight constituents are likely to adsorb to soils, particularly those with a high organic content. Although the water solubility of diesel fuel and oil is minimal, migration of POLs via water could be expected to affect surface water bodies and, potentially, groundwater.

PAH compounds are persistent in the environment and are strongly adsorbed to soils, particularly those having high organic content. They are also readily assimilated by plants, thus entering the food chain. In water, these compounds tend to concentrate in sediments and aquatic invertebrates. Some PAHs are carcinogenic in mammals.

The mobility of lead in soils is variable, depending on the nature of the soil. It generally bonds to organic material in soils. Consequently, lead in soils is not easily assimilated by plants. Elemental lead is highly soluble in water, however, and thus is quite mobile in surface and groundwater.

6.2 POTENTIAL RECEPTORS

Potential receptors of greatest concern include the approximately 160 residents of Amchitka Island in addition to the nine threatened or

endangered species in the vicinity. These include eight endangered species of whale and one threatened avian species, the Aleutian Canada goose. Marine species such as whales may be at risk mostly from lead, which is mobile in surface water. The Aleutian Canada goose and other terrestrial species may be at risk for exposure to lead in the surface water and PAHs in plant and invertebrate food items.

Human and animal populations may be potentially exposed via air, soil, groundwater, and surface water. These pathways are discussed in the following section.

6.3 POTENTIAL CONTAMINANT TRANSPORT PATHWAYS

6.3.1 Air Pathway

There have been no known releases of contaminants to the air from any of the sites. Mobility of the contaminants by volatilization to the atmosphere is limited by several factors: the adsorption to fine-grained material and silts, the confining effects of overlying ground cover (i.e., vegetation), and the confining effects of a frozen surface layer during freezing periods.

Soils on Amchitka Island are primarily volcanic and contain large amounts of organic matter, greatly increasing the adsorption of organic compounds. The island is almost completely dominated by grasses during the summer months, and a freezing layer of snowfall covers the island during the winter months. Additionally, the island's moist climate and lush vegetative layer leaves little chance for the buildup of dusts and the inhalation of contaminated airborne particulates. Because of these conditions and the fact that POL products found on Amchitka have been weathering for more than 40 years, all volatile constituents may be assumed to have evaporated or to be well confined prior to the present time.

6.3.2 Soil Pathway

There are five potential exposure routes by which humans and animals inhabiting Amchitka Island may come in contact with contaminated soils. These include:

- o Ingestion of soil contaminants;
- o Inhalation of contaminated particulates;
- o Dermal adsorption of soil contaminants;
- o Ingestion of vegetation grown in contaminated soil; and
- o The ingestion of contaminated sediment underlying or suspended in surface water.

The contaminated area closest to island residents is the asbestos disposal area located approximately 2 miles from base camp. Due to this distance from residential housing, residents do not normally participate in activities on or near areas of soil contamination and therefore have a low risk potential for exposure to site contaminants. Wildlife, however, may have a greater potential for coming into contact with site contaminants particularly through ingestion of vegetation grown in contaminated soil, and ingestion of contaminated sediment or invertebrates. This is particularly applicable to the Bird Cape and Top Camp areas, where elevated PAH concentrations occur in sediments.

6.3.3 Groundwater Pathway

Groundwater is not a potential pathway for pollutant exposure from the areas of contamination because drinking water for domestic use is obtained from surface impoundments and springs. Although groundwater is not utilized as a drinking water source on Amchitka Island, the potential exists for migration of contaminants to groundwater. Groundwater could also be expected to transport contaminants from waste source areas to springs, surface ponds, or the marine environment.

6.3.4 Surface Water Pathway

Surface water appears to be the pathway of greatest concern. During the E & E inspection POL products released to surface water were discovered in three separate areas on the island. The first area was discovered adjacent to Bird Cape Drum Group 5 (Figure 4-2), where POLs were observed flowing into an intermittent stream that eventually flows into a 10- by 20-foot-wide pond. Surface water in the form of a small flowing stream exits the pond in a westerly direction and empties into

the Bering Sea (see Figure 2-2). E & E field team members collected a soil sample from this area upgradient of its release into the stream. Sample analytical results indicate the release contains 320,000 mg/kg of oil as well as arsenic, barium, chromium, lead, and PAHs. Surface water was sampled at the stream exiting the pond; however, contamination was not present above detection limit at this point.

It is possible that the pond itself may support freshwater fish and birds that may be exposed to fuels and PAHs accumulating in sediments and plants or lead dissolved in surface water. Six different species of fish and up to 131 species of birds have been recorded on or near Amchitka Island. Should contaminants migrate the approximately 1,000 feet to the Bering Sea via surface water, the concentrations would likely be much lower than those found in the pond due to dispersion in surface water and dilution with ocean water. Marine mammals such as the eight species of endangered whales that inhabit the coastal waters may also be exposed via this pathway, although it is unlikely that POL contaminants would reach the coast in sufficient concentrations to pose a substantial risk to marine life.

In the second area, located immediately downgradient west of the asbestos disposal area, a POL sheen was observed on a standing pool of water. Water and sediment samples were taken from this location and sample analytical results indicated 290 µg/L of oil in water and 490 mg/kg of oil in sediments as well as several heavy metals, including barium, cadmium, chromium, arsenic, and lead. However, the concentrations of these analytes were below the applicable action levels. There was no surface water observed exiting the pool.

The third area is located in a wetland downgradient of the Top Camp area. The Top Camp area is located on a ridge at the northern end of Amchitka Island (see Figure 2-3). Samples collected from sediments in the parking area contained diesel at concentrations of 5,000 to 11,000 mg/kg. PAH concentrations ranging from 4 to 910 mg/kg were also found in these sediments. Both the diesel and PAH concentrations are high enough to pose a threat to human health and the environment. The presence of these contaminants in sediments makes them readily available for migration via surface water. Some migration has already occurred, as indicated by diesel contamination found in a downgradient wetland

sample (024SD). Surface water in the wetland area flows intermittently in a southerly direction and eventually enters a lake approximately 1 mile away.

Table 6-1

CONTAMINANTS OF CONCERN
AMCHITKA ISLAND, ALASKA

Area	Matrix	Contaminant	Concentration (mg/kg)	Level of Concern (mg/kg)	Source
Bird Cape	soil	Diesel	5,400 mg/kg-270,000 mg/kg	2,000 mg/kg	ADEC Guidance[b]
Bird Cape	soil	Oil	22,000 mg/kg-320,000 mg/kg	2,000 mg/kg	ADEC Guidance[b]
Bird Cape	soil	Naphthalene	1,100 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Acenaphthylene	1.8 mg/kg-390 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Acenaphthene	8.0 mg/kg-170 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Fluorene	260 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Phenanthrene	5.2 mg/kg- 110 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Fluoranthene	27 mg/kg-31 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Benzo(a)anthracene	199 mg/kg-237 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Chrysene	63 mg/kg-2,870 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Benzo(b+k) - Fluoranthene	61 mg/kg-174 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Benzo(a)pyrene	372 mg/kg	1.0 mg/kg	10 x detection limit[c]
Bird Cape	soil	Lead	102 mg/kg- 224 mg/kg	100 mg/kg	TCLP[a]
Top Camp	sediment	Diesel	5,000 mg/kg-10,000 mg/kg	2,000 mg/kg	ADEC Guidance[b]
Top Camp	sediment	Acenaphthene	370 mg/kg	1.0 mg/kg	10 x detection limit[c]
Top Camp	sediment	Fluorene	370 mg/kg	1.0 mg/kg	10 x detection limit[c]
Top Camp	sediment	Phenanthrene	4.0 mg/kg-170 mg/kg	1.0 mg/kg	10 x detection limit[c]

02[IL]KO7030:D087(A)/1771/1

[a]100 ppm lead represents minimum total lead concentration required for potential failure of TCLP test.
[b]ADEC Interim Guidance for Non-UST Contaminated Soil Cleanup Levels, Guidance No. 001, Revision 1, July 17, 1991.
[c]Detection Limit = The lowest analytical detection limit in the project data.

Source: Ecology and Environment, Inc. 1991.

7. SUMMARY AND CONCLUSIONS

7.1 SUMMARY

Three areas on Amchitka Island were investigated by E & E during September 1991. The three areas, Bird Cape, Top Camp, and Base Camp, were identified through background research as potential sources of petroleum and hazardous substances contamination. Surface soil, sediment, drum, and water samples were collected at these areas to characterize the presence and nature of contaminant sources and to determine the extent of off-site contaminant migration.

A total of 33 field samples including one background sample, two sets of QA/QC duplicate samples plus one rinsate and its duplicate were collected from the three areas on Amchitka Island. Analytical results of the samples indicated the presence of petroleum, PAH, and lead contamination at all three areas investigated. The asbestos disposal area and a nearby seep at Base Camp contained elevated concentrations of oil. Drums at Bird Cape have leaked and contaminated surrounding surface soil and surface water with diesel fuel, oil, lead, and PAHs. Drums at Top Camp have also leaked diesel fuel and oil into surface soils. High diesel fuel and PAH concentrations at the Top Camp parking area and in a downgradient wetland area were detected.

Contaminants of concern proposed for Amchitka Island include diesel fuel and oil petroleum hydrocarbons, 10 PAH compounds, and lead. Contaminants of concern were detected at all three areas investigated. Surface water is the most likely migration pathway through which contaminant exposure to humans or wildlife could occur.

Chromium may potentially be a contaminant of concern as well. Chromium was detected at levels above background, although the detected levels of chromium did not exceed the criterion for selection as

contaminants of concern. This criterion, as discussed in Section 6.1.1, is based on a 20-fold dilution used in the TCLP extraction procedure and subsequent extrapolation of the regulatory limits.

7.2 CONCLUSIONS

Results of the Amchitka Island investigation indicate that chemical contamination from petroleum and hazardous substances is present at identified potential contaminant source areas. Bird Cape appears to be the area containing the most significant number and concentration of contaminants. All of the contaminants of concern identified for this project were detected at Bird Cape. Base Camp and Top Camp are considered to be less of a threat to human health or the environment based on the number and type and concentration of contaminants detected in these areas.

Only the areas of Amchitka Island specifically addressed in this report were investigated. Conclusions and recommendations for all contaminants refer only to these areas. Although the investigation was designed to address the potentially most contaminated areas of each island, it is possible that other areas not investigated also contain contaminants at levels of concern.

As mentioned in Section 4, most of the drums encountered during the investigation were in poor condition. This observation and the age of contaminated debris suggests that the most significant contaminant releases from these materials have occurred in the past. Present conditions observed during the field investigation and from analytical data are likely representative of a steady-state situation after many years of debris weathering, contaminant releases, and natural environmental degradation. The need for cleanup and/or remediation of contamination on Amchitka Island should be evaluated with regard to environmental damage from heavy equipment, the relative concentrations and toxicity, mobility, and persistence of identified contaminants of concern, and the quantity of potential contaminant receptors that could be exposed to on-site contaminants. These issues will be evaluated in the Amchitka Island Remedial Alternatives Report.

8. REFERENCES

Alaska Department of Environmental Conservation (ADEC), 1991, Interim Guidance for Non-UST Contaminated Soil Cleanup Levels, Guidance No. 001, Revision 1, July 17, 1991.

Ecology and Environment, Inc. (E & E), 1991, Amchitka Island Sampling/ Analysis Plan, Environmental Evaluation and Remedial Alternatives Analysis, Aleutian Islands, Alaska.

_____, 1991a, Chemical Data Acquisition Plan for Environmental Evaluations at Attu, Amchitka, Kiska, and Great Sitkin Islands, Alaska.

Naval Energy and Environmental Support Activity, (NEESA), December 1990, Draft Preliminary Assessment Report (Three Appendices), Fleet Surveillance Support Command, Amchitka Island, Alaska, NEESA-13-218PA.

United States Army Corps of Engineers (COE), 1991, Defense Environmental Restoration Program, Formerly Used Defense Sites, Findings and Determination of Eligibility, Amchitka Island, Alaska, Site No. F10AK085000.

_____, 1985, Defense Environmental Restoration Program, Environmental Assessment, Amchitka Island, Alaska.

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_____, 1977, Debris Removal and Cleanup Study, Aleutian Islands and Lower Alaska Peninsula, Alaska.

APPENDIX A

CHEMICAL QUALITY ASSURANCE REVIEW

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION MATERIALS LABORATORY
CORPS OF ENGINEERS
1491 N.W. GRAHAM AVENUE
TROUTDALE, OREGON 97060-0503

November 14, 1991

Dr. Peter Brokx/Ms. Sue Wolfe
Ecology and Environment, Inc.
1057 W. Firewood, Suite 102
Anchorage, Alaska 99503

Dear Dr. Brokx/Ms. Wolfe:

Please reference the project and quality assurance data for Aleutian Island-Amchita samples which were forwarded to your office on November 13, 1991.

Enclosed is the Chemical Quality Assurance Report for the above referenced project.

Please contact Dr. Ajmal Illas at (503)665-4166 if you have any questions.

Sincerely,

Timothy J. Seeman

Timothy J. Seeman, Director
CENPD Materials Laboratory

Enclosures

CHEMICAL QUALITY ASSURANCE REPORT

ALEUTIAN ISLAND - AMCHITKA

1. SUMMARY:

a. The project data are acceptable with the following qualifications:

1) The silver data in oil should be considered a low estimate due to low matrix spike (MS) recoveries.

2) Polynuclear aromatic hydrocarbon (PAH) data of samples -09SL and -18SL are questionable due to low surrogate recoveries.

b. All project and quality assurance (QA) data agree except for PAH data, where the project data are questionable. (see details in Tables II-2 and III-2 and Item 8). The lead discrepancy is Table III-3 is probably due to non-homogeneous lead distribution in the sediment.

2. BACKGROUND: The samples were collected on September 7,8 and 10, 1991 and were received by the analytical laboratories on September 16, 1991.

3. OBJECTIVES:

a. Twenty-one soil samples, five drum samples, three surface water and one rinsate, including two blind duplicates, were collected to determine the extent of chemical contamination of the site.

b. Two soil and one rinsate QA samples were submitted to evaluate the project laboratory's data.

4. PROJECT ORGANIZATION:

a. The samples were collected by Ecology and Environment, Inc., Anchorage, Alaska.

b. The project samples were analyzed by Columbia Analytical Services, Inc. (CAS), Kelso, Washington.

c. The QA samples were analyzed by ARDL, Inc., Mt. Vernon, Illinois.

5. ANALYTICAL REFERENCES:

Number	Title	Date
a. SW-846, Third Edition	Test Methods for Evaluating Solid Waste	11/86
b. CENPD-PE-GT-L Proposed Modified Method 8015	Fuel Quantitation and Identification	1989
1) Method D-3328-78	Annual Book of ASTM Standards, Part 31	1980
2) Method D-2600	Annual Book of ASTM Standards, Part 24	1980

6. EVALUATION OF THE PROJECT LABORATORY'S DATA:

a. Surrogates: One surrogate identical in chemical behavior to analytes of PCB's, fuel hydrocarbons and PAH's was used for each method. The surrogate recoveries in all PCB samples were within QC limits except for samples -013SL and -021SL. Data of these samples were accepted based on laboratory control recoveries. The surrogate recoveries of Modified Method 8015 were within quality control (QC) limits except for four samples, where recoveries were below advisory limits. Of these four samples, recoveries in two samples were marginally below QC limits but acceptable. The recoveries of -031SD and -023SL were 35.6 and 50.1-percent, respectively, due to matrix interference. Data of these samples are acceptable based on other acceptable internal QC. The surrogate recoveries of all PAH samples were within advisory limits except for samples -09SL, -018SL, -017WA, -019WA, and -029WA. Surrogate recoveries for all water samples were above upper advisory limits but data was not adversely affected as no targeted analytes were detected in these samples. The surrogates in samples -09SL and -018SL interfered with the hydrocarbons of diesel present and were not rerun. The PAH data of these samples are questionable.

b. Matrix Spike (MS) and Matrix Spike Duplicates (MSD): MS and MSD of Methods 8080 and Modified 8015 were within QC limits except one set of soil Modified 8015 were diluted out, data were acceptable based on acceptable laboratory control MS and MSD recoveries. Two out of six PAH MS and MSD of soil samples were above QC limits, data were accepted based on control MS and MSD recoveries. The MS and MSD of other matrices for PAH method were within QC limits and are acceptable. The MS recoveries of metals were within QC limits except silver recoveries in oil was 40-percent and 72-percent in water. The latter recovery is marginally below QC limits but acceptable. The silver in oil may not have been complete recovered.

c. Laboratory Duplicates: Relative percent differences (RPD's) of all methods were within limits and are acceptable. The RPD of lead in sample -011DR was 50-percent, at close to detection limits. RPD calculations at close to detection limits are not significant.

d. Blind Duplicates: All blind duplicates are shown in Tables II and III. All data agree.

e. Laboratory Blanks: All blanks were free from targeted analytes and are acceptable.

f. Rinsate Blanks: Rinsate blanks are shown in Table I. No targeted analytes were detected significantly above detection limits.

g. Detection Limits and Calibration: All met method requirements.

h. Holding Times (HT): Modified 8015 analysis of sample -029WA was done one day after the maximum allowed HT. Data are not severely affected as samples were stored in the dark at 4 C. PAH sample -032 was reanalyzed 16 days after the recommended HT, due to internal QC failure. PAH samples -017WA and -019WA were received at the project laboratory two days after the recommended HT. Data are not severely affected due to a few days of HT expiration when samples are well preserved.

i. Overall Evaluation of the Project Laboratory's Data: All data are acceptable except silver data in oil, where MS recovery was 40-percent.

7. EVALUATION OF THE QA LABORATORY'S DATA: Laboratory blanks, method detection limits, calibration, surrogate recoveries, MS, MSD, HT, control recoveries and RPD's met method requirements except for recovery of silver in soil was zero and chromium was 36-percent. These analytes may not have been completely recovered if present at low levels in the soil matrix. The laboratory control recoveries of these metals were within QC limits, which indicates poor recoveries were due to matrix effect. THe MS and MSD of PCB's were above upper advisory limits. As no PCB's were detected, higher recoveries did not affect the data.

8. QA/QC COMPARISONS: QA/QC comparisons are shown in Tables II and III. All data agree except PAH data in Tables II-2 and III-2 and lead in Table III-3, where the project data appears questionable as soil/sediment samples were contaminated with up to 24000 ppm of diesel, indicating the possible presence of PAH's in the samples. Up to four PAH's, ranging in concentration from 110 through 1100 ppm were found in the QA samples, which are generally expected in soil/sediment samples highly contaminated with fuel. The aforementioned soil/sediment QA data are acceptable and can be substituted for the project data where applicable. The lead discrepancy in Table III-3 is probably due to non-identical distribution of lead in sediments.

CDNPD-FE-GT-L (21-HM-475)

COMPARISON OF PROJECT AND QA RESULTS

TABLE I

RINSATES

Project: AMCHITKA Matrix: water Sample Prefix: 9136AMCH
Project Laboratory: CAS QA Laboratory: ARIL

1. Method: PCB's (EPA 8080) Units: ug/L (ppb)

Analytes Detected	Project Lab -019WA	Detection Limits	QA Lab -020WA	Detection Limits
	ND	0.1	ND	0.71-1.4

ND = None detected

SUMMARY: The project and QA data agree for all targeted PCB's and are acceptable.

2. Method: FAM (EPA 8100) Units: ug/L (ppb)

Analytes Detected	Project Lab -019WA	Detection Limits	QA Lab -020WA	Detection Limits
	ND	1-2	ND	7.1

SUMMARY: The project and QA data agree for all targeted analtyes and are acceptable.

3. Method: Hydrocarbon Scan (Modified 8015) Units: ug/L (ppb)

Analytes Detected	Project Lab -019WA	Detection Limits	QA Lab -020WA	Detection Limits
	ND	50	ND	71-360

SUMMARY: The project and QA data agree and are acceptable.

(ENCO PE-ST-L (9 -MM-475)
Table 1

4. Method: Metals (EPA 6000/7000) Units: mg/L (ppm)

Analytes Screened	Project Lab -019WA	Detection Limits	QA Lab -020WA	Detection Limits
Arsenic	ND	0.005	ND	0.0045
Barium	ND	0.005	ND	0.050
Cadmium	ND	0.003	ND	0.0050
Chromium	ND	0.005	ND	0.01
Lead	ND	0.002	0.0039	--
Mercury	ND	0.0005	ND	0.0002
Selenium	ND	0.005	ND	0.0045
Silver	ND	0.01	ND	0.01

-- = Not reported

SUMMARY: The project and QA agree and are acceptable.

(5)PD-FE-GT-L (91-HN-175)

COMPARISON OF PROJECT AND QA RESULTS

TABLE II

Project: ANCHITA Matrix: soil Sample Prefix: 9136AMCH
Project Laboratory: CAS QA Laboratory: ARDL

1. Method: PCB's (EPA 8080) Units: mg/kg (ppm)

Analytes Detected	Project Lab -008SL	-009SL	Detection Limits	QA Lab -010SL	Detection Limits
	ND	ND	1	ND	0.092-0.180

ND = None detected

SUMMARY: The project blind duplicate and QA data agree for all targeted PCB's and are acceptable.

2. Method: PAH (EPA 8100) Units: mg/kg

Analytes Detected	Project Lab -008SL	-009SL	Detection Limits	QA Lab -010SL	Detection Limits
Naphthalene	ND	ND	1*	1100	--
Acenaphthylene	ND	ND	1*	330	--
Acenaphthene	ND	ND	1*	170	--
Fluorene	ND	ND	1*	260	--
Phenanthrene	ND	5.2	1*	110	--

* - Elevated MDL because samples required dilution
-- - Not reported

SUMMARY: The project blind duplicate data did not agree with the QA data. The project laboratory's data appear questionable as high levels of fuels found in the soil indicates the presence of PAH's.

3. Method: Hydrocarbon Scan (Modified 8015) Units: mg/kg

Analytes Detected	Project Lab -008SL	-009SL	Detection Limits	QA Lab -010SL	Detection Limits
Diesel fuel #2	18000	18000	200	24000	--

SUMMARY: The project blind duplicate and QA data agree within a factor of two and are acceptable.

CENPD-PE-GT-L (91-HM-475)
Table II

4. Method: Metals (EPA 6000/7000) Units: mg/kg (ppm)

Analytes Detected	Project Lab -008SL	-009SL	Detection Limits	QA Lab -010SL	Detection Limits
Arsenic	2	2	1	2.4	--
Barium	19	16	1	16	--
Cadmium	ND	ND	1	ND	0.57
Chromium	26	21	2	39	--
Lead	5	8	1	6.3	--
Mercury	ND	ND	0.2	ND	0.0079
Selenium	ND	ND	1	ND	0.51
Silver	ND	ND	2	ND	1.1
Percent Solids	89	89		87	

SUMMARY: The project blind duplicate and QA data agree and are acceptable.

CEHNC-PE-ST-L (91-HM-475)

COMPARISON OF PROJECT AND QA RESULTS

TABLE III

Project: AMCHITKA Matrix: soil Sample Prefix: 9137AMCH
Project Laboratory: CAS QA Laboratory: ARDL

1. Method: Hydrocarbon Scan (Modified 8015) Units: mg/kg (ppm)

Analytes Detected	Project Lab -026SD	-027SD	Detection Limits	QA Lab -028SD	Detection Limits
Diesel fuel #2	10000	11000	100	5000	--
Oil*	850	ND	400	--	--

ND = None detected
- = Not reported
* = Quantitated using hydraulic oil

SUMMARY: The project blind duplicate and QA data agree within a factor of two and are acceptable.

2. Method: PAH (EPA 8100) Units: mg/Kg

Analytes Detected	Project Lab -026SD	-027SD	Detection Limits	QA Lab -028SD	Detection Limits
Acenaphthene	ND	ND	1	370	--
Fluorene	ND	ND	1	370	--
Phenanthrene	4.0	6.4	1	170	--

SUMMARY: The project blind duplicate data did not agree with the QA data. The project laboratory's data appear questionable as high levels of fuels found in the soil indicates the presence of PAH's.

3. Method: Metals (EPA 6000/7000) Units: mg/Kg (ppm)

Analytes Detected	Project Lab -026SD	-027SD	Detection Limits	QA Lab -028SD	Detection Limits
Arsenic	ND	ND	1	0.49	--
Barium	12	12	1	18	--
Cadmium	ND	ND	1	1.6	--
Chromium	22	22	2	41	--
Lead	1	1	1	6.2	--
Mercury	ND	ND	0.2	ND	0.10
Selenium	ND	ND	1	ND	0.39
Silver	ND	ND	2	ND	1.1
Percent Solids	61	60		65	

SUMMARY: The project blind duplicate and QA data agree within a factor of three to each other or their detection limits except lead. The QA laboratory found higher lead values, probably due to non-homogeneous lead distribution in the sediment.

APPENDIX B

PHOTOGRAPHIC LOG

APPENDIX B

PHOTOGRAPHIC LOG
ALEUTIAN ISLANDS CONTAMINATION ASSESSMENT
AMCHITKA ISLAND

Photo	Date	Island	Description
R1 F19	9/7/91	Amchitka	Collection of Sample 9136AMCH003SL; Bird Cape Drum Group 1
R1 F21	9/7/91	Amchitka	Collection of Sample 9136AMCH004SL; Bird Cape Drum Group 1
R1 F4	9/6/91	Amchitka	Location of Sample 9136AMCH005SL; Bird Cape Drum Group 1
R1 F20	9/7/91	Amchitka	Collection of Sample 9136AMCH001DR; Bird Cape Drum Group 1
R2 F2	9/7/91	Amchitka	Drum Group 3; Bird Cape
R1 F14	9/6/91	Amchitka	Drum Group 5; Bird Cape
R1 F15	9/6/91	Amchitka	Product release at Drum Group 5; Bird Cape
R1 F16	9/6/91	Amchitka	Downgradient drainage; Drum Group 5; Bird Cape
R1 F24	9/7/91	Amchitka	Collection of Sample 9136AMCH016DR; Bird Cape Drum Group 5
R1 F25	9/7/91	Amchitka	Collection of Sample 9136AMCH015SL; Bird Cape Drum Group 6
R1 F23	9/7/91	Amchitka	Collection of Sample 9136AMCH006SL
R1 F11	9/6/91	Amchitka	*Stained soil;* Bird Cape Drum Group
R2 F3	9/7/91	Amchitka	Collection of Sample 9136AMCH012DR; Bird Cape Drum Group 7
R1 F28	9/7/91	Amchitka	Location of Sample 9136AMCH017WA; Bird Cape
R1 F27	9/7/91	Amchitka	Location of Sample 9137AMCH021SL; Bird Cape
R1 F31	9/8/91	Amchitka	Collection of Sample 9137AMCH023SL; Top Camp
R3 F1	9/8/91	Amchitka	Location of Sample 9137AMCH026SD, 027SD, 028SD; Top Camp
R3 F2	9/8/91	Amchitka	Collection of Sample 9137AMCH024SD; Top Camp

Appendix B (Cont.)

Photo	Date	Island	Description
R3 F8	9/9/91	Amchitka	Collection of Sample 9137AMCH032SD; Base Camp
R3 F10	9/9/91	Amchitka	Asbestos Disposal Area Seep; Base Camp
R3 F29	9/10/91	Amchitka	Collection of Sample 9137AMCH032SD; Base Camp
R3 F28	9/10/91	Amchitka	Signs at perimeter of Asbestos Disposal Area
R3 F27	9/10/91	Amchitka	Collection of Sample 9137AMCH033WA; Base Camp
R3 F7	9/8/91	Amchitka	Seep along roadway near Constantine Harbor

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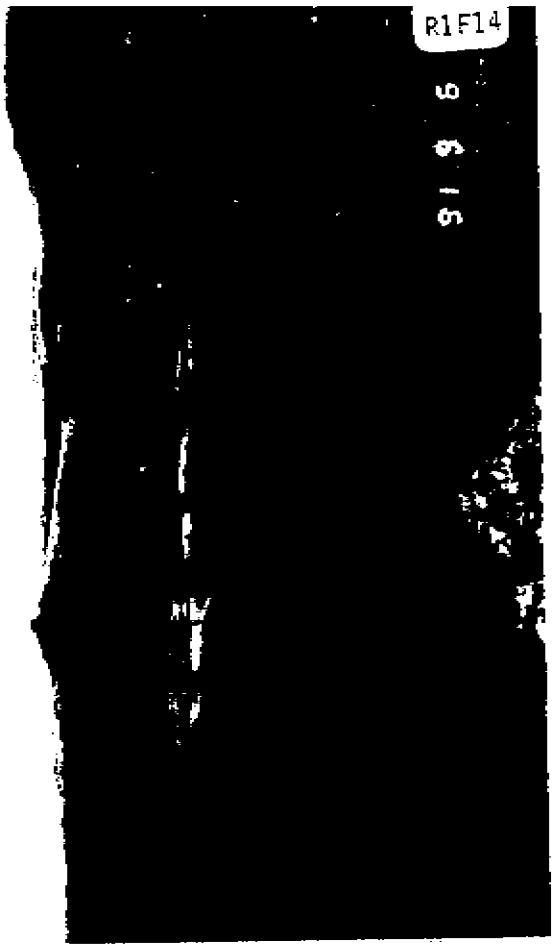
R1F21


R1F20


R1F19


R1F4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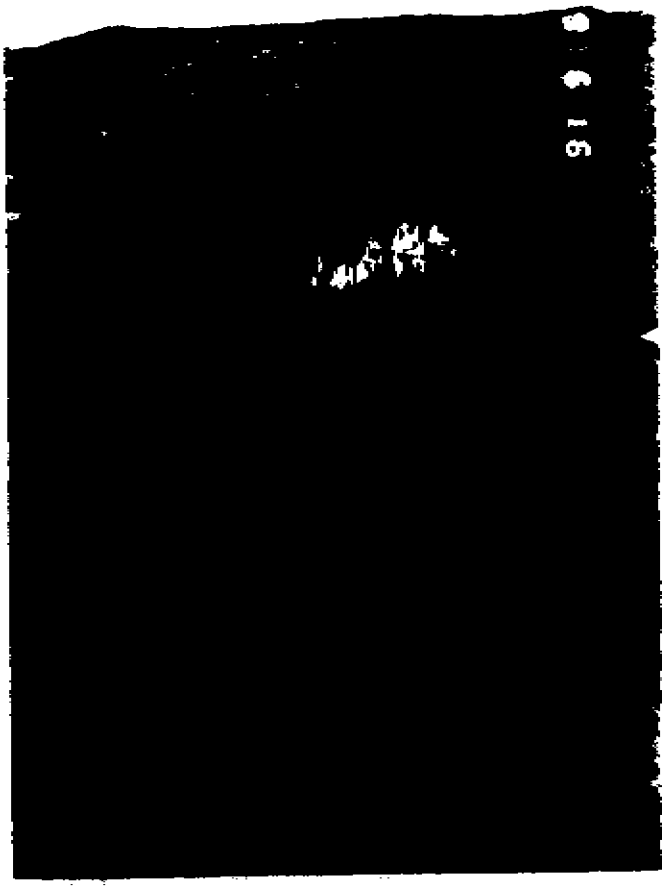



P2 F2


R1F15

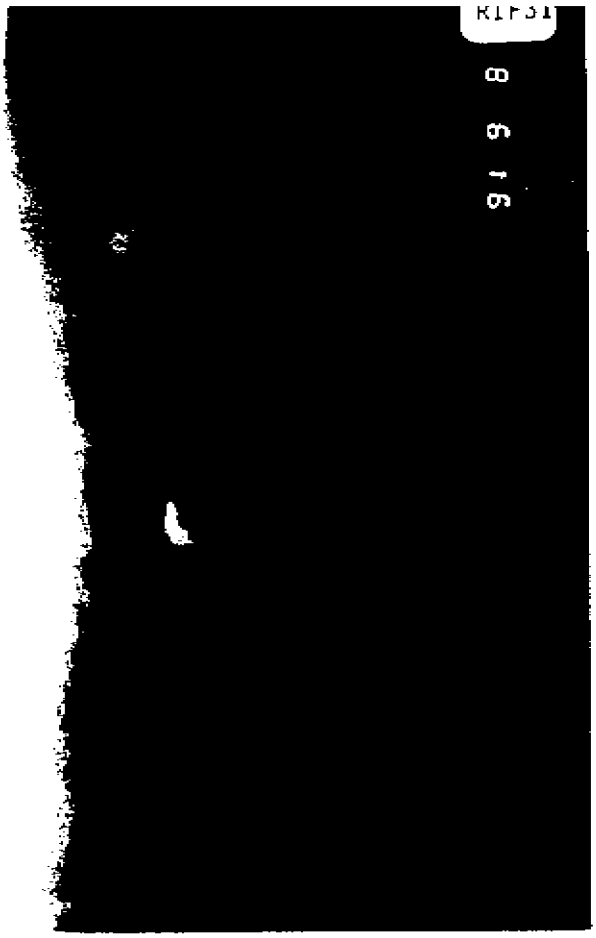

R1F25


S1 S-6


R1F24


R1F23

R1F29



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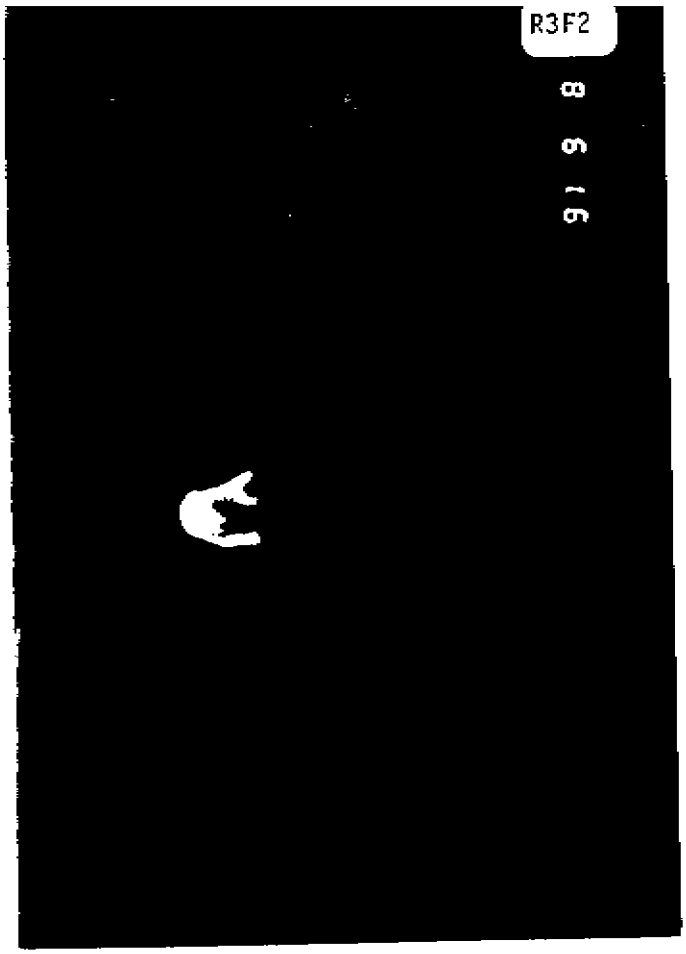

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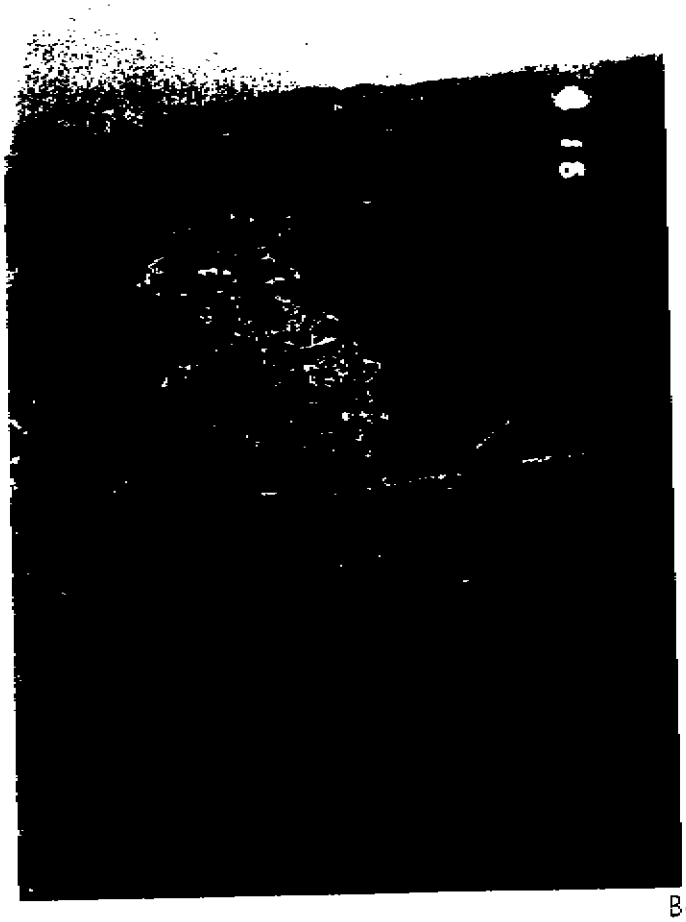


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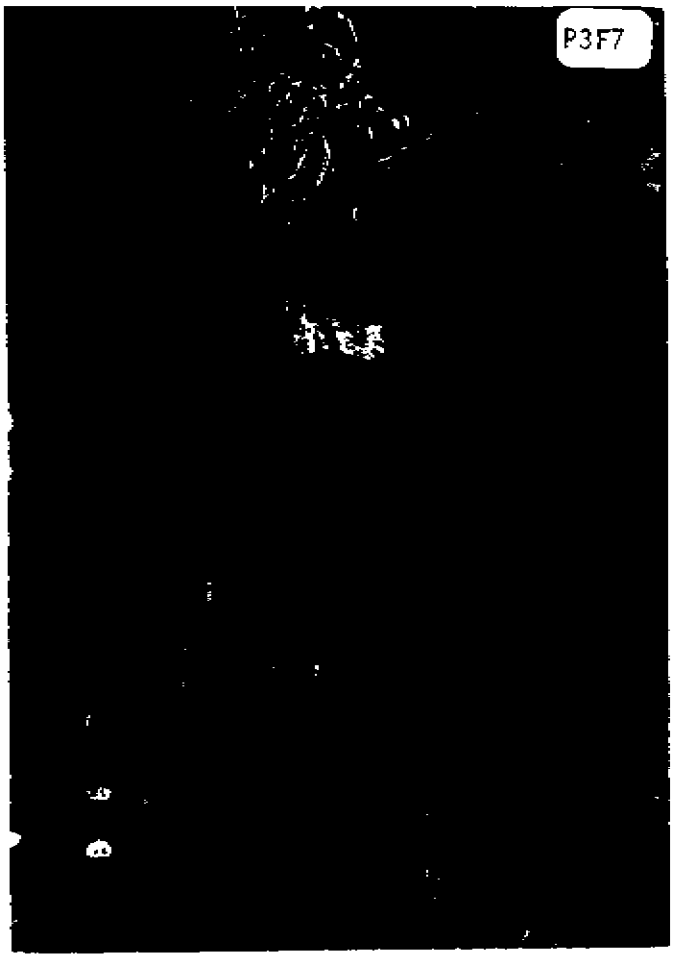
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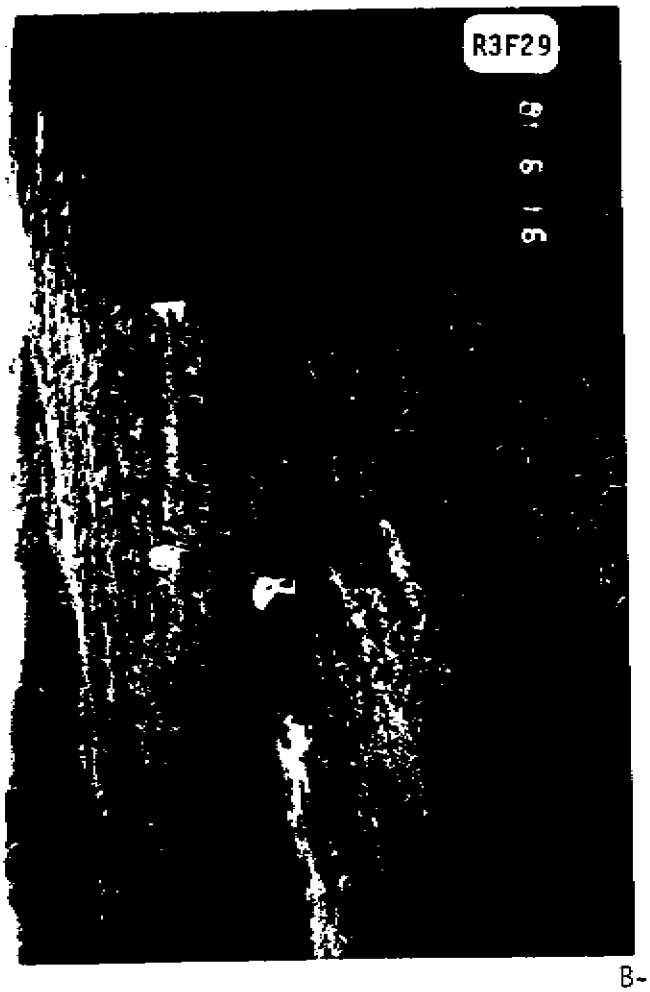
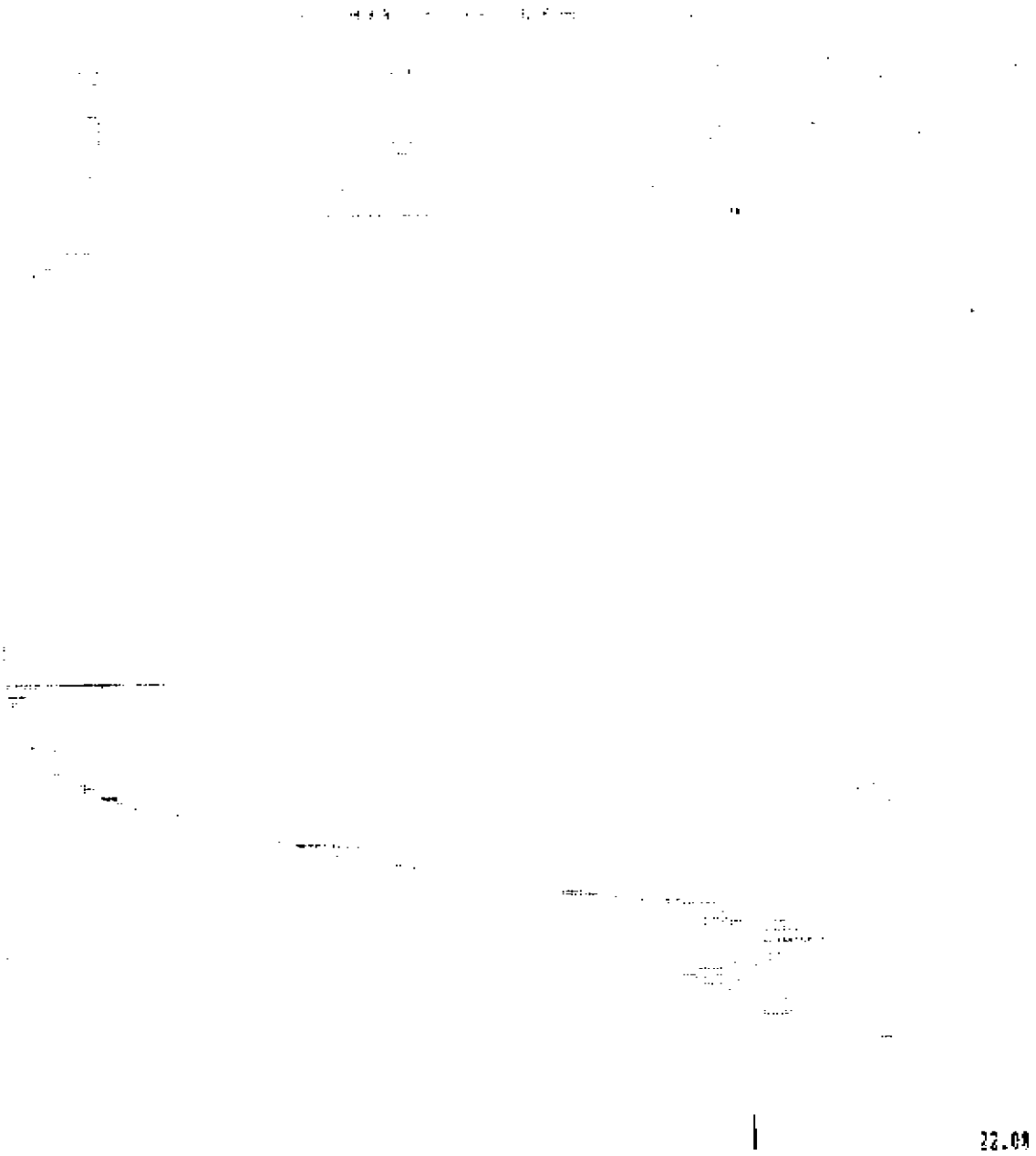

R3F29


R3F27

APPENDIX C

BACKGROUND SAMPLE CHROMATOGRAPHS

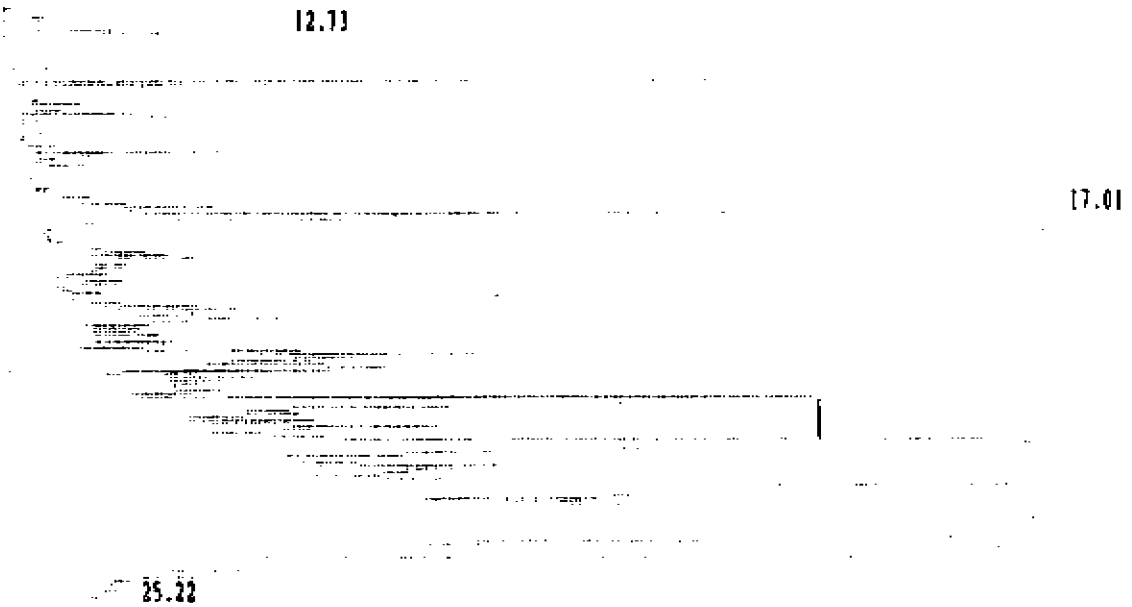
Sample: OIL 1220 Channel: GODZILLA FID Filename: 3670888
Acquired: 01-OCT-91 17:04 Method: C:\MAX\DATA1\5296-RR Operator: SCB



CAS Lab. OIl Standard

0179

Dilution: 1 : 2.000 Amount: 5.750



CAS Lab. 9136AMCH021SL

APPENDIX D

EPA FORM 2070-12

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

STATE	SITE NUMBER
AK	8170000147

II. SITE NAME AND LOCATION

SITE NAME	STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Amchitka Island	

CITY	STATE	ZIP CODE	COUNTY	CONG. DIST.
	AK			

LATITUDE	LONGITUDE
51° 22' 00" 0	179° 20' 00" 0

From Anchorage International Airport, fly to Adak. From Adak, fly to Amchitka aboard Piquniq Management Corp. Charter flight. To reach Bird Cape, drive north on Infantry Road to end. To reach Top Camp, drive to mile 28 on Infantry Road.

III. RESPONSIBLE PARTIES

OWNER (If known)	STREET (Business, mailing, residential)
United States Fish & Wildlife Service	

CITY	STATE	ZIP CODE	TELEPHONE NUMBER
			( )

OPERATOR (If known and different from owner)	STREET (Business, mailing, residential)
United States Army Corps of Engineers	P. O. Box 898

CITY	STATE	ZIP CODE	TELEPHONE NUMBER
Anchorage	AK	99506-0898	(907) 753-5655

A. PRIVATE X B. FEDERAL Fish & Wildlife Service C. STATE D. COUNTY E. MUNICIPAL F. OTHER G. UNKNOWN

A. NPL B. PROPOSED NPL C. DELISTED NPL D. ERCLIS E. NFRAP F. REMOVED G. OTHER (Specify) DATE RECEIVED (Month, Day, Year)

IV. CHARACTERIZATION OF POTENTIAL HAZARD

A. CONFIRMED DATE 09 05 91 B. EPA C. EPA CONTRACTOR D. STATE E. LOCAL HEALTH OFFICIAL X F. OTHER U.S. Army Corps of Engineers G. OTHER CONTRACTOR(S) Ecology and Environment, Inc.

A. ACTUAL B. POTENTIAL C. UNKNOWN

DATE OF OPERATION	
BEGIN YEAR	END YEAR
1943	1950

D. UNKNOWN

DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

Waste oil and fuel drums abandoned on site. Potential PCB wastes present. Known areas of explosive ordnance disposal both on surface and buried.

POTENTIAL HAZARDOUS CONDITIONS AND ENVIRONMENTAL CONCERNS

Potential hazards from the site primarily to surface water and direct contact with contaminants. Low potential for release to groundwater or air.

V. PRIORITY ASSESSMENT

A. HIGH B. MEDIUM C. LOW D. NONE

VI. INFORMATION AVAILABLE FROM

NAME	ORGANIZATION	TELEPHONE NUMBER
Mr. Dale Berry	United States Army Corps of Engineers	(907) 753-5655
Christopher Farmer	E & E	(907) 257-5000

DATE 12 10 91

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE | 02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

02 WASTE QUANTITY AT SITE

TONS: Unknown

CUBIC YARDS: Unknown

NO. OF DRUMS: Unknown

03 WASTE CHARACTERISTICS

X A. TOXIC | E. SOLUBLE | I. HIGHLY VOLATILE
B. CORROSIVE | F. INFECTIOUS | X J. EXPLOSIVE
C. FLAMMABLE | G. FLAMMABLE | K. REACTIVE
X D. REACTIVE | X H. IGNITABLE | L. INCOMPATIBLE
M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Unknown		Scattered among abandoned drums and in soil.
OLW	OILY WASTE	Unknown		Scattered among abandoned drums and in soil.
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	Unknown		In soil

IV. HAZARDOUS SUBSTANCES

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OLW	NAPHTHALENE	91-20-3	OD	0.2-5,330	mg/kg
OLW	FLUORANTHENE	206440	OD	0.9-885	mg/kg
OLW	ACENAPHTHYLENE	208968	OD	1.8-776	mg/kg
OLW	ACENAPHTHENE	83329	OD	0.3-370	mg/kg
OLW	FLUORENE	86737	OD	260-370	mg/kg
OLW	PHENANTHRENE	85018	OD	4.0-170	mg/kg
OLW	BENZO(A)ANTHRACENE	56553	OD	199-237	mg/kg
OLW	CHRYSENE	218019	OD	63-2,870	mg/kg
OLW	BENZO(b&k)FLUORANTHENE	205992/ 207089	OD	61-293	mg/kg
OLW	BENZO(A) PYRENE	50328	OD	372	mg/kg
OLW	PYRENE	129000	OD	215	
OLW	LEAD	7439921	OD	34-224	mg/kg

V. FEEDSTOCKS

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION

1. Naval Energy and Environmental Support Activity, 1990, Draft Preliminary Assessment, Amchitka Island, Alaska.
2. Columbia Analytical Services, 1991, Analytical Report, Aleutians-Amchitka/ Project # K07020
3. ARDL, Inc., 1991, Analytical Report, Amchitka, ARDL ID NO. 975

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POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] GROUNDWATER CONTAMINATION
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 160
04 NARRATIVE DESCRIPTION

No known groundwater contamination. Depth to groundwater unknown. Conditions (soil contamination) exist that could potentially lead to groundwater contamination.

01 [ ] SURFACE WATER CONTAMINATION
02 [ ] OBSERVED (DATE: 9/10/91) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 160
04 NARRATIVE DESCRIPTION

290 Mg/L oil detected in water down gradient of asbestos disposal area in Base Camp Potential for surface water contamination exists at Bird Cape where an oil release was observed in an intermittent drainage path.

01 [ ] CONTAMINATION OF AIR
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

None known or suspected

01 [ ] FIRE/EXPLOSIVE CONDITIONS
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 160
04 NARRATIVE DESCRIPTION

Several known areas of ordnance disposal currently under investigation by U.S. Army Explosive Ordnance Disposal Team. 1991 action consisted of removal of 600 napalm bombs.

01 [X] DIRECT CONTACT
02 [X] OBSERVED (DATE: 9/6-9/19/91) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

Indigenous wildlife at risk of exposure by direct contact with oily waste at Bird Cape, Top Camp and Base Camp. Areas not frequented by humans.

01 [X] CONTAMINATION OF SOIL
02 [X] OBSERVED (DATE: 9/6-9/10/91) 03 [ ] POTENTIAL [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

Several areas contaminated, particularly near drum dumps. Contaminants detected are oil, diesel fuel, and PAH compounds.

01 [ ] CONTAMINATION OF DRINKING WATER
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

None known or suspected

01 [ ] WORKER EXPOSURE/INJURY
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

None known or suspected

01 [ ] POPULATION EXPOSURE/INJURY
02 [ ] OBSERVED (DATE:) 03 [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

None known or suspected

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 [X] OBSERVED (DATE: 9/6/91-9/10/91) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Stressed vegetation noted at several drum groups and areas of stained soil.

01 [X] K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include species if known)

Fauna at risk of exposure via surface water or direct contact.

01 [X] L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Potential for herbivores to ingest vegetation contaminated by release.

01 [X] M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids/Leaking drums) — 02 [X] OBSERVED (DATE: 9/6/91-9/10/91) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

Corroded drums containing wastes observed at Bird Cape. Product releases observed at Bird Cape. Unlined landfill releasing contaminants to surface water at Bird Cape.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Numerous dumps observed. It is unclear whether the dumping was illegal or not at the time of D.O.D. us.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

Residual napalm (gelatinous gasoline) left at site of 1991 U.S. Army Explosive Ordnance Disposal Team removal.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 160

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. E. & E. Inc., 1991, Site Visit.

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APPENDIX E

EPA FORM 2070-13

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

II. SITE NAME AND LOCATION

Amchitka Island		AK			

51° 22' 00" 0 / 179° 20' 00" 0	A PRIVATE X B FEDERAL USFWS C STATE D COUNTY E MUNICIPAL F OTHER G UNKNOWN

III. INSPECTION INFORMATION

09 05 91	X ACTIVE / INACTIVE	1943 (BEGINNING YEAR)	1950 (ENDING YEAR) / UNKNOWN

A EPA / B EPA CONTRACTOR / C MUNICIPAL / D MUNICIPAL CONTRACTOR
E STATE / F STATE CONTRACTOR / X G OTHER U.S. Army Corps of Engineers & Contractors

Paul Laverty		Corps	(907) 257-5000
Brian Miskill	Team Leader	E & E	(907) 257-5000
Shelia Fleming	Engineer	E & E	(907) 257-5000
Brad Ackman	Hydrogeologist	E & E	(907) 257-5000
Christopher Farmer	Environmental Scientist	E & E	(907) 257-5000
			( )
John Cannon	Hazardous Materials Manager	Amchitka Island, AK	(907) 751-2424
			( )
			( )
			( )
			( )
			( )

X PERMISSION / WARRANT		Cool (40-50° F), Rain, Fog

IV. INFORMATION AVAILABLE FROM

Mr. Dale Berry	U.S. Army Corps of Engineers		(907) 753-5655
Christopher Farmer		E & E	907-257-5000	12 10 91

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

X	Unknown	X
X	Unknown	
	Unknown	

III. WASTE TYPE

	SLUDGE	Unknown		Scattered among aband.drums & in soil
	OIL WASTE	Unknown		Scattered among aband.drums & in soil
	SOLVENTS			
	PESTICIDES			
	OTHER ORGANIC CHEMICALS			
	INORGANIC CHEMICALS			
	ACIDS			
	BASES			
	MIXED WASTES			

IV. HAZARDOUS SUBSTANCES

OLW	NAPHTHALENE	91-20-3	OD	0.2-5,330	mg/kg
OLW	FLUORANTHENE	206440	OD	0.9-885	mg/kg
OLW	ACENAPHTHYLENE	208968	OD	1.8-776	mg/kg
OLW	ACENAPHTHENE	83329	OD	0.3-370	mg/kg
OLW	FLUORENE	86737	OD	260-370	mg/kg
OLW	PHENANTHRENE	85018	OD	4.0-170	mg/kg
OLW	BENZO (A)ANTHRACENE	56553	OD	199-237	mg/kg
OLW	CHRYSENE	218019	OD	63-2,870	mg/kg
OLW	BENZO(B&K)FLUORANTHENE	205992/207089	OD	61-293	mg/kg
OLW	BENZO (A) PYRENE	50328	OD	372	mg/kg
OLW	PYRENE	129000	OD	215	mg/kg
MES	LEAD	7439921	OD	34-224	mg/kg

V. FEEDSTOCKS

			FDS		
			FDS		
			FDS		
			FDS		

VI. SOURCES OF INFORMATION

1. Naval Energy and Environmental Support Activity, 1990, Draft Preliminary Assessment.
2. Columbia Analytical Services, 1991, Analytical Report, Aleutians-Amchitka/Proj. #K07020
3. ARDL, Inc., 1991, Analytical Report, Amchitka, ARDL ID NO. 975.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

II. HAZARDOUS CONDITIONS AND INCIDENTS

X | 02 OBSERVED DATE | X POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

No known groundwater contamination. Depth to groundwater unknown. Conditions (soil contamination) exist that could potentially lead to groundwater contamination.

X | 01 160 | 02 OBSERVED DATE 9/10/91 | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

290 mg/L oil detected in water downgradient of asbestos disposal area in Base Camp. Potential for surface water contamination exists at Bird Cape, where an oil release was observed in an intermittent drainage path.

01 | 02 OBSERVED DATE | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected

X | 02 OBSERVED DATE | X POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

Several known areas of ordnance disposal currently under investigation by U. S. Army Explosive Ordnance Disposal Team. 1991 action consisted of removal of 600 napalm bombs.

X | 02 OBSERVED DATE 9/6/91-9/10/91 | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

Indigenous wildlife at risk of exposure by direct contact with oily waste at Bird Cape, Top Camp, and Base Camp. Areas not frequented by humans.

X | 02 X OBSERVED DATE 9/6/91-9/10-91 | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

Several areas contaminated, particularly near drum dumps. Contaminants detected are oil, diesel fuel, and PAH compounds.

02 OBSERVED DATE | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected

02 OBSERVED DATE | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected

02 OBSERVED DATE | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

None known or suspected

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

II. HAZARDOUS CONDITIONS AND INCIDENTS

X | 02 X OBSERVED (DATE 9/6/91-9/10/91) | POTENTIAL | ALLEGED

Stressed vegetation noted at several drum groups and areas of stained soil.

X | 02 OBSERVED (DATE) | X POTENTIAL | ALLEGED

Fauna at risk of exposure via surface water or direct contact.

X | 02 OBSERVED (DATE) | X POTENTIAL | ALLEGED

Potential for herbivores to ingest vegetation contaminanted by releases.

X | 02 X OBSERVED (DATE 9/6/91-9/10/91) | POTENTIAL | ALLEGED
04 NARRATIVE DESCRIPTION

Corroded drums containing wastes observed at Bird Cape. Product releases observed at Bird Cape. Unlined landfill releasing contaminants to surface water at Base Camp.

02 OBSERVED (DATE) | POTENTIAL | ALLEGED

None known or suspected.

02 OBSERVED (DATE) | POTENTIAL | ALLEGED

None known or suspected.

02 OBSERVED (DATE) | POTENTIAL | ALLEGED

Numerous dumps observed. It is unclear whether the dumping was illegal or not at the time of D.O.D. use.

Residual Napalm(gelatinous gasoline) left at site of 1991, U.S. Army Explosive Ordnance Disposal Team removal.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 160

IV. COMMENTS

V. SOURCES OF INFORMATION

1. E & E, Inc., 1991, Site Visit

revised 8/87

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

II. PERMIT INFORMATION

NPDES				
RCRA				
AIR				
UIC				
RCRA INTERIM STATUS				
SPCC PLAN				
STATE				
X OTHER				

III. SITE DESCRIPTION

X	1,100	Drums		X
X	Buried drums, soil contamination.		X None	15-20

IV. CONTAINMENT

X D. SECURE

Drums extremely corroded. No liner on landfill, contaminants entering soils and groundwater.

V. ACCESSIBILITY

X YES NO

VI. SOURCES OF INFORMATION

1. E. & E., Inc., 1991, Site Visit

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

II. DRINKING WATER SUPPLY

TYPE OF DRINKING WATER SUPPLY	SURFACE	WELL
	A. X	B.
	C.	D.

STATUS	
ENDANGERED	A. X
ALLEGED	B.
MONITORED	C.
	D.
	E.
	F.

DISTANCE TO SITE	
	2 (mile)
	(mile)

III. GROUNDWATER

A. ONLY SOURCE FOR DRINKING (and other uses) B. DRINKING C. COMMERCIAL, INDUSTRIAL, IRRIGATION D. NOT CURRENTLY USED

A. ONLY SOURCE FOR DRINKING (and other uses) B. DRINKING C. COMMERCIAL, INDUSTRIAL, IRRIGATION D. NOT CURRENTLY USED

DISTANCE TO NEAREST DRINKING WATER WELL (mile)

NET PRECIPITATION (in)	DIRECTION OF GROUNDWATER FLOW	DEPTH TO AQUIFER OF CONCERN (ft)	POTENTIAL YIELD OF AQUIFER (gpd)	SOLE SOURCE AQUIFER
0-20	Downward & Seaward	Unknown	Unknown	YES X NO

DESCRIBE WELLS IN USE AND ANY OTHER KNOWN USES OF THE AQUIFER

None

AREA OF CONCERN	POPULATION	RESPONSIBLE AREA	COMMENTS
YES		YES	
NO		NO	

IV. SURFACE WATER

X A. USE(S) IN VICINITY (RECREATION, COMMERCIAL FISHING, DRINKING WATER SOURCE) B. DRINKING (DOWNSTREAM ECONOMICALLY IMPORTANT WATER RESOURCES) C. COMMERCIAL, INDUSTRIAL D. NOT CURRENTLY USED

DESCRIBE USES OF SURFACE WATER WITHIN 3-MILE RADIUS OF SITE

NAME	AFFECTED	DISTANCE TO SITE
Jones Lake		.25 (mile)
Other unnamed lakes		.50-2.5 (mile)
		(mile)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

POPULATION WITHIN 1-MILE RADIUS OF SITE	POPULATION WITHIN 3-MILE RADIUS OF SITE	POPULATION WITHIN 4-MILE RADIUS OF SITE	DISTANCE FROM SITE TO NEAREST PERMANENT RESIDENCE
0	160	0	2 (mile)

NUMBER OF PERSONS CONNECTED TO WELLS WITHIN 3-MILE RADIUS OF SITE	DISTANCE FROM SITE TO NEAREST DRINKING WATER WELL
25	1 (mile)

DESCRIBE POPULATION WITHIN 1-MILE RADIUS OF SITE AND ANY NEARBY SPECIAL POPULATIONS

Population is concentrated in two semipermanent camp buildings of metal construction.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

VI. ENVIRONMENTAL INFORMATION

Unknown

X C. RELATIVELY IMPERMEABLE

	Unknown		
33	Unknown	0-10 %	variable

SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
0-10 %	variable	.5 %

FLOOD PLAIN

SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

1 MILE RADIUS		4 MILE RADIUS	
RESIDENTIAL	COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL, STATE PARKS, FORESTS OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND / AG LAND
.5 mi	.25 mi	2 mi	0

DISTANCE TO CRITICAL HABITAT (ENDANGERED SPECIES): mi

*area is within National Wildlife refuge.

Bird Cape - Low area at mountainous north end of island. Approximately 100 ft above sea level.

Top Camp - Located in a valley amoung high ridges in central portion of island.

Base Camp - Low lying area at southeast end of island. Areas consists of dunes and low hills. Contaminated areas are upgradient of inhabited areas.

VII. SOURCES OF INFORMATION

1. E & E, Inc., 1991, Site Visit.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

II. SAMPLES TAKEN

	2	Columbia Analytical Services	11/30/91
	5	Columbia Analytical Services	11/30/91
	1	Columbia Analytical Services	11/30/91
	16	Columbia Analytical Services ARDL, Inc.	11/30/91
sediment	6	Columbia Analytical Services- ARDL, Inc.	11/30/91

III. FIELD MEASUREMENTS TAKEN

IV. PHOTOGRAPHS AND MAPS

X	Dale Berry, U.S. Army Corps of Engineers
X	U. S. Army Corps of Engineers, Alaska District

V. OTHER FIELD DATA COLLECTED

Inventory of military wood and metal debris

VI. SOURCES OF INFORMATION

1. E & E, Inc., 1991, Site Visit
2. E & E, Inc., 1991, Amchitka Island Debris Inventory

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - OWNER INFORMATION

I. IDENTIFICATION

II. CURRENT OWNER(S)

U.S. Fish & Wildlife Service

Fleet Surveillance Support Command

III. PREVIOUS OWNER(S)

U. S. Army Corps of Engineers
P. O. Box 898
Anchorage AK 99506-0898

PARENT COMPANY

U.S. Department of Interior

U. S. Navy

IV. REALTY OWNER(S)

V. SOURCES OF INFORMATION

1. Defense Environmental Restoration Program, Findings and determination of eligibility, Amchitka Island, Alaska, Site No. F10AK085008

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

II. CURRENT OPERATOR

Fleet Surveillance Support Command

OPERATOR'S PARENT COMPANY

U. S. Navy

III. PREVIOUS OPERATOR(S)

PREVIOUS OPERATORS' PARENT COMPANIES

U. S. Department of Energy

1965-1971 U.S. Atomic Energy Commission

U.S. Army Corps of Engineers

P. O. Box 898

Anchorage AK 99506-0898

1943-1950 U.S. Fish & Wildlife Service

IV. SOURCES OF INFORMATION

1. Defense Environmental Restoration Program, 1991, Formerly used defense site Findings and determination of eligibility, Great Amchitka Island, Alaska
2. Naval Energy and Environmental Support Activity, 1990, Draft Preliminary Assessment Report, Amchitka Island, Alaska.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ON-SITE GENERATOR

	05 STATE		

III. OFF-SITE GENERATOR(S)

		01 NAME	
	04 SIC CODE	03 STREET ADDRESS	04 SIC CODE
	06 STATE	07 ZIP CODE	05 CITY
		01 NAME	
	04 SIC CODE	03 STREET ADDRESS	04 SIC CODE
	06 STATE	07 ZIP CODE	05 CITY

IV. TRANSPORTER(S)

		01 NAME	
	04 SIC CODE	03 STREET ADDRESS	04 SIC CODE
	06 STATE	07 ZIP CODE	05 CITY
		01 NAME	
	04 SIC CODE	03 STREET ADDRESS	04 SIC CODE
	06 STATE	07 ZIP CODE	05 CITY

V. SOURCES OF INFORMATION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

II. PAST RESPONSE ACTIVITIES

	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
X	02 DATE 1986	03 AGENCY U.S. Army Corps of Engineers.

Asbestos-containing debris buried in landfill

	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY
	02 DATE	03 AGENCY

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES

01 [ ] A. BARRIER WALLS CONSTRUCTED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] B. CAPPING/COVERING 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] C. BULK TANKS OF WASTE REMOVED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] D. GROUT CURTAIN CONSTRUCTED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] E. BOTTOM SEALED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] F. GAS CONTROL 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] G. FIRE CONTROL 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] H. LEACHATE TREATMENT 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] I. AREA EVACUATED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] J. ACCESS TO SITE RESTRICTED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] K. POPULATION RELOCATED 01 DESCRIPTION	02 DATE	03 AGENCY
01 [ ] L. OTHER REMEDIAL ACTIVITIES 01 DESCRIPTION	02 DATE	03 AGENCY

III. SOURCES OF INFORMATION

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES

[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] BOTTOM SEALED (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] GAS CAPTURE (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] LEACHATE TREATMENT (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] AREA EVACUATED (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] (DESCRIPTION)	02 DATE	03 AGENCY
[illegible] OTHER REMEDIAL ACTIVITIES (DESCRIPTION)	02 DATE	03 AGENCY

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION

II. ENFORCEMENT INFORMATION

X

III. SOURCES OF INFORMATION

APPENDIX F

PROJECT SCOPE OF WORK

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project(0704-0187), Washington, DC 20503.

1. CONTRACT/PURCH ORDER NO.	2. DELIVERY ORDER NO.	3. DATE OF ORDER	4. REQUISITION/PURCH REQUEST NO.	5. CERTIFIED
DACA85-91-D-0003	0007	1 8 AUG 1991	[illegible]	

6. ISSUED BY	CODE	NPADOC	7. ADMINISTERED BY	CODE	256	8. DELIVER
U.S. ARMY ENGINEER DISTRICT,AK CEPOA-CT P.O. BOX 898 ANCHORAGE, AK 99506-0898 Sharon Dunn (907)-753-2556			See Block 9 ATTN: Sharon Dunn (907)753-2556			[ ] DEST [ ] OTHER

9. CONTRACTOR	CODE	00000000	FACILITY CODE	10. DELIVER TO FOB POINT BY	11. MARK IF PO
NAME AND ADDRESS ECOLOGY & ENVIRONMENT, INC. [illegible] FIREWEED LANE, STE 102 ANCHORAGE, AK 99503-				See Revised Scope of Work dated 29 Jul 91	[ ] SMALL [ ] SMALL ADVANT [ ] WOMEN-
				12. DISCOUNT TERMS [illegible] Net 0	
				13. MAIL INVOICES TO Address Block 9, Contract	

14. SHIP TO	CODE	npaenga	15. PAYMENT WILL BE MADE BY	CODE	NPAFMO	MARK ALL PACKAGES AND PAPERS WITH CONTRACT AND ORDER NUMBER
U.S. ARMY ENGINEER DISTRICT,AK CEIRA-EN-FK P.O. BOX 898 ANCHORAGE, AK 99506-0898 DACA85-91-D-0003/0007			DISBURSING OFFICER USARED, ALASKA P.O. BOX 898 ANCHORAGE, AK 99506-0898			

16. DELIVERY / PURCHASE	This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract. Reference your	Furnish the following on terms specified he

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEE
N IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIG
[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:			

17. ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
See Attached

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/SERVICE	20. QUANTITY ORDERED/ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
0001	Perform Environmental Evaluation and Remediation Alternatives, Great Sitkin, Kiska, Attu and Amchitka Islands, Alaska in strict accordance with the Revised Scope of Work dated 29 Jul 91. TOTAL CUMULATIVE CONTRACT AMOUNT	1	JB	[illegible]	[illegible]

*If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.	24. UNITED STATES OF AMERICA BY: Leslie R. Pylant, [illegible] CONTRACTING/ORDERING OFFICER	25. TOTAL	[illegible]
		26. DIFFERENCES	

27a. QUANTITY IN COLUMN 20 HAS BEEN	27. SHIP NO.	28. D.O. VOUCHER NO.	29. INITIALS
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED	[ ] PARTIAL [ ] FINAL	32. PAID BY	33. AMT VERIFIED CORR
DATE / SIGNATURE OF AUTHORIZED GOVERNMENT REP.	31. PAYMENT		34. CHECK NUMBER
36. I certify this account is correct and proper for payment DATE / SIGNATURE AND TITLE OF CERTIFYING OFFICER	[ ] COMPLETE [ ] PARTIAL [ ] FINAL		35. BILL OF LADING N

37. REC'D AT	38. RECEIVED BY	39. DATE REC'D	40. TOTAL CONT.	41. S/R ACCOUNT NUMBER	42. S/R VOUCHER NO.
	[illegible]	8/16/91			

NOTE: This form is used in contract actions if submission of cost or pricing data is required. *(See FAR 15.804-6(b))*

2. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	3A. NAME AND TITLE OF OFFEROR'S POINT OF CONTACT	3B. TELEPHONE N
Ecology and Environment, Inc. 1057 W. Fireweed Lane, Suite 102 Anchorage, AK 99503	Peter A. Brokx, Manager	907-257-500

4. TYPE OF CONTRACT ACTION *(Check)*

A. NEW CONTRACT	D. LETTER CONTRACT
B. CHANGE ORDER	E. UNPRICED ORDER
C. PRICE REVISION/ REDETERMINATION	[X] F. OTHER *(Specify)* Delivery Order

5. TYPE OF CONTRACT *(Check)*

[ ] FFP [ ] CPFF [ ] CPIF [ ] CPAF
[X] CPI [ ] OTHER *(Specify)*

6. PROPOSED COST *(A+B=C)*

A. COST	B. PROFIT/FEE	C. TOTAL
$ 341,784.16	$ 29,797.57	$ 371,581.7

7. PLACE(S) AND PERIOD(S) OF PERFORMANCE

Great Sitkin, Kiska, Amchitka, Attu Islands, Alaska

8. List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this requirement unless otherwise specified by the Contracting Officer. *(Continue on reverse, and then on plain paper, if necessary. Use same headings.)*

A. LINE ITEM NO	B. IDENTIFICATION	C. QUANTITY	D. TOTAL PRICE	E
01	Environmental Assessment			

9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING *(If available)*

A. CONTRACT ADMINISTRATION OFFICE	B. AUDIT OFFICE
	Defense Contract Agency 5360 Genesee Street Bowmansville, NY

10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? *(If "Yes," identify)*	11A. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? *(If "Yes," complete item 11B)*	11B. TYPE OF FINANCING
[X] YES [ ] NO	[X] YES [ ] NO	[ ] ADVANCE PAYMENTS [ ] PA [ ] GUARANTEED LOAN

12. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS? *(If "Yes," identify item(s), customer(s) and contract number(s))*	13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES FAR PART 31 COST PRINCIPLES? *(If "No," explain)*
[X] YES [ ] NO	[X] YES [ ] NO

14. COST ACCOUNTING STANDARDS BOARD (CASB) DATA *(Public Law 91-379 as amended and FAR PART 30)*

A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? *(If "No," explain in proposal)*	B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT? *(CASB DS 1 or 2)* *(If "Yes," specify in proposal the office to which submitted and if determined to be adequate)*
[X] YES [ ] NO	[ ] YES [X] NO
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NONCOMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? *(If "Yes," explain in proposal)*	D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? *(If "Yes," explain in proposal)*
[ ] YES [ ] NO	[ ] YES [X] NO

This proposal is submitted in response to the RFP contract, modification, etc. in Item 1 and reflects our best estimates and/or actual costs as of this

15. NAME AND TITLE *(Type)*	16. NAME OF FIRM	17. SIGNATURE	18. DATE OF SUBMISSI
Peter A. Brokx, Ph.D., Manager	Ecology and Environment, Inc.		July 29, 1991

NSN 7540-01-152-8045 1431-101 STANDARD FORM 14

ECOLOGY & ENVIRONMENT, INC.

ITEM NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	UNIT	UNIT-PRICE	A

0001 (cont'd)
INCLUDING DELIVERY ORDER NO. 0007
TOTAL $1,049,227.03.

GOVERNMENT OPTIONS:

0001A ATTU: Two (2) Weather Days at $3,357.00/day which may be awarded in whole or in part.

0001B AMCHITKA: Two (2) Weather Days at $2,485.25/day which may be awarded in whole or inpart.

0001C ADAK: Two (2) Weather Days at $3,357.29/day which may be awarded in whole or in part.

0001D GREAT SITKIN: Two (2) Weather Days at $3,357.29/day which may be awarded in whole or in part.

0001E SUBSTITUTE PERSONNEL: Four (4) mandays at $2,656.40 for two (2) people per manday. This option may be awarded in whole or in part.

ACCOUNTING AND APPROPRIATION DATA:

97X4930.1101 100 0001 P000000 2572 S95507 MOD# 91-C-32 dated 2 Aug 91.

(DR)FM1803100180004	$196,000.00
(DR)FM1806100180004	28,000.00
(DR)FM1852100180004	116,855.00
(DR)FM1896100180004	196,000.00

11 2020 100 0001 P1000021 2572 S95507 MOD# 91-C-34 dated 7 Aug 91.

FM1803100180004	$ 1,651.36
TOTAL	$396,306.36

SCOPE OF WORK
CONTRACT NO. DACA85-91-D-0003
DELIVERY ORDER NO. 0007

Environmental Evaluation and Remediation Alternatives
Great Sitkin, Kiska, Attu, and Amchitka Islands, Alaska

1.0 INTRODUCTION

The U.S. Department of Defense Senate Appropriations Bill for 1991 included authorization and funding to the Corps of Engineers to provide Congress with an assessment of environment damage and remediation requirements for potential environmental hazards resulting from past military activity on Great Sitkin, Kiska, Attu, and Amchitka Islands. These islands are located in the Aleutian Island chain in Alaska.

Great Sitkin Island: The U.S. Navy used approximately 700 acres at Sand Bay as an advance fueling station from 1943 to 1945. In 1957 the Navy obtained a permit to use 9310 acres for a temporary petroleum storage facility. The permit expired in 1962. The island is currently under the jurisdiction of the U.S. Fish and Wildlife Service.

Kiska Island was occupied by the Japanese in 1942 and 1943. The U.S. Army and Navy used the 5850 acre site as a protective garrison from 1943 to 1945. The Navy had jurisdiction of the site from 1949 to 1955. Use, if any, during this time is unknown. Reports indicate that live ordnance is scattered on the island. The island is currently under the jurisdiction of the U.S. Fish and Wildlife Service.

Attu Island was occupied by the Japanese from 1942 to 1943. The U.S. Army and Air Force utilized the 82,400 acre island until 1950. Reports indicate that live ordnance is scattered on the island. The island is currently under the jurisdiction of the U.S. Fish and Wildlife Service. There is a small Coast Guard LORAN station on the island.

Amchitka Island was utilized by the U.S. Army and Air Force periodically from 1943 until 1961. The 71,000 acre site was utilized as the Amchitka Army Air Base. In 1965, the Atomic Energy Commission used the island for underground nuclear tests and studies until 1973. Reports indicate that live ordnance is scattered on the island. The island is currently under the jurisdiction of the U.S. Fish and Wildlife Service.

2.0 PROJECT OBJECTIVES AND SCOPE

The primary objectives of this project are as follows:

o Determine the presence, approximate quantity, and nature of HTW and POL at each island;

o Determine the presence and/or the extent (where possible) of contaminant migration from HTW/POL disposal areas;

o Identify potential human and environmental contaminant receptors;

o Conduct a reconnaissance level inventory of anthropogenic debris of DoD origin on each island; and

o Provide appropriate clean-up/remediation options for areas of concern at each island.

Preliminary review of available information indicates that several islands have multiple potential problem areas. These areas are listed below:

ISLAND	AREA OF CONCERN
Great Sitkin	Sandy Bay Area
Kiska	Kiska Harbor Area
Amchitka	Bird Cape Infantry Road Corridor Constantine Harbor Area
Attu	Navy Town Area Alexei Point Chichagoff Hbr. Road Corridor Chichagoff Harbor Holtz Bay

These locations are shown on DoD real estate maps provided as GFMa.

3.0 BACKGROUND REVIEW

The Contractor shall review existing reports, analytical data, and aerial photographs provided as Government Furnished Materials (GFM). The information shall be used to develop the Sampling and Quality Assurance Plans and Debris Inventories. The Contractor shall conduct a detailed aerial photograph analysis to identify high priority areas for sampling and debris inventory activities. Information contained in existing reports (see Section 13.0) shall be used to provide baseline information for the Debris Inventories and Contamination Assessment Reports which will be verified in the field by the Contractor's field team(s).

4.0 WORKPLAN

The Contractor shall submit a Workplan to the Government Project Manager. The Workplan shall outline the chosen methods of transportation to each island, dates of mobilization and fieldwork, field team organization and personnel, transportation logistics while on each island, and projected daily schedule of activities for all field teams involved with the project.

The Contractor's Project Manager shall present the Workplan to the Government at a one-hour review conference. Following the review conference, the Government will issue written approval to initiate the development of the Sampling and Safety Plans.

5.0 SAFETY PLANS

The Contractor shall prepare separate Site Health and Safety Plans for each island. The plans shall be prepared following guidelines established by the Army Corps of Engineers (GFMb). The plans shall include required safety equipment, personnel protective gear, first aid provisions, emergency evacuation plans, HTW safety, and accident reporting. The Safety Plans shall address unique weather and terrain hazards found in the Aleutian Islands, and include a list of emergency contacts in Anchorage, Dutch Harbor, Adak, and Attu.

As mentioned in Section 1, live ordnance is scattered around most of the islands. ORDNANCE SHALL NOT BE DISTURBED BY THE CONTRACTOR. The Safety Plans shall include detailed ordnance safety precautions and avoidance measures.

All members of the field team(s) shall, prior to entering the field, have undergone the initial examination of a medical monitoring program and be current on health and safety training appropriate to the proposed work.

6.0 SAMPLING AND QUALITY ASSURANCE PLANS

The Contractor shall prepare Sampling and Quality Assurance Plans for each island following applicable Army Corps of Engineers guidance (GFMc and d). The Sampling and Quality Assurance Plans shall be designed to collect information that will supplement existing data and observations collected by the U.S. Fish and Wildlife Service (GFMe). Extent of contamination, confirmation of hot spots, and presence of contamination in runoff shall be priorities for the sampling strategy. Each plan shall be sufficiently detailed to guide an experienced team in the collection, shipment, and processing of samples from the site. Field protocol for selection of sampling locations and recommended laboratory analyses shall be included in the Sampling and Quality Assurance Plans. Each Sampling and Quality Assurance

Plan shall be prepared using the following format:

1.0 Introduction and Site History
2.0 Sampling Objectives
3.0 Sample Locations, Types, and Rationale
4.0 Sample Designation and Handling Procedures
5.0 Sampling Methods and Equipment
6.0 Analytical Requirements
7.0 Quality Assurance Requirements

Due to the remote nature of the sites, the Sampling and Quality Assurance Plans shall not require the collection of sample fractions for volatile organics analyses (VOA) since the sample holding time for VOAs would likely be exceeded. The Contractor should evaluate the applicability of analyses for petroleum hydrocarbons, polychlorinated biphenyls, polyaromatic hydrocarbons, and heavy metals analyses for each area of concern.

Each plan shall include 8x11-inch, 11x17-inch, and 24x36-inch maps showing anticipated sample locations and known or suspected waste deposition areas. The 24x36-inch maps shall be used for all field mapping, including sample locations and the debris inventory. The Contractor shall review available information supplied as GFM, and other available information to develop the Sampling and Quality Assurance Plans.

The Contractor shall submit draft Sampling and Quality Assurance Plans to the Government Project Manager. A 4-hour pre-fieldwork review conference will be arranged in conjunction with the U.S. Fish and Wildlife Service to address all topics of concern relating to the Sampling and Quality Assurance Plans, the proposed schedule and field team logistics, and debris inventory strategies presented in the Workplan. Following the review meeting, the Contractor shall revise the Sampling and Quality Assurance Plans according to comments received during the review conference. The final Sampling and Quality Assurance Plans shall be approved by the Contracting Officer prior to commencement of field work.

7.0 FIELDWORK

The Contractor shall notify the Government's Division Laboratory (CENPD-EN-G-L, Timothy Seeman, 503-665-4166) of the sampling to be performed. Notification of sampling shall be a minimum of 20 working days prior to the anticipated dates of

sampling. Notification shall include as a minimum:

-project name and contract number
-point of contact
-number of field and quality control samples
-sample matrices
-analytical methods
-estimated sample shipment dates

Following laboratory notification by the Contractor, CENPD-EN-G-L will provide the following information:

-assigned laboratory names, addresses, phone numbers
-number and type of samples to ship to each laboratory

The Contractor shall mobilize field personnel to the sites as a single team or multiple teams. The Contractor shall be responsible for making all travel arrangements to the sites for field team members, including one representative each from the Alaska District and the U.S. Fish and Wildlife Service, and arranging for accommodations for all personnel at the sites. The Contractor shall utilize the most cost-effective method(s) of mobilizing personnel and equipment to each island. Government furnished transportation may be available to and on some of the islands and the Contractor shall coordinate with the Alaska District for arranging any required Government transportation. The Contractor shall also be responsible for transporting all equipment and necessary on-island transportation that cannot be furnished by the Government to the sites. The Alaska District will obtain all necessary access permits for the Contractor's field team(s) on all of the islands.

