Proposed Plan for Former Adak Naval Complex, Adak Island, Alaska
Proposed Cleanup of Area 303

August 2011

INTRODUCTION

(Note: Technical terms used in this plan are italicized where they are first used and defined in the Glossary section at the end of the plan.)

This Proposed Plan proposes the preferred cleanup alternative for Area 303 at the former Adak Naval Complex, Adak Island, Alaska. This Proposed Plan was developed in accordance with State of Alaska regulations governing petroleum-release sites, the Alaska Department of Environmental Conservation (DEC) Oil and Other Hazardous Substances Pollution Control Regulations (18 Alaska Administrative Code [AAC] Chapter 75). This Proposed Plan is being issued by the Navy, the lead agency for site activities. Alaska DEC is the lead regulatory agency at the site. This document summarizes information that can be found in greater detail in revision 1 of the final focused feasibility study (FFS) report for Area 303 and other relevant documents referenced in this Proposed Plan. The Navy encourages the public to review the final FFS report and other relevant documents to increase their understanding of the site and the activities that have been conducted there. The final FFS report and other relevant documents cited in this Proposed Plan are available in the information repositories listed on the sidebar of this page.

The public is encouraged to review and comment on this Proposed Plan. The Navy, in consultation with the Alaska DEC, may modify any of the cleanup alternatives, including the preferred cleanup alternative, based on public comments or new information. Following consideration of public comments, the final decision for Area 303 will be presented in a *Decision Document* (DD). The DD will include a responsiveness summary describing how public comments were addressed.

The Proposