# USACE FUDS
# DECISION DOCUMENT NO. 5

## AMAKNAK AND UNALASKA ISLANDS, ALASKA
**(FUDS Property No. F10AK0841)**

## DRAFT
## DECEMBER 2008

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# AMAKNAK AND UNALASKA ISLANDS, ALASKA

# DECISION DOCUMENT NO. 5
## DECEMBER 2008

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**ATTACHMENTS**

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAC | Alaska Administrative Code |
| ADEC | Alaska Department of Environmental Conservation |
| ARLIS | Alaska Resources Library and Information Services |
| AST | aboveground storage tank |
| bgs | below ground surface |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COC | contaminant of concern |
| cy | cubic yards |
| DERP | Defense Environmental Restoration Program |
| DoD | U.S. Department of Defense |
| DRO | diesel-range organics |
| $ft^2$ | square feet |
| FUDS | Formerly Used Defense Sites |
| GRO | gasoline-range organics |
| HAVE | hot-air vapor extraction |
| IRA | interim removal action |
| Jacobs | Jacobs Engineering Group Inc. |
| LIF | laser-induced fluorescence |
| LNAPL | light nonaqueous-phase liquid |
| mg/kg | milligrams per kilogram |
| mg/l | milligrams per liter |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| O&M | operations and maintenance |
| OSHA | Occupational Safety and Health Administration |
| PAH | polynuclear aromatic hydrocarbon |
| PID | photoionization detector |
| PPE | personal protective equipment |
| RAO | remedial action objectives |

**ACRONYMS AND ABBREVIATIONS**
(continued)

| | |
|---|---|
| RecKey | record key |
| RI | remedial investigation |
| ROST | Rapid Optical Screening Tool |
| RRO | residual-range organics |
| SI | site investigation |
| TAH | total aromatic hydrocarbons |
| TAqH | total aqueous hydrocarbons |
| TDU | thermal desorption unit |
| USAED | U.S. Army Engineer District, Alaska |
| USC | United States Code |
| UST | underground storage tank |
| VOC | volatile organic compound |
| WWII | World War Two |
| µg/m³ | micrograms per cubic meter |

## PART 1: THE DECLARATION

### 1.1 SITE NAME AND LOCATION

The Amaknak and Unalaska Islands are located in southwestern Alaska, in the Fox Islands Group of the Aleutian Islands chain. The following 14 sites in three Management Areas comprise a portion of the FUDS investigated from 1984 to 2002 on Amaknak and Unalaska Islands.

**Management Area 2: Rocky Point (Strawberry Hill)**

- Fort Mears Hospital Underground Storage Tank (UST)

**Management Area 5: Margaret Bay Area and Former Fort Mears Garrison**

- Fort Mears Public Works Garage (Building 484)
- Fort Mears Gas Station/Post Office Area
- Warehouse Tract D Area
- Margaret Bay 28 USTs (Building 884)
- Fort Mears Landfill (North)
- Fort Mears Landfill (South)
- Warehouse Building (UST 820)

**Management Area 7: Little South America**

- Little South America (LSA) Drums
- Building 1050 (Barracks)
- Building 1128 (Garage)
- Building 1245 (Mess Hall)
- Building 1154 (Mess Hall)
- LSA Latrine 1 UST

### 1.2 STATEMENT OF BASIS AND PURPOSE

Authorities: DERP, United States Code, Title 10, Section 2701, et seq.; Alaska Administrative Code (AAC), Title 18, Chapter 75. This Decision Document presents the U.S. Army Corps of Engineers (USACE)-selected remedy for 14 sites in three Management Areas on Amaknak and Unalaska Islands, chosen in accordance with DERP, the Administrative Record for this site, and based upon the successful results of interim removal actions (IRA)

and treatment of excavated soil. Petroleum, oil and lubricants (POL)-contaminated sites fall under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion, addressed under the authority of the DERP statute. The proposed response actions meet ADEC requirements for cleanup of petroleum-contaminated sites and are consistent with the response process set forth in the National Oil and Hazardous Substances Contingency Plan (NCP). ADEC concurs with the selected remedies. This document does not address abandoned WWII buildings and debris.

### 1.3 ASSESSMENT OF THE SITE

The sites in this Decision Document were identified areas of concern due to the presence of petroleum products and community concerns. The response action selected in this Decision Document is necessary to protect public health, welfare, or the environment from actual or threatened releases of pollutants or contaminants from this site, which may present an imminent and substantial endangerment to the public health, welfare, or to the environment.

### 1.4 DESCRIPTION OF SELECTED REMEDY

Analytical results from investigation activities indicated that either:

- No sources of contamination found.

OR

- Following IRA activities, no contaminants were identified at concentrations exceeding Alaska Department of Environmental Conservation (ADEC) Method Two cleanup and/or Method Three levels in 18 Alaska Administrative Code (AAC) 75.341, or groundwater cleanup levels as stated in 18 AAC 75.345 Table C.

OR

- Remaining contamination is minimal, localized, and does not appear to be migrating; therefore remaining contaminants do not pose an unacceptable risk to human health or the environment

Based on the investigation results, ADEC and the Alaska District recommend the following remedies for the 14 sites.

No Further Action recommended for the following seven sites:

- Fort Mears Gas Station/Post Office Area
- Warehouse Tract D Area
- Fort Mears Landfill (South)
- Little South America (LSA) Drums
- Building 1050 (Barracks)
- Building 1128 (Garage)
- Building 1245 (Mess Hall)

Conditional Closure recommended for the following six sites:

- Fort Mears Hospital Underground Storage Tank (UST)
- Fort Mears Public Works Garage (Building 484)
- Warehouse Building (UST 820)
- Fort Mears Landfill (North)
- Building 1154 (Mess Hall)
- LSA Latrine 1 UST

Monitored Natural Attenuation recommended for the following site:

- Margaret Bay 28 USTs (Building 884)

## 1.5 STATUTORY DETERMINATIONS

The selected remedies are protective of human health and the environment and comply with ADEC cleanup standards, although these are neither legally applicable nor relevant and appropriate because of POL contaminants exclusion from the definition of hazardous substances under CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Permanent solutions are used to the maximum extent practicable; however, guaranteed permanence of the selected remedies is not possible due to the residual petroleum contamination that exists. This may warrant additional remedial action in the future if there is a change in the conditions onsite.

## 1.6 DATA CERTIFICATION CHECKLIST

Part 2 of this Decision Document includes the following information:

- Site history, description, and site characteristics (Sections 2.1 through 2.7)
- Current and reasonably anticipated future land and groundwater-use assumptions (Section 2.8)
- Summary of site risks (Section 2.9)
- The overall remedial action objectives (Section 2.10)
- A description and comparative analysis of the alternatives (Sections 2.11 and 2.12)
- A description of the selected remedy (Section 2.13)

## 1.7 AUTHORIZING SIGNATURES

This Decision Document presents the selected remedy for the 14 sites on Amaknak and Unalaska Islands, Alaska. The Alaska District, the lead agency under DERP at the Amaknak FUDS, developed this Decision Document, which incorporates into the larger Administrative Record file for Amaknak and Unalaska Islands, available for public view at three Information Repositories:

- Ounalashka Corporation, 400 Salmon Way, Amaknak Island, Alaska
- Unalaska Public Library, P.O. Box 1370, Unalaska Island
- Alaska Resources Library and Information Services (ARLIS), Room 111, Library Building, 3211 Providence Drive, Anchorage, Alaska.

These documents are also stored at the Alaska District Office on Elmendorf Air Force Base, Alaska. This Decision Document, presenting the selected remedy with no present-worth cost for No Further Action, a present-worth cost of $5,000 for Conditional Closure, and a present-worth cost for Monitored Natural Attenuation of $ approved by the undersigned, pursuant to Memorandum DAIM-ZA, 9 September 2003, Subject: Policies for Staffing and Approving Decision Documents, and to Engineer Regulation 200-3-1, FUDS Program Policy.

APPROVED:

Kevin Wilson, Colonel
Corps of Engineers
District Commander

Date

ADEC concurs with the Alaska District's selected remedy. The concurrence may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposures that may cause unacceptable risk to human health or the environment.

Jennifer Roberts
Federal Facility Environmental Restoration Program Manager
Alaska Department of Environmental Conservation

Date

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## PART 2: THE DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

Amaknak and Unalaska Islands are located in southwestern Alaska, in the Fox Islands Group of the Aleutian Islands chain, approximately 850 air miles southwest of Anchorage, Alaska, and 1,300 air miles northwest of Seattle, Washington (Figure 1). Amaknak Island is a small island partially encircled by the northeastern portion of Unalaska Island. Dutch Harbor is a geographic feature of Amaknak Island. The two islands connect by a bridge and road system.

This Decision Document details the rationale for the recommendations for 14 Formerly Used Defense Sites (FUDS) on Amaknak and Unalaska Islands, Alaska (FUDS F10AK0841).

No Further Action recommended for the following seven sites:

- Fort Mears Gas Station/Post Office Area
- Warehouse Tract D Area
- Fort Mears Landfill (South)
- Little South America (LSA) Drums
- Building 1050 (Barracks)
- Building 1128 (Garage)
- Building 1245 (Mess Hall)

Conditional Closure recommended for the following six sites:

- Fort Mears Hospital UST
- Fort Mears Public Works Garage (Building 484)
- Fort Mears Landfill (North)
- Warehouse Building (UST 820)
- Building 1154 (Mess Hall)
- LSA Latrine 1 UST

Monitored Natural Attenuation recommended for the following site:

- Margaret Bay 28 USTs (Building 884)

The U.S. Army Engineer District, Alaska (USAED) is the lead agency for addressing environmental contamination on Amaknak and Unalaska Islands FUDS. The Alaska

Department of Environmental Conservation (ADEC) is the lead regulatory agency. The Department of Defense (DoD) FUDS program provides the monies for regulatory oversight (as part of the Defense and State Memorandum of Agreement), investigation, and cleanup.

Figure 1 Project Location and Vicinity

8 ½ x 11 (b&w)

## 2.2 SITE HISTORY

During WWII, several U.S. Army posts and a Naval Operating Base established in the Amaknak and Unalaska area housed approximately 65,000 military personnel. The population density and the intensive preparations for the war effort required large volumes of fuel, which were predominantly stored in aboveground storage tanks (AST) or in underground storage tanks (UST). Most of the facilities were intact when the military withdrew from Amaknak and the Unalaska area in 1947. The majority of the facilities remained vacant through the mid-1960s, although occupation and sublease of some facilities did occur during this time. The 1983 Defense Appropriations Act initiated DoD cleanup activities at FUDS. The USAED, the executing agent for the DoD, was assigned responsibility to clean up FUDS. The Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army Post received National Historic Landmark designation on 4 February 1985.

Currently, Unalaska is a major support base for several commercial industries, including commercial fishing and processing, shipping, and to a lesser extent, offshore oil exploration. Approximately 4,300 people live in Unalaska year-round.

## 2.3 SUMMARY OF ACTIONS TO DATE

The field activities conducted between 1996 and 2002 included site investigations (SI), remedial investigations (RI), and interim removal actions (IRA) at each of the 14 sites. This section summarizes the activities that occurred at the 14 sites discussed in this Decision Document. Greater detail of this information resides in the Site Investigation, Remedial Investigation, Interim Removal Action, and other documents contained in the Administrative Record file for these sites.

In 1984 and 1985, dismantling and decommissioning of the Unalaska Army Garrison and Naval Operating Base took place as a part of BDDR activities.

Between 1996 and 1998, USTs were located, decommissioned, and removed along with their associated piping. Activities also included the locating, excavation, and treatment of

contaminated soils as well as installing and sampling well points. Additionally in 1997, free product recovery from a tar pond took place and in 1998, the removal of fuel distribution pipelines and drums occurred.

Between the years of 2000 and 2002, contaminated soil excavation and disposal ensued, along with test pit excavation, drums removal, environmental samples collection, and groundwater well and well point installation. Electromagnetic survey of the area was conducted in 2000.

## 2.4 ENFORCEMENT ACTIVITIES

The investigations and removal actions at the 14 sites were performed under the Defense Environmental Restoration Program (DERP)-FUDS program. No enforcement activities, notices of violation, or lawsuits pertaining to DoD activities have been enacted regarding these sites.

## 2.5 COMMUNITY PARTICIPATION

Documentation of previous characterization and cleanup activities at the 14 sites resides in the Alaska District reports prepared by Jacobs Engineering Group Inc. (Jacobs). Part 4 of this Decision Document (References) lists these reports. An Administrative Record file resides at the Alaska District office at Elmendorf Air Force Base, Alaska, and copies of these documents are located at the three Information Repositories: Ounalashka Corporation, Unalaska Public Library, and ARLIS.

The Alaska District initiated a community relations program for Amaknak and Unalaska Islands, and community relations public meetings were held in 1996 (three), 1997 (two), 1998 (two), 1999 (two), 2000 (three), 2004 (two), 2007 (one), and 2008 (one). A distribution of newsletters and fact sheets is used to keep the community updated on activities performed.

A public comment period for Proposed Plan No. 5 (USAED 2007), which described the SI and cleanup work completed at the site covered in this Decision Document, was held in conjunction with the public comment period for Proposed Plan No. 6 from 10 January to 12

February 2007. Two public meetings, held on 31 January 2007, at the Unalaska City Council Chambers and the Father Ishmail Gromoff Senior Center, allowed for public discussion. The *Dutch Harbor Fisherman*, cable television, and local radio all advertised these meetings. At these meetings, representatives from the ADEC, the Alaska District, and Jacobs answered questions from the public regarding cleanup activities.

Part 3, the Responsiveness Summary, lists responses to all comments received on Proposed Plan No. 5.

## 2.6 SCOPE AND ROLE OF RESPONSE ACTION

This document addresses 14 sites in three management areas; however, these sites represent only part of the Amaknak FUDS property overall. The Amaknak and Unalaska Islands FUDS project divides into 14 management areas based on geographical location and type of contamination. These 14 management areas correspond to 17 FUDS property numbers, listed under the Amaknak FUDS (F10AK0841).

Previous IRAs included removal of USTs, or drums; and the removal and thermal treatment of contaminated soil. Contaminant concentrations in soil at these 14 sites are either below ADEC Method Two or minimal, localized, and do not appear to be migrating. Groundwater monitoring found no indication of groundwater contamination at these sites, with the exception of Fort Mears Landfill (North). Groundwater contaminant concentrations at Fort Mears Landfill (North) are minimal and expected to dilute significantly upon mixing with the marine environment; therefore, groundwater contamination at this site does not pose a heightened risk to human health or the environment.

## 2.7 SITE CHARACTERISTICS

### 2.7.1 Overview

The following sections briefly describe each of the 14 Amaknak and Unalaska Islands AOCs and the associated contamination, discuss the results of the analytical samples that were

collected, and discuss the potential human health or ecological risks associated with these results. For a complete discussion of each site's COCs, results of analytical samples and the potential human health or ecological risks associated with each site, refer to Section 2.7.6.

### 2.7.2 Conceptual Site Model

Appendix A includes current conceptual site models (CSM) for the three Management Areas addressed in this Decision Document. These figures present a generalized flow diagram of complete exposure pathways that may exist at each Management Area. Potential pathways for exposure to human health and ecological receptors from contaminated sources include soil, groundwater, surface water, sediment, and air.

**Management Area 2: Rocky Point (Strawberry Hill)**

**Management Area 5: Margaret Bay Area and Former Fort Mears Garrison**

**Management Area 7: Little South America**

### 2.7.3 Sampling Strategy

During initial investigations, soil and groundwater analyses were performed to determine the full range of chemicals that could be present due to known historical site activities. The following investigation activities were conducted:

- Sampling soil and groundwater to characterize the nature, extent, and concentration of contamination
- Sampling sediment at Fort Mears Landfill (North) to determine if contamination was migrating to the marine environment
- Installation of monitoring wells and groundwater sampling to determine if contamination had migrated to groundwater
- Removal and treatment of contaminated soil

### 2.7.4 Known or Suspected Sources of Contamination

Primary sources of contamination at the 14 sites included USTs and associated piping, drums, and contaminated liquids and sludge, and landfills; the secondary source of contamination was petroleum-hydrocarbon impacted soil.

The Warehouse Tract D and LSA Buildings 1050 (Barracks), 1128 (Garage), and 1245 (Mess Hall) were investigated due to potential contamination from these sources; however, no contamination was discovered.

### 2.7.5 Types of Contamination and the Affected Media

The Alaska District and ADEC have identified petroleum hydrocarbons as the primary source of contamination at the three management areas that pose the greatest potential risk to human health and the environment. Other contaminants of concern include semi-volatile organic compounds (SVOC), including polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), and volatile organic compounds (VOC).

### 2.7.6 Location and Extent of Contamination

This section includes site-specific summaries of field investigation and removal actions performed at the closed sites as detailed in the *1998 Comprehensive Remedial Investigation Report* (USAED 2000), *2000 Islandwide SI/IRA/RI Report* (USAED 2001b) and *2001/2002 Islandwide SI/RI/IRA Report* (USAED 2003).

Based on removal actions, analytical data, and visual observations made during sampling and test pit excavation activities, DoD-related contamination removal is to the extent practicable and does not present a risk to human health or the environment at the 14 sites addressed in this Decision Document.

**Management Area 2: Rocky Point (Strawberry Hill)**

The Strawberry Hill portion of Rocky Point encompasses the entire area south of the Rocky Point Tank Farm and east of the Margaret Bay Area and Fort Mears Garrison. It borders Iliuliuk Lake to the northeast and Iliuliuk Harbor to the southwest (Figure 2). This Decision Document addresses the one remaining FUDS - eligible site in Management Area 2, the Fort Mears Hospital UST.

Figure 2 Management Area 2: Rocky Point (Strawberry Hill)

8 ½ x 11 (color)

**Fort Mears Hospital UST**

The former Fort Mears Hospital site is on the northern side of East Point Road. The concrete foundation of the former Fort Mears Hospital appears unchanged when compared to aerial photographs taken in 1980 and 1994. A UST was located west of this concrete foundation.

In August 1998, removal of the UST was conducted. Collection of two confirmation soil samples from the bottom of the excavation, approximately 10 feet below the roof of the concrete entryway (Figure 2a), preceded analysis for DRO, RRO, and benzene, toluene, ethylbenzene, and xylenes (BTEX).

One soil sample contained DRO at a concentration of 340 mg/kg, exceeding the ADEC Method Two cleanup level of 230 mg/kg (Table 2). Although DRO detection was present at a concentration exceeding the ADEC Method Two migration to groundwater cleanup level for soil, the exceedance occurred in a sample collected 10 feet below the ground surface (bgs). The DRO concentration does not exceed the inhalation or ingestion cleanup levels (Table 1 from Proposed Plan #5). All other analytes were either non-detect or below cleanup criteria.

Groundwater was not encountered during excavation activities; therefore, no monitoring well installation or groundwater sampling occurred.

Total cumulative risk was not calculated, since carcinogenic compounds were not detected in the analytical samples. Due to the concentration and location of the DRO, this site does not pose an unacceptable risk to human health or the environment.

**(Insert Table 1 from Proposed Plan #5, Cleanup Criteria)**

**Table 2**

**Fort Mears Hospital UST**

| Media | Parameter | Units | Cleanup Criteria[1] | Remaining Maximum Concentration | Number of Detections at or above Criteria / No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Soil | DRO | mg/kg | 230 | **340** | 1/2 | FMH-01SO (1998) |

Notes:
1 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways
Soil samples also were analyzed for RRO and BTEX. Any detected concentrations did not exceed ADEC Method Two levels.
Results in **bold** exceed cleanup criteria.

Figure 2a Fort Mears Hospital

4 x 5 ½ ? ( ½ page)

**Management Area 5: Margaret Bay Area and Former Fort Mears Garrison**

The Margaret Bay Area and Former Fort Mears Garrison area is located on the southern portion of Amaknak Island, between the airport and Little South America. Margaret Bay resides approximately in the middle of Management Area 5 (Figure 3). During WWII, the Margaret Bay area was home to the original Fort Mears, a large concentration of military structures and facilities. This Decision Document addresses the FUDS-eligible areas of concern in Management Area 5.

Figure 3 Management Area 3: Margaret Bay and Former Fort Mears Garrison

8 ½ x 11 (color)

**Fort Mears Public Works Garage (Building 484)**

The former Public Works Maintenance Garage (Building 484) and Tire Repair Shop site is approximately 500 feet east of the shore of Unalaska Bay (Figure 3a) and considered an area of concern. Documentation of several releases from present-day activities also exists within the area

In 1992, removal of three 5,000-gallon USTs and associated piping was conducted. A soil sample, collected from the distribution piping, contained a concentration of 25,000 mg/kg DRO, 77,000 mg/kg volatile organic compounds (VOCs); and 24,000 mg/kg total BTEX.

In 1998, soil samples collected adjacent to the garage area and analyzed for DRO, RRO, PAHs, VOCs, and select metals contained concentrations of arsenic and total chromium above ADEC Method Two migration to groundwater cleanup criteria and calculated background levels (Table 3). The maximum detected value of chromium (122 mg/kg) exceeded the maximum ADEC Method Two cleanup level for total chromium (23 mg/kg) but does not exceed the ADEC Method Two trivalent chromium cleanup criteria (120,000 mg/kg). Based on site use and the presence of organic materials in the soil, chromium at this site most likely exists in the trivalent chromium state and is therefore below the cleanup level for total chromium. A Method Three cleanup level was calculated for arsenic for industrial exposure at this site. The maximum arsenic concentration detected (17.8 mg/kg) was less than the Method Three cleanup level of 38 mg/kg. All other analytes were either non-detect or below ADEC Method Two cleanup criteria.

In 1998, installation of three groundwater monitoring wells ensued. Two groundwater samples collected and analyzed for DRO, GRO, RRO, PAHs, VOCs, and select metals contained concentrations of analytes either non-detect or below ADEC Table C cleanup criteria. Groundwater samples were not collected from FMPW-MW1 due to insufficient water in the well.

**Table 3**

**Fort Mears Public Works Garage (Building 484)**

| Media | Parameter | Units | Cleanup Criteria[1,2] | Remaining Maximum Concentration | No. of Detections at or above Criteria/ No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Soil | Arsenic | mg/kg | 1.8[3] | **17.8** | 6/6 | FMPW-B2-01 (1998) |
| | Chromium | mg/kg | 23 | **122** | 5/6[4] | FMPW-B1-02 (1998) |
| Groundwater | No analytes exceeded cleanup criteria | | | | 0/2 | All Samples (1998) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways

[2] ADEC 18 AAC 75, Table C, Groundwater cleanup levels

[3] Only four of six soil samples exceed calculated background concentrations for arsenic (9.85 mg/kg), and none of the six samples exceeded the Method Three ingestion/inhalation cleanup level for industrial exposure (38 mg/kg).

[4] If the detected chromium were trivalent chromium, none of the six samples would exceed the ADEC Method Two cleanup level of 120,000 mg/kg.

Soil samples also were analyzed for DRO, RRO, PAHs, VOCs, cadmium, and lead. Any detected concentrations did not exceed ADEC Method Two cleanup levels.

Groundwater sample concentrations for DRO, GRO, RRO, PAH, VOCs, and four metals did not exceed Table C levels.

Results in **bold** exceed cleanup criteria.

The total cumulative carcinogenic risk calculated for this site ($4.7 \times 10^{-6}$) is less than the limit of $1 \times 10^{-5}$ allowed by ADEC. The cumulative hazard index for each exposure pathway is also less than the limit of 1.0.

Based on the above information, this site does not pose an unacceptable risk to human health or the environment.

**Fort Mears Gas Station/Post Office Area**

The former Fort Mears Gas Station is located on the southwest side of Salmon Way between Airport Beach Road and Sea Lion Circle, approximately 100 feet south of the U.S. Post Office (Figure 3b). Asphalt partly covers the gas station, which itself is a part of the AC Value Center parking lot. Fuel storage occurred in one diesel UST and nine gasoline USTs.

In 1996, 10 USTs were removed and approximately 2,950 cy of petroleum contaminated soil was excavated and thermally treated. The area was backfilled with treated soil and soil donated by Ounalashka Corporation.

Soil samples collected and analyzed for DRO, GRO, RRO, VOCs, SVOCs, and lead contained concentrations of contaminants below Method Two cleanup criteria. In 1998, soil samples collected and analyzed for DRO, GRO, RRO, PAHs, VOCs, and lead revealed levels below Method Two cleanup criteria.

In 1998, six monitoring wells were installed. Groundwater samples collected and analyzed for DRO, GRO, PAHs, VOCs, and lead detected only DRO. These DRO concentrations were less than the ADEC Table C cleanup criterion of 1.5 milligrams per liter (mg/L). No criteria exceedances for surface water occurred.

In 2000, a strong fuel odor observation took place in one well, warranting the collection of an additional sample. The additional sample was analyzed for DRO, RRO, Resource Conservation and Recovery Act (RCRA) metals (silver, arsenic, barium, cadmium, chromium, mercury, lead, and selenium), PAHs, and VOCs. The concentration of detected analytes registered below ADEC Table C cleanup criteria.

The total cumulative carcinogenic risk for this site ($2.0 \times 10^{-6}$) is less than the limit of $1 \times 10^{-5}$ allowed by ADEC. The cumulative hazard index for each exposure pathway is also less than the limit of 1.0.

No contaminants are present in concentrations above cleanup criteria in either soil or groundwater. This site does not pose an unacceptable risk to human health or the environment.

**Warehouse Tract D Area**

Located on the northeastern side of Margaret Bay, the Warehouse Tract D Area is part of the former Fort Mears Hospital Complex (Figure 3c). Previous investigations indicated potential petroleum hydrocarbon contamination at the site, possibly associated with a buried fuel pipeline.

In 1997, two trenches were excavated, one to the northwest and one to the southeast, in an attempt to locate a fuel pipeline. During the field activities, three wood-stave pipes in the northwestern trench were discovered running parallel to East Point Road. No petroleum hydrocarbon staining or odors were noted in the trench. Two soil samples collected from each end of the northwestern trench were analyzed for DRO and RRO. Contaminants were below ADEC Method Two cleanup levels. One eight-inch wood-stave pipe was uncovered in the southwestern trench, but no petroleum hydrocarbon staining or odors existed. No samples were collected due to the coarse nature of the soils. All of the pipes remained in place. The fuel pipeline was not discovered.

Based on this information, this site does not pose an unacceptable risk to human health or the environment.

**Margaret Bay 28 USTs (Building 884)**

Much of the observed contamination in the Margaret Bay area comes from the former USTs in the area. Using subsurface metal detection surveys, test pit explorations, and historical drawings, 28 USTs were identified in the Margaret Bay area ranging in size from 300 to 2000 gallons. Figure 3 provides the designations (based on the collocated buildings) and locations for the 28 Margaret Bay USTs.

In 1996, excavation and removal of all 28 USTs from the Margaret Bay area was conducted. Alaska Scrap Procurement recycled the decontaminated USTs. Field observations (headspace results, staining, and odor) were used during UST removal to determine if contaminated soil

existed in the excavations. Based on these field observations, contaminated soil was present at 10 of the 28 UST locations. Thermal treatment of the contaminated soil followed excavation. The treated soil served as backfill at other excavations once it was confirmed clean. Six monitoring wells were installed after the removal activities were completed.

Soil samples collected from the bottoms of the UST excavations and analyzed for DRO, RRO, and SVOCs revealed DRO at a maximum concentration of 2,490 mg/kg (Table 4), exceeding the ADEC Method Two cleanup level. Several of the soil samples were also analyzed for VOCs, but concentrations were below cleanup levels. Concentrations of DRO above the ADEC cleanup level were present at only 8 of the 28 former UST locations, 3.5 to 6 feet below the ground surface (Figure 3). Although the residual DRO concentrations in soil are above the ADEC Method Two migration to groundwater cleanup levels, the shallow aquifer in the area is an unlikely source of drinking water due to seawater intrusion. All remaining DRO contamination is below ADEC inhalation and ingestion cleanup levels. The other remaining analytes were below ADEC Method Two cleanup levels.

Groundwater samples collected from the six monitoring wells and two test pits and analyzed for SVOCs, VOCs, and metals revealed tetrachloroethene (PCE) and lead above ADEC Table C groundwater cleanup levels. Groundwater testing for DRO was not conducted, since the majority of the observed contaminated soils were in an area of suspected saltwater intrusion, making the aquifer an unlikely source of drinking water. Further investigation of the PCE result led to the designation of a separate site: Fort Mears Landfill (North). The PCE detection is addressed under the Fort Mears Landfill (North) section of this decision document.

The proximity of the former UST sites to Unalaska Bay and Margaret Bay suggests that the onsite groundwater mixes with the marine environment, therefore, the groundwater sample results required comparison to ADEC marine surface water criteria for quality. Although most analytes were below the ADEC Table C groundwater cleanup criteria, lead, copper and zinc existed at concentrations exceeding marine surface water standards for quality (Table 4). The seawater intrusion of the shallow aquifer and the distance to Unalaska Bay and Margaret

Bay makes it unlikely that that lead, copper, and zinc would discharge directly to the marine environment above the surface water standards for quality.

The DRO contamination in soil and the lead, zinc, and copper detected in site groundwater do not pose an adverse risk to human health. However, documentation of the residual DRO soil contamination at the former UST locations BLDG 725, BLDG 765, BLDG 769, BLDG 771, BLDG 787, BLDG 793, BLDG 851, BLDG 865, and BLDG 884 and the groundwater at BLDG 754 shall assist with future land management planning.

**Comment [jsw1]:** For JW/KM – will need to change text to suit MNA alternative.

**Table 4**

**Margaret Bay 28 USTs (Building 884)**

| Media | Parameter | Unit | Cleanup Criteria[1],[2] | Marine Surface Water Criteria[3] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|---|
| Soil | DRO | mg/kg | 230 | N/A | **2,490** | 12/44[4] | MB-884CEN (1996) |
| Groundwater | Lead | mg/L | 0.015 | 0.0081 | **0.04**[5] | 1/1 | MB-754RI01 (1996) |
| | Copper | mg/L | 1.3 | 0.0031 | 0.117[5] | 1/1 | MB-754RI01 (1996) |
| | Zinc | mg/L | 11 | 0.081 | 0.471[5] | 1/1 | MB-754RI01 (1996) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways

[2] ADEC 18 AAC 75, Table C, Groundwater cleanup levels

[3] ADEC 18 AAC 70 surface water quality criteria

[4] Seven of the DRO exceedances are in areas where the ADEC 10-times rule applies.

[5] Result exceeds marine surface water criteria.

Soil samples also were analyzed for RRO, VOCs, and SVOCs. Any detected concentrations did not exceed ADEC Method Two cleanup levels.

Groundwater samples also were analyzed for SVOCs and one sample was analyzed for all RCRA metals. Any detected concentration not reported did not exceed ADEC Table C cleanup levels.

Results in **bold** exceed cleanup criteria.

N/A = not applicable

None of the contaminants detected at this site pose an unacceptable risk to human health or the environment.

**Fort Mears Landfill (North)**

Fort Mears Landfill (North) is located on the north side of the intersection of Salmon Way and Airport Beach Road and between Airport Beach Road and Unalaska Bay (Figure 3e). Irregular and sparse vegetation currently covers the landfill area.

In 1997, the discovery of several old pits or excavations, up to 5 feet in depth, took place. An investigation of the pits found the partially exposed remnants of two USTs in one of the pits.

From 1996 to 1997, soil samples collected from Fort Mears Landfill (North) were analyzed for DRO, RRO, SVOCs, VOCs, PAHs, and RCRA metals. Although samples contained concentrations of analytes above ADEC Method Two cleanup levels, none of the concentrations exceeded 10 times ADEC Method Two cleanup levels (Table 5). A Method Three cleanup level was calculated for arsenic for industrial exposure at this site. The maximum arsenic concentration detected was 19 mg/kg, less than the Method Three cleanup level of 38 mg/kg.

From 1996 to 2001, groundwater samples were collected from five monitoring wells located in and around the landfill and analyzed for DRO, RRO, PCBs, PAHs, VOCs, and RCRA metals. For risk-based screening, the groundwater sample results were compared to 10 times the ADEC Table C cleanup levels. Since the proximity of the Fort Mears landfill (North) to Unalaska Bay suggests that the onsite groundwater mixes with the marine environment, the groundwater sample results were also compared to ADEC marine criteria for surface water quality. Although most analytes were below the ADEC marine criteria for surface water quality, selenium existed at concentrations exceeding those ADEC values in some wells (Table 5). The seawater intrusion of the shallow aquifer and the distance to Unalaska Bay make it unlikely that selenium would directly discharge at a concentration above the standards for surface water quality. Although selenium existed in concentrations above cleanup criteria, the site does not pose an unacceptable risk to human health or the environment.

In 2000, two sediment samples were collected along the beach near the landfill. These samples came from an area below the mean high-tide mark during low tide. The samples were analyzed for DRO, RRO, PAHs, VOCs, and RCRA metals. Both samples contained lead above sediment guidelines and the calculated background concentration (10 mg/kg). One sample detected arsenic above sediment guidelines but below background concentrations (12 mg/kg). All other analytes were below the cleanup guidelines. Additional sediment sample collection occurred in 2001. The sediment samples collected in 2001 detected lead at concentrations below the sediment quality guideline. The elevated lead results detected during the 2000 field season probably reflect a sampling anomaly or naturally occurring background levels.

None of the contaminants detected at this site pose an unacceptable risk to human health or the environment.

**Table 5**

**Fort Mears Landfill (North)**

| Media | Parameter | Units | Cleanup Criteria[1,2,3] | Marine Surface Water Criteria[4] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|---|
| Soil | Arsenic | mg/kg | 4.5 | N/A | **19**[5] | 6/6[6] | FML-RI-05 (1997) |
| | Cadmium | mg/kg | 45 | N/A | **5**[5] | 0/6 | FML-RI-04 (1997) |
| | Chromium | mg/kg | 230 | N/A | **33**[5] | 0/6 | FML-RI-04 (1997) |
| | Selenium | mg/kg | 30 | N/A | **4**[5] | 0/6 | FML-RI-04 (1997) |
| | Silver | mg/kg | 190 | N/A | **126**[5] | 0/6 | FML-RI-04 (1997) |
| Sediment[7] | Lead | mg/kg | 30.2 | N/A | 3.25 | 2/5 | East 112206 (2001) |
| Groundwater[7] | Arsenic | mg/L | 0.5 | 0.036 | 0.0309 | 0/16 | FML-3 112702 |

| Media | Parameter | Units | Cleanup Criteria[1,2,3] | Marine Surface Water Criteria[4] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|---|
| | | | | | | (4/16 marine) | (2001) |
| | Selenium | mg/L | 0.5 | 0.071 | **0.115**[5] | 0/9 (7/9 marine) | FML-3 112702 (2001) |
| | Lead | mg/L | 0.15 | 0.0081 | Not detected | 0/12[7] (1/12 marine) | All Samples 2000 |
| | PCE | mg/L | 0.05 | N/A | 0.0009 | 0/9[7] (N/A marine) | FML-5 (2000) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and 10 times the migration-to-groundwater pathways.

[2] ADEC 18 AAC 75, 10 times Table C, Groundwater cleanup levels

[3] NOAA SQuiRT, NOAA HAZMAT Report 99-1, 1999.

[4] ADEC 18 AAC 70 surface water criteria

[5] Results in **bold** exceed standard cleanup criteria, but only arsenic in soil exceeded 10 times ADEC Method Two cleanup levels.

[6] Four soil samples exceeded the arsenic calculated background concentration (9.85 mg/kg), and none of these samples exceeded the calculated Method Three industrial cleanup level (19 mg/kg).

[7] Maximum remaining groundwater and sediment results represent the most recent sample results analyzed for a contaminant that previously exceeded a cleanup level.

Soil samples also were analyzed for DRO, RRO, VOCs, PAHs, and RCRA metals. Any detected concentrations not reported did not exceed ADEC Method Two or 10 times ADEC Method Two cleanup levels.

Groundwater samples also were analyzed for DRO, RRO, PCBs, PAHs, VOCs, and RCRA metals. Any detected concentration not reported did not exceed Table C cleanup levels.

N/A = not applicable

## Fort Mears Landfill (South)

Fort Mears Landfill (South) is a flat, open area located on the west side of Airport Beach Road (Figure 3). A 1944 map of the former NOB and aerial photography indicate that a WWII-era garbage dump was located at this site.

In 2000, soil samples collected and analyzed for DRO, RRO, PAHs, VOCs, and RCRA metals contained concentrations of DRO, carbon tetrachloride, arsenic, chromium, and lead concentrations above the ADEC Method Two cleanup levels. Site-specific Method Three cleanup levels were calculated using total organic carbon samples collected from the site. The maximum DRO (454 mg/kg) and carbon tetrachloride (0.0042 mg/kg) concentrations did not exceed the Method Three cleanup levels (832 mg/kg and 0.0567 mg/kg, respectively).

Concentrations of arsenic, chromium, and lead did not exceed their respective background concentrations. Sediment samples collected from the beach adjacent to the site were analyzed for DRO, RRO, PAHs, VOCs and RCRA metals to determine if any contaminant migration occurred towards the beach. Contaminants do not appear to be migrating from the landfill in concentrations that pose an unacceptable risk to human health and the environment.

The 2000 sampling event uncovered evidence that the site's use as a landfill continued well into the 1970s. It is necessary to identify other potentially responsible parties in order to perform additional work at this site. In the meantime, this site does not appear to pose an unacceptable risk to human health or the environment.

**Warehouse Building (UST 820)**

Building 820 was a former Warehouse Building located on the south shore of Margaret Bay, adjacent to the Ounalashka Corporation office building (Figure 3f). The intact building foundation served as the footprint for the Museum of the Aleutians, which opened in 1999.

In 1997, field activities revealed a 480-gallon steel UST near the former building. Water was pumped from the UST before removal of the UST from the site. Contaminated soil excavation occurred shortly after; the contaminated soil was thermally treated, confirmed clean, and then used as backfill.

Nine soil samples collected and analyzed for DRO, RRO, PAHs, and BTEX revealed that DRO concentrations exceeded the ADEC Method Two cleanup level (230 mg/kg) in three soil samples, with a maximum concentration of 11,000 mg/kg detected adjacent to the building foundation (Table 6). The DRO maximum concentration did not exceed the calculated Method Three cleanup level. All other analytes were below ADEC Method Two cleanup criteria.

**Table 6**

**Warehouse Building (UST 820)**

| Media | Analyte | Units | Cleanup Criteria[1,2] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Soil | DRO | mg/kg | 230 | **11,000** | 3/9 | 0820-05SO (1997) |
| Groundwater | No analytes exceeded cleanup criteria[2] | | | | 0/1 | 0820-14 (1997) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways

[2] ADEC 18 AAC 75, Table C, Groundwater cleanup levels

Soil samples also were analyzed for RRO, BTEX, and PAHs. Any detected concentrations did not exceed ADEC Method Two cleanup levels.

Groundwater sample was analyzed for DRO, RRO, BTEX, PAHs, total aromatic hydrocarbons, and total aqueous hydrocarbons.

Results in **bold** exceed cleanup criteria.

Two monitoring wells, MW820-01 and MW820-02 were installed between the excavation and Margaret Bay to determine if contamination migration offsite had occurred. One groundwater sample collected from MW820-02 and analyzed for DRO, RRO, PAHs, and BTEX, revealed that the concentrations of contaminants did not exceed ADEC Table C groundwater cleanup levels or ADEC standards for surface water quality.

**Comment [jsw2]:** Did we only collect one sample from one well? Why didn't we collect samples from both wells? 1997 report

Although the extent of contamination beneath the building foundation is uncertain, the presence of the foundation as a cap should serve to inhibit the migration of remaining contaminants. The absence of groundwater contamination indicates that no migration to groundwater is occurring. The concentrations of contaminants detected at this site do not pose an unacceptable risk to human health or the environment.

Figure 3a Former Fort Mears Public Works Garage (Building 484)

Figure 3b Fort Mears Gasoline Station/Post Office Area

Figure 3c Warehouse Tract D Area

Figure 3d Eagle Quality Center

Figure 3e Fort Mears Landfill (North)

Figure 3f Warehouse Building (UST 820)

4 x 5 ½? (2 per page)

**Management Area 7: Little South America**

The Little South America/Hill 400 area is located at the southern end of Amaknak Island (Figure 4). The Little South America area includes the former upper defensive positions on Hill 400 and the former Lower Service Facilities related to the Fort Mears NOB, including the area surrounding the Metal Shop and shoreline toward the barge area. This Decision Document addresses the FUDS-eligible sites in Management Area 7.

Figure 4 Management Area 7: Little South America

8 ½ x 11 (color)

**Little South America Drums**

The Little South America Drums where located at the dry lakebed in the drainage west of the former Mess Hall 1154 (Figure 4a).

In 1998, reconnaissance activities identified five empty, rusted 55-gallon drums and one newer, empty 55-gallon drum. In 2000, removal of the five rusted drums from the site was conducted; the sixth drum was already gone.

Four soil samples collected after drum removal were analyzed for DRO, GRO, RRO, PCBs, PAHs, VOCs, and RCRA metals. At three of the drum locations, arsenic was detected above the ADEC Method Two cleanup level, but below the calculated background concentration (9.85 mg/kg) (Table 7). All other analyte concentrations at three of the drum locations were below ADEC Method Two cleanup levels. A sample collected from the fourth drum location contained arsenic at a concentration of 10.0 mg/kg, slightly above the background concentration of 9.9 mg/kg. Selenium and chromium were also detected above ADEC Method Two cleanup levels and calculated background concentrations for this soil sample. Analysis of soil samples collected from the four drum locations also revealed 2-butanone at elevated concentrations. However, the VOC data was rejected during the data because the laboratory incorrectly used an assumed sample weight for a sample associated with methanol preservation.

In 2002, additional soil was removed from the immediate vicinity of the fourth drum location. Four soil samples, collected from the four drum locations, were analyzed for 2-butanone. The soil sample collected from the fourth drum location was also analyzed for RCRA metals. None of the analytical results exceeded the ADEC Method Two cleanup levels.

**Table 7**

**Little South America Drums**

| Media | Parameter | Units | Cleanup Criteria[1] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Soil | 2-Butanone | mg/kg | 53.2[2] | Not detected | 0/4[3] | All Samples (2002) |
| | Arsenic | mg/kg | 1.8 | **5** | 3/4[4] | Drum Location 1 (2000) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways.

[2] ADEC, 2001, Technical Memorandum 01-007

[3] Four samples from 2000 were rejected and are not included in this total.

[4] None of these samples exceeded the calculated soil background concentration for arsenic of 9.85 mg/kg.

2002 samples at Drum Location #4 are post-excavation.

Soil samples also were analyzed for DRO, RRO, GRO, PCBs, PAHs, VOCs, and RCRA metals. Any detected concentration not reported did not exceed ADEC Method Two cleanup levels.

Results in **bold** exceed cleanup criteria.

The total cumulative carcinogenic risk for this site ($4.0 \times 10^{-6}$) is less than the limit of $1 \times 10^{-5}$ allowed by ADEC. The cumulative hazard index for each exposure pathway is also less than the limit of 1.0. This site does not pose an unacceptable risk to human health or the environment.

Figure 4a LSA Drums and LSA Latrine 1

Figure 4b Building 1154

4 x 5 ½? (2 per page) (color)

**Building 1050 (Barracks)**

During site reconnaissance activities in 1998, a magnetic anomaly was detected near the south end of former Building 1050 (Barracks) (Figure 4). Two excavated test pits at Building 1050, in an attempt to locate a suspected UST, found no evidence of an UST or petroleum hydrocarbon contamination. Sample collection did not occur at this site.

In 2006, the Alaska Department of Transportation and Public Facilities excavated 18 cubic yards of DRO contaminated soil from or near this site during road and bridge realignment work. The soil was packaged and shipped off-Island for disposal. This work was not conducted under the FUDS program.

**Building 1128 (Garage)**

In 1998, a site survey showed a potential magnetic anomaly at the edge of an active rock quarry near the former location of Building 1128 (Figure 4). No evidence of a UST existed and no sample collection occurred. In 2000, another survey of the area by metal detector found no anomalies; therefore, no sample collection occurred at this site.

**Building 1245 (Mess Hall)**

In 1998, a site survey showed a potential magnetic anomaly at the edge of an active rock quarry near the former location of Building 1245 (Figure 4). No evidence of a UST existed, and no sample collection occurred. In 2000, another survey of the area by metal detector found no anomalies; therefore, no sample collection took place at this site.

**Building 1154 (Mess Hall)**

In 1998, an intact UST was discovered southwest of Building 1154, the former Mess Hall (Figure 4b). In 2000, the water was pumped from the tank and the surrounding contaminated soil was excavated to bedrock. Removal of the tank, along with three 30-foot sections of 0.5-

inch-diameter pipe, located to the east of the tank, occurred shortly after excavation activities. The excavated soil was thermally treated and used as backfill. Groundwater was not encountered during the excavation activities.

Soil samples collected and analyzed for DRO, RRO, PAHs, and BTEX revealed one sample with DRO at a concentration of 1,810 mg/kg, above the ADEC Method Two migration to groundwater cleanup level of 230 mg/kg (Table 8). However, groundwater was not encountered during site activities; therefore, the migration-to-groundwater pathway is not complete. The nearest surface water feature (Iliuliuk Harbor) is located approximately 600 feet east of Building 1154 and is not used for drinking water. It is unlikely that the remaining DRO contamination could migrate to groundwater or surface water in this area.

The remaining soil DRO concentration is less than the inhalation and ingestion cleanup criteria. All other analytes were either non-detect or below ADEC Method Two cleanup criteria. Any remaining contamination at this site is minimal and located in the bedrock fissures, making removal impractical. Therefore, this site does not pose an unacceptable risk to human health or the environment.

**Table 8**

**Building 1154**

| Media | Parameter | Units | Cleanup Criteria[1] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Soil | DRO | mg/kg | 230 | **1,810 J** | 1/6 | West Floor AM-A502502 (2000) |

**Notes:**

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways.

Soil samples were analyzed for RRO, PAHs, and BTEX. Any detected concentrations did not exceed ADEC Method Two cleanup levels.

Results in **bold** exceed cleanup criteria.

J = estimated value

**Little South America Latrine 1 UST**

In 1998, a partially buried fuel tank was discovered during reconnaissance activities. This tank resided next to the ruins of a Quonset-style latrine (Figure 4a). The tank contained 50 to 100 gallons of water and appeared to be perforated and rusty.

In 2000, in-place closure of the UST ensued due to the severity of the slope. Removal of approximately 55 gallons of water and sludge from the tank followed and the tank was then filled with clean soil. No soil excavation occurred during these activities. A soil sample collected from one foot below the UST and analyzed for DRO, RRO, PAH, and BTEX revealed DRO and RRO in one sample above ADEC Method Two cleanup levels at concentrations of 66,700 mg/kg and 9,330 mg/kg, respectively (Table 9). All other analytes were below ADEC Method Two cleanup criteria.

In 2001, further investigation of the Latrine 1 site was conducted to determine the amount of contamination in the area and if contaminant migration from the immediate vicinity of the UST had occurred. Four soil samples collected from two locations downgradient of the building foundation and analyzed for DRO and RRO indicated that petroleum hydrocarbon concentrations were below ADEC Method Two cleanup levels (Table 9). Based on these results, petroleum contamination at this site remains localized and does not appear to be migrating

The former latrine site is on a steep hillside in an undeveloped area. Groundwater was not encountered during either the 2000 or the 2001 activities and is not a drinking water source. Based on these factors, minimal exposure to DRO is likely, and the contaminants do not pose an unacceptable risk to human health or the environment.

**Table 9**

**Little South America Latrine 1 UST**

| Media | Parameter | Units | Cleanup Criteria[1] | Remaining Maximum Concentration | No. of Detections at or above Criteria/No. of Samples Analyzed | Sample Location/ID (Year) |
|---|---|---|---|---|---|---|
| Below UST Sample | | | | | | |
| Soil | DRO | mg/kg | 230 | **66,700 J** | 1/1 | Under Latrine 1 (2000) |
| | RRO | mg/kg | 8,300 | **9,330 J** | 1/1 | Under Latrine 1 (2000) |
| Downgradient Samples | | | | | | |
| Soil | DRO | mg/kg | 230 | 44 | 0/4 | LSALT1B 4' bgs 112202 (2001) |
| | RRO | mg/kg | 8,300 | 310 | 0/4 | LSALT1B 4' bgs 112202 (2001) |

Notes:

[1] 18 AAC 75, Table B1, Over 40-Inch Zone, most stringent of the inhalation, ingestion, and migration-to-groundwater pathways.

Soil samples below the UST also were analyzed for PAHs and BTEX. Any detected concentrations did not exceed ADEC Method Two cleanup levels.

Results in **bold** exceed cleanup criteria.

J = estimated value

## 2.8 CURRENT AND POTENTIAL LAND AND WATER USES

### 2.8.1 Land Use

Current and potential land use is based on how each land area is zoned. Management Area 2 is currently zoned as a marine-related/industrial area. Ounalashka Corporation currently owns surface rights and Aleut Corporation currently owns subsurface rights to this management area. Management Area 5 is currently zoned as a general commercial, marine-related industrial, and high-density residential area. Ounalashka Corporation, City of Unalaska, Aleutian Development Corporation, and Alaska International Properties Inc. currently own Management Area 5. Management Area 7 is currently zoned as a marine-related industrial area and is owned by Ounalashka Corporation and the City of Unalaska.

### 2.8.2 Groundwater Use

Currently, drinking water is supplied by the City of Unalaska from surface and groundwater sources on Unalaska Island. Additionally, a City of Unalaska ordinance requires that facilities within 300 feet of a sewer line connect to the sewer system. Therefore, facilities would connect to the city water supply as well. Any groundwater discharging into surface water must still meet the water quality standards for surface water per 18 AAC 70 (ADEC 2006b).

## 2.9 SUMMARY OF SITES RISKS

Contaminant concentrations in soil, sediment, groundwater, and surface water samples collected at the 14 sites were compared to federal- and state-established criteria to screen to determine the risks to human health and the environment. This section discusses the impact of the concentrations of contaminants detected during site activities.

### 2.9.1 Summary of Human Health Risk Evaluation

The baseline risk evaluation estimates what risks the site poses with no actions taken. This section summarizes the results of the human health risk screening for this site. Total cumulative risk was not calculated because no carcinogenic compounds were detected in the analytical samples at any time at levels exceeding cleanup criteria. To complete the risk screening, the maximum chemical concentrations detected in soil, sediment, groundwater, and surface water samples collected at this site were compared to state-established criteria to screen for risks to human health and the environment. The ADEC standards published in 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control* (ADEC 2006a), are risk-based and used as risk benchmarks. The cleanup levels address both short-term (acute) and long-term (chronic) risks associated with the sites. Tables 1 and 2 presents the COCs detected in soil and groundwater at concentrations greater than regulatory limits, the maximum concentration detected, the appropriate regulatory limit, and the source of the regulatory limit.

### 2.9.2 Summary of Ecological Risk Evaluation

An evaluation of ecological risks indicates a small potential for ecological impacts to occur. This region is a heavily used industrial and marine area, which may limit habitat suitability for terrestrial and marine organisms. Both aquatic and terrestrial receptors may encounter marine surface water and sediment; however, the contaminated region is relatively small in comparison to the home ranges of the target terrestrial ecological receptor habitats. Comparisons of sediment contaminant concentrations to related benchmarks indicate that adverse effects to sediment-dwelling marine organisms are not expected.

### 2.9.3 Basis for Response Action

The investigations completed at the 14 sites verified that contaminated soil and groundwater might present an unacceptable risk to human health or the environment at one site (Margaret Bay 28 USTs). The remaining sites do not pose an unacceptable risk to human health or the environment. The response actions selected in this Record of Decision are necessary to protect the public health from actual or threatened releases of hazardous substances into the environment.

## 2.10 REMEDIAL ACTION OBJECTIVES

The primary remedial action objective (RAO) for these sites was to reduce contaminant concentrations below regulatory cleanup levels. The reduction in contaminant concentration will reduce cumulative risk.

Risk-based federal and state standards are used to define the cleanup levels for the sites. Contaminant concentrations in soil, sediment, and groundwater samples collected at the sites require comparison to federal- and state-established criteria to evaluate the remaining risk to human health and the environment.

## 2.11 DESCRIPTION OF ALTERNATIVES

This Decision Document evaluates three alternatives for the 14 sites identified herein. This section presents a description, common elements, and distinguishing features, expected outcomes, and comparative analysis of each alternative.

### ALTERNATIVE 1: NO FURTHER ACTION

*Estimated Total Costs: $0*
*Estimated Annual Operations and Maintenance (O&M) Cost: $0*
*Estimated Construction Timeframe: None*

Alternative 1 applies to sites that do not have contaminant concentrations exceeding ADEC cleanup levels or background levels, or to sites where no contamination was found. No further action is necessary beyond the investigation already completed because the established cleanup levels are risk-based and protective of human health and the environment.

Alternative 1 also applies to sites that are not eligible for cleanup under the FUDS program and sites that may involve other responsible parties. For sites that are not eligible for cleanup under the FUDS program, no further action is required. For sites involving other responsible parties, no work progresses at these sites unless an agreement between parties occurs. At this time, no further remedial action is required.

### ALTERNATIVE 2: CONDITIONAL SITE CLOSURE

*Estimated Total Costs: $5K*
*Estimated Annual O&M Cost: $0*
*Estimated Construction Timeframe: None*
*Estimated Time to Achieve RAOs: None*

Alternative 2 applies to sites that have concentrations remaining at levels exceeding ADEC Method Two soil cleanup levels or Table C groundwater cleanup levels. However, the sites are recommended for closure because alternative cleanup levels are applicable and are protective of human health and the environment, remaining contamination is minimal or at depth, or contamination does not appear to be migrating offsite. Alternative cleanup levels

may apply if the site does not zone for residential use and commercial exposure assumptions are used. In other cases, onsite groundwater is not a likely or potential future source of drinking water; therefore, 10 times the cleanup level allows for comparison. In cases of residual contamination, the contamination shall assist in future land management planning to minimize risk and potential exposure to site contaminants. A minimal cost to document the planning approach is associated with this alternative.

ALTERNATIVE 3: EXCAVATION AND DISPOSAL
*Estimated Total Costs: Site dependent (see individual site estimates listed below)*
*Estimated Annual O&M Cost: $0*
*Estimated Construction Timeframe: 2 months*
*Estimated Time to Achieve RAOs: 2 months*

Alternative 3 includes excavation and offsite transportation and disposal of contaminated soil. Excavation of contaminated soil would continue until the remaining soil meets the applicable regulatory cleanup levels (ADEC Method Two of 18 AAC 75 and ADEC Technical Memorandum 01-007). Table 10 provides an approximate quantity of soil excavation per site. Contaminated soil would be excavated using conventional equipment and placed in DOT-approved containers for off-island shipment to an appropriate disposal facility. An approved waste disposal facility for this soil has not been determined at this time. Confirmation soil samples will be used to ensure soil remaining in the ground is below applicable regulatory cleanup levels. After confirmation soil samples confirm the achievement of cleanup goals, the excavation would be backfilled with clean soil.

Alternative 4: Monitored Natural Attenuation
*Estimated Total Costs: $$$*
*Estimated Annual O&M Cost: $0*
*Estimated Construction Timeframe: 2 weeks*
*Estimated Time to Achieve RAOs: 20 years*

Alternative 4 is a limited-action alternative. This alternative may apply to sites with contamination remaining in the groundwater aquifer

at levels exceeding the ADEC Table C groundwater cleanup levels. Additionally, groundwater contaminant concentrations would need to be stable or declining over time, with no migration off site. This alternative would involve the installation of a network of groundwater monitoring wells to delineate the contaminant plume, evaluate groundwater flow, and provide information about the background and in-plume geochemical environment. A downgradient sentry well (or wells) would verify the absence of contaminant migration. If contaminants are present primarily below the water table rather than in a smear zone at the water table, the rate of natural attenuation may also be predicted from the geochemical and hydrologic data. For sites with contaminated smear zones, geochemical data can verify that degradation is occurring, but the complex interaction of such zones with groundwater is not readily quantifiable, and the rate of natural attenuation would be best determined empirically through periodic monitoring. Long-term monitoring would be a component of this alternative, serving to demonstrate continued degradation at the expected rate and continuing to verify the absence of off-site migration.

## 2.12 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section evaluates the relative performance of each alternative against the others in accordance with the nine-evaluation criterion criteria set forth in the NCP.

Nine criteria are used to evaluate the different remediation alternatives individually and against each other to select a remedy. This section of the Decision Document profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration.

**1. Overall Protection of Human Health and the Environment**

All of the alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risks through land management practices, treatment, and/or engineering controls. Alternative 2 (Conditional Closure) would leave residual contamination above ADEC Method Two cleanup levels at some of the sites. However, the risk associated with Alternative 2 is considered acceptable because the volume of remaining contamination is either very small, below the ground surface, or in locations that are not easily accessed. Under Alternative 2, contaminant of concern management occurs according to site-specific, risk-based levels. Alternative 3 (Excavation and Disposal), would provide more protection by removing the contaminated soils. Alternatve 4 (MNA) All alternatives received consideration when choosing the appropriate Preferred Alternative for each site.

**2. Compliance with Applicable or Relevant and Appropriate Regulations**

All selected remedial actions comply with state and federal laws and regulations except for Alternative 1. Alternative 2 (Conditional Closure) meets all applicable risk-based standards (specifically for petroleum hydrocarbons) because even though small volumes of contamination remain at depth and at concentrations above ADEC Method Two cleanup levels, no unacceptable risk exists as long as soil with residual contamination is managed properly. Method Three cleanup levels may apply. Alternative 3, 4

**3. Long-Term Effectiveness and Permanence**

Land management planning would be included as a component of Alternative 2 (Conditional Closure) to ensure long-term effectiveness and permanence. Alternative 3 (Excavation and Disposal) would be effective and permanent in that it would remove the contaminated soil from the sites. Both Alternatives will maintain protection of human health and the environment over time. Alternative 1 (No Further Action) would not provide any degree of

long-term protection for sites with residual contamination but is applicable where contamination concentrations are less than cleanup levels. Alternative 4

**4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment**

Alternative 1 (No Further Action) and Alternative 2 (Conditional Closure) do not include additional treatment and therefore would not reduce toxicity, mobility, or volume of contaminants. Alternative 3 (Excavation and Disposal) would reduce the inherent hazards posed by the contaminants at the site to or below applicable site cleanup levels and would reduce toxicity, mobility, and volume by removing contaminated soil. Alternative 4

**5. Short-Term Effectiveness**

This criterion evaluates the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation. Workers conducting remedial actions are required to wear protective clothing and equipment to minimize potential exposure.

Alternative 1 (No Further Action) and Alternative 2 (Conditional Closure) would be completed immediately, as no further construction activities are necessary. No exposure to hazardous substances would occur to workers, residents, and the environment under either alternative.

Alternative 3 (Excavation and Disposal) would be completed in approximately 2 months. This alternative would involve excavation of contaminated soil and thus present a potential for short-term exposure to site workers. Minimizing risks to the community occurs through notices, signage, and covered loads during transport along with construction fencing. Normal protective measures for the workers, including HAZWOPER training and the use of personal protective equipment, will reduce worker risks to acceptable levels. Alternative 4

**6. Implementability**

Alternative 1 (No Further Action) and Alternative 2 (Conditional Closure) would be the easiest to implement as no further remedial action would be required. Alternative 3 (Excavation and Disposal) would require mobilization of excavation equipment and materials to the site; however, these services are readily and commercially available. Alternative 4

**7. Cost**

The estimated costs of Alternative 3 (Excavation and Disposal) are greater than the costs of Alternative 1 (No Further Action), Alternative 2 (Conditional Closure), and Alternative 4 (MNA). Sites where excavation is a feasible alternative contain minimal, localized, or inaccessible contamination that does not appear to be migrating and/or posing an unacceptable risk to human health or the environment; therefore, the additional costs of Alternative 3 do not support the benefits. The estimated cost bases on similar work completed at the site in 2005. The costs reflect projected 2007 prices. There are no costs associated with Alternative 1 and minimal costs for Alternative 2.

**8. State/Support Agency Acceptance**

The State of Alaska supports the selected remedy.

**9. Community Acceptance**

Community acceptance of the Preferred Alternative evaluation occurred after the public comment period ended. Documentation resides in Section XX of this Decision Document.

## 2.13 SELECTED REMEDY

Based on the information available at this time, the Alaska District and ADEC believe the selected remedies would protect human health and the environment, comply with cleanup requirements, be cost effective, and utilize permanent solutions and alternative technologies to

the maximum extent practicable. There are two Selected Remedies for the sites discussed in this Decision Document. Table X summarizes the selected remedy for each site by Management Area.

**Table X**

**Summary of Selected Remedies and Basis for Selection**

| Management Area | Location | Basis for Selection |
|---|---|---|
| **Alternative 1 (No Further Action)** | | |
| 5: Margaret Bay and Former Fort Mears Garrison | Fort Mears Landfill (South) | No further work can be completed under the FUDS program at this site unless an agreement between potentially responsible parties is reached. |
| | Fort Mears Gas Station/Post Office Area | Contaminant concentrations after excavation were less than cleanup levels. None of the contaminants at this site poses an unacceptable risk to human health or the environment. |
| | Warehouse Tract D Area | Contaminant concentrations found were less than cleanup levels. None of the contaminants at this site poses an unacceptable risk to human health or the environment. |
| 7: Little South America | Little South America Drums | Remaining contamination is less than cleanup levels and/or background levels. Contaminants detected at this site do not pose an unacceptable risk to human health or the environment. |
| | Building 1050 (Barracks) | No evidence of petroleum hydrocarbon contamination. |
| | Building 1128 (Garage) | No evidence of petroleum hydrocarbon contamination. |
| | Building 1245 (Mess Hall) | No evidence of petroleum hydrocarbon contamination. |
| **Alternative 2 (Conditional Closure)** | | |
| 5: Margaret Bay and Former Fort Mears Garrison | Fort Mears Public Works Garage (Building 484) | All contaminant concentrations are below cleanup levels except arsenic and chromium. None of the contaminants at this site poses an unacceptable risk to human health or the environment. |
| | Fort Mears Landfill (North) | Soil and groundwater contamination levels are below ADEC Method Two cleanup levels, with the exception of arsenic, which is below Method Three cleanup levels. None of the contaminants at this site poses an unacceptable risk to human health or the environment. |

| Management Area | Location | Basis for Selection |
|---|---|---|
| | Warehouse Building (UST 820) | Remaining contamination is below the building foundation and is below Method Three industrial cleanup levels. None of the contaminants at this site poses an unacceptable risk to human health. |
| | Building 1154 (Mess Hall) | Remaining contamination is minimal, and the source has been removed to the extent practicable, making excavation a cost-prohibitive alternative. Contaminants detected at this site do not pose an unacceptable risk to human health or the environment. |
| 7: Little South America | Little South America Latrine 1 UST | Remaining contamination is minimal, localized, and does not appear to be migrating. No indication exists that this site poses an unacceptable risk to human health or the environment. |
| | Fort Mears Hospital UST | Remaining contamination is below ground surface and is inaccessible. There is no indication that this site poses an unacceptable risk to human health or the environment. |
| **Alternative 4 (Monitored Natural Attenuation)** | | |
| 5: Margaret Bay and Former Fort Mears Garrison | Margaret Bay 28 USTs (Building 884) | Contaminant concentrations did not exceed the ADEC 10-times rule and do not appear to be accessible or migrating. No indication exists that this site poses an unacceptable risk to human health or the environment. MNA |

### 2.13.1 Summary of the Rationale for the Selected Remedy

This section expands on the selected remedy details provided in the description of alternatives (Section 2.13).

### 2.13.2 Description of the Selected Remedies

**No Further Action**

The Alaska District has selected No Further Action for the seven sites listed in Table X. The sites recommended for No Further Action are either not eligible for cleanup under the DERP-FUDS program or residual soil contamination is below ADEC Method Two cleanup criteria,

therefore there is no need to utilize alternative technologies to address the remaining contamination at these sites.

**Conditional Closure**

The Alaska District has selected Conditional Closure for the six sites listed in Table X. These sites have concentrations of contaminants at levels that exceed ADEC Method Two soil cleanup levels or Table C groundwater cleanup levels. The sites are recommended conditional for closure because alternative cleanup levels are applicable and protective of human health and the environment, remaining contamination is minimal or at depth, or contamination does not appear to be migrating offsite.

**Monitored Natural Attenuation**

The Alaska District has selected Monitored Natural Attenuation for one site listed in Table X. Further investigation of groundwater is warranted at this site to determine if contamination detected in the soil has migrated to groundwater sources.

### 2.13.3 Summary of Estimated Remedy Costs

Costs reflect 2006 pricing compiled during generation of the Proposed Plan (USAED 2007).

### 2.13.4 Expected Outcomes of the Selected Remedies

The selected remedies indicate that no further investigation or cleanup is necessary to address chemical contamination from past DoD activities at these sites. The 14 sites are available for the continued use for which they zone.

### 2.13.5 Reopen Clause

Under 18 AAC 75.380(d)(1), ADEC may require additional cleanup action if new information is discovered that leads ADEC to make a determination that the cleanup described in this Decision Document is not protective of human health, safety, or welfare or of the environment.

### 2.13.6 Statutory Determinations

Selected remedies must:

- Be protective of human health and the environment
- Comply with federal and state requirements (unless a waiver is justified)
- Be cost effective
- Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable

Remedies that employ treatments that permanently and significantly reduce the volume, toxicity, or mobility of contaminants as a principal element receive preference. The following subsections discuss how the selected remedies meet these statutory requirements and describe regulatory input during the cleanup process.

**Protection of Human Health and the Environment**

The soil and groundwater cleanup goals used to evaluate onsite levels of contaminants are risk-bases and established in accordance with 18 AAC 75. The Alaska District and ADEC believe that no substantial risk will be associated with use of the site once RAOs exist. Groundwater shall meet criteria for surface water quality as established in 18 AAC 70 where groundwater has a direct connection with surface water.

**Compliance with Requirements**

The selected remedies of No Further Action, Conditional Closure, and Monitored Natural Attenuation would achieve chemical-specific cleanup criteria or regulations. There are no

location- or action-specific criteria or regulations associated with the selected remedies. The selected remedies do not require any waivers for compliance with applicable or relevant and appropriate requirements.

**Cost Effectiveness**

There are no associated costs with the No Further Action remedy. In the judgment of the Alaska District, the Conditional Closure and Monitored Natural Attenuation remedies are cost effective and represent a reasonable value for the money spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). The overall effectiveness of the selected remedy is determined to be proportional to its cost, and represents a reasonable value for the money spent.

**Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Possible**

There are no treatment technologies associated with the selected remedies.

**Preference for Treatment as a Principal Element**

The primary constituents of concern at the 14 sites addressed in this Decision Document do not use treatment technologies because treatment was not a practicable response to the level and type of contamination present at the site.

**Five-Year Review Requirement**

A 5-year review is not mandated.

**Documentation of Significant Changes**

*Proposed Plan No. 5* (USAED 2007) was released for public comment in September 2001. This document described the SI, RI, IRA, and cleanup work and identified the preferred

alternatives at 14 sites — No Further Action, Conditional Closure, or Monitored Natural Attenuation.

The public received 30 days to provide comments pertaining to the selected remedial alternative. A public meeting convened on 2 July 2008, at the Unalaska City Hall.

Responses to all comments received on *Proposed Plan No. 5* reside in the Responsiveness Summary in Part 3 of this Decision Document. No significant changes to the selected remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

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## PART 3: RESPONSIVENESS SUMMARY

## PART 4: REFERENCES

**APPENDIX A**

**Conceptual Site Model Scoping Form**