The Contractor's field team(s) shall consist entirely of personnel experienced in the collection, packaging, and shipment of environmental samples. In addition, the Contractor's field team(s) will include a civil/environmental engineer experienced with remediation of POL contamination, and a site safety officer with remote site investigation experience. All field team members shall have completed an approved 40-hour health and safety training course, and shall be current on health and safety refresher training.

The Contractor's field team(s) shall implement the sampling activities as described in the approved Sampling and Quality Assurance Plans and debris inventory activities as outlined in the Workplan. Any changes to the sampling and debris inventory procedures shall be fully documented in field logbooks.

The Contractor shall complete a Daily Sampling Report following each day's sampling activity. The Daily Sampling Report shall summarize the sampling activity for that particular day and will include, but not be limited to, the following

information:

-date
-site weather
-names of samplers
-location
-time and number of samples collected
-requested analyses and containers used
-additional field data collected

Daily Sampling Reports shall be submitted as photocopies of field log books. The log books shall be set up in a clear and consistent format, and entries shall be neat and legible. The submitted photocopies shall be of good quality, with all entries easily readable.

Samples obtained during sampling at each of the sites shall be analyzed as described in the approved Sampling and Quality Assurance Plans. Laboratory analyses will be performed by laboratories under contract to the Corps of Engineers and laboratory costs will be borne by the Government, separate of this contract. Samples will be labeled with appropriate labels and tags that conform to GFMd.

The Contractor shall be responsible for coordinating schedules and testing arrangements with the assigned laboratories and shall be responsible for the handling and transportation of samples to the laboratory locations. The Contractor is responsible for all samples from the time of sample collection to receipt by the laboratories. However, because of the remote site locations, the Government will waive Contractor's responsibility for samples lost, delayed beyond holding times, or damaged in shipment while in the custody of an approved carrier and beyond the control of the Contractor.

The Contractor, as soon after shipment as possible, shall notify the testing laboratory that samples have been shipped, and shall supply them with the estimated time of arrival and a Contractor's point-of contact. The Contractor shall also verify to the laboratory that chain of custody forms and analytical methods to be performed accompany the shipped samples.

The Contractor shall supply to CENPD-EN-G-L one copy each of the following information: chain of custody forms, Daily Sampling Reports, field notes, and quality control/quality assurance sample information. Data shall be sent to the following address:

U.S. Army Corps of Engineers
Director, North Pacific Division Laboratory
1491 NW Graham Avenue
Troutadale, Oregon 90760-9503
(503) 665-4166

Test results for the project and QA samples will be reported to CENPD-EN-G-L. The laboratory will provide a Quality Assurance Report (QAR), meeting the requirements of ER 1110-1-263 (GFMc), within 45 calendar days after receipt of final test results. The QAR will include test results, comparison of project QA and QC analyses, documentation and appropriate recommendation on the acceptability of the analyses. Copies will be furnished to the Contractor. Estimated times for reporting of results, after receipt of samples at the laboratories, is as follows:

Activity	Calendar Days
Lab receives samples	0
All analyses complete	45
Report to District	60

This is an accelerated laboratory schedule.

8.0 DEBRIS INVENTORY

The purpose of the debris inventory is to verify the existence, quantity, and nature of debris identified by aerial photograph analysis conducted under Section 3.0. The Contractor's field team(s) shall record location, size, and condition of and photograph all debris considered to be high priority, which includes the following:

- -fuel tanks, pipelines, sumps, and pump stations
- -drum disposal areas, HTW containers, transformers
- -major buildings and roads
- -ordnance disposal areas

Other debris, including minor buildings and structures, foundations, vehicles, antennae, scrap metal, and miscellaneous debris should be considered lower priority for field verification. However, if time permits, the Contractor's field team(s) shall record and photograph as much of this debris as possible.

The Debris Inventories shall estimate the quantity of debris for each area of concern (Section 2.0). However, the Contractor's field team(s) are not expected to count every drum or determine the volume of materials in each drum or tank. Estimates of quantities may be made based on an evaluation of a representative percentage of these materials. Similarly, estimates of debris tonnage and/or volume will be required in some cases. Documentation of the assumptions used in estimates shall be included in the Debris Inventory. This contract does not require identification of the type and/or quantity of abandoned ordnance on the islands, however, areas of obvious and/or known ordnance disposal shall be identified.

The Debris Inventories shall include 8x11-inch, 11x17-inch, and 24x36-inch maps indicating debris locations. The 24x36-inch maps shall be on Mylar and shall be the principal mapping tool in the inventory, and shall be based on aerial photographs for the sites where available. The Mylar maps shall include the following:

- Debris areas
- POL pipelines, pump stations, etc.
- HTW/POL sources/storage containers
- Major buildings
- Roads, showing those adequate for vehicle traffic

The Debris Inventories shall also include 35mm color slides of all major debris and ordnance disposal areas. The slides shall be placed in plastic sleeves, numbered, and indexed with a photo-identification sheet, and shall be of clarity suitable for future identification in the field. The inventories should be organized in tabular format for each area of concern. Draft Debris Inventories shall be submitted to the Government Project Manager for review, and will be discussed at a review conference following submission of the Contamination Assessment Report.

9.0 CONTAMINATION ASSESSMENT REPORT

Following receipt of all raw laboratory data and the Quality Assurance Report by the Contractor, a 4-hour data analyses review meeting will be held with the Government. The meeting shall be attended by the Contractor's Project Manager and chemist. The purpose of the meeting will be to review all of the laboratory, quality assurance and quality control data for validity and inclusion in the Contamination Assessment Report.

The Contractor shall prepare a Contamination Assessment Report for each island. The reports should be divided into areas of concern as presented in Section 2 of this Scope of Work. The suggested format for the reports is provided below. The Contamination Assessment Reports shall also include Daily Sampling Reports and the Government quality assurance review.

Contamination Assessment Report
Suggested Format

1.0 Introduction
2.0 Site Background
3.0 Environmental Setting
4.0 Summary of Sampling Activities
5.0 Analytical Results and Discussion
6.0 Potential Contaminant Transport Pathways and Receptors
7.0 Summary and Conclusion

The Contamination Assessment Reports shall be submitted in draft form to the Government Project Manager for review and discussion at the Review Conference.

Mylar maps (24x36 inch) of each Area of Concern on all islands shall be prepared (using the base maps created during the Sampling and Quality Assurance Plans and Debris Inventory phases) and submitted with the draft Contamination Assessment Reports. The Mylar maps shall include the following:

- o HTW/POL sources/storage containers
- o HTW/POL release areas
- o Runoff routes, wetlands, sensitive areas
- o Archeological sites

The Contractor shall also prepare and ubmit a separate EPA Form 2070-12 and 2070-13 for each island, based on the results of the contamination assessment.

10.0 REVIEW CONFERENCE

The Contractor's Project Manager and engineer(s) shall attend a 4-hour review conference with the Alaska District and U.S. Fish and Wildlife Service to present the contents of the Debris Inventories and Contamination Assessment Reports. The Contractor will receive written review comments on the reports to be integrated into final reports. Project objectives will be re-evaluated at the review conference, and an overall clean-up/remediation strategy will be discussed for later inclusion in the Remediation Options Report.

11.0 REMEDIATION OPTIONS REPORT

Following the review conference, the Contractor shall prepare Remediation Options Reports for each island based on discussions of clean-up priorities during the review conference. The Remediation Options Reports shall include the following:

-Summary of Debris Inventory and Contamination Assessment;
-Prioritization of Areas of Concern for clean-up/remediation;
-Several different options and levels of effort for island-wide clean-up based on prioritization;
-Preliminary cost estimates for each option; and
-Justification of reasons for no clean-up, if appropriate.

A final review conference will be held with the Alaska District. The Contractor shall integrate written review comments received at the review conference into final Mylar maps and Remediation Options Reports.

12.0 OPTIONS

Inclement weather may prolong the fieldwork. Consequently, weather days and additional transportation reimbursement may be added by the Government as contingencies. A day determined to be unsafe for fieldwork by the site safety officer, or for travel by a pilot or other transportation-related operator shall be determined to be a weather day for the purpose of this contract if the field work schedule must be extended to accomplish the scope of work. For each weather day, the costs shall include 8 hours labor and one day perdiem (where applicable) for each member of the field team. Additional transportation costs from down-time during weather delays may be reimbursed by the Government for actual losses incurred. The Contractor must substantiate in writing all delays due to weather. There will be 2 weather day options for each island for a total of 8 weather day options.

An option providing travel allowance for substitute field personnel in the event of an accident or other emergency will also be included.

13.0 COMPLETION SCHEDULE

The Contractor shall complete the project as follows:

Activity	Schedule	Quantity
1) Notice to Proceed (NTP)		
2) Workplan Submittal	10 days following NTP	5 copies
3) Workplan Review Conference	within 3 days following 2)	1 hour
4) Safety Plans Submittal	10 days following NTP	5 copies
5) Sampling and Quality Assurance Plans Submittal	20 days following NTP	10 copies
6) Laboratory Notification	20 days prior to mobilization	
7) Pre-Fieldwork Conference	7 days prior to fieldwork	
8) Fieldwork	Early September	

9)	Debris Inventories	45 days following fieldwork	10 copies +1 electronic copy, including CAD files
10)	Receipt of Data and QAR	60 days following fieldwork	To Contractor and Alaska District
11)	Data Analysis Review Conference	14 days following receipt of data	4 hours
12)	Draft Contamination Assessment Reports Submittal	45 days following receipt of data	5 copies
13)	Review Conference	28 days following submission of draft Contamination Assessment Reports	4 hours
14)	Final Contamination Assessment Reports Submittal	14 days following review conference	10 copies +1 electronic copy, including CAD files
15)	Draft Remediation Options Reports Submittal	45 days following review conference	5 copies
16)	Final Review Conference	28 days following draft Remediation Options Report	4 hours
17)	Final Remediation Options Reports and Mylars Submittal	28 days following final review conference	10 copies +1 electronic copy, including CAD files

14.0 LIST OF GFM

Referenced GFM:

a) Corps of Engineers, Alaska District, Real Estate maps of former military reservations: Great Sitkin Island, Camp Earle Air Force Field (Attu), Amchitka Air Force Auxillary Filed, Kiska

Island Garrison Site, and Little Kiska Island Harbor Defense Site.

b) Engineering Manual (EM-385-1-1, Rev. Oct. '87) Corps of Engineers Safety and Health Requirements Manual.

c) Engineering Regulation ER 11110-1-263, Chemical Quality Management Toxic and Hazardous Wastes, 30 Dec 85.

d) Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Wastes, U.S. Army Corps of Engineers, MRD, Oct. '86.

e) Report of Findings Aleution Islands Military Contaminants: Adak Island, Agatta Island, Great Sitkin Island, Kiska Island, prepared by U.S. Fish and Wildlife Service, Anchorage, June '90.

Additional GFM:

- Defense Environmental Restoration Program, Formerly Used Defense Sites, Findings and Determination of Eligibility, Amchitka Island, Attu Island, Great Sitkin Island, Kiska Island.

- Debris Removal and Clean-up Study, Aleution Islands and Lower Alaska Peninsula, Alaska, prepared by Corps of Engineers, Alaska District, Oct. '76.

- Debris Removal and Clean-up, Draft Environmental Impact Statement, Aleutian Islands and Lower Alaska Peninsula, Sept. '79.

- Debris Removal and Clean-up, Draft Environmental Impact Statement, Aleution Islands and Lower Alaska Peninsula, Appendices.

- Aerial photographs: Kiska, Little Kiska, Great Sitkin, Attu Islands.

- Draft Preliminary Assessment Report, Fleet Surveillance Support Command, Amchitka Island, Alaska, prepared by Naval Energy and Environmental Support Activity, December, 1990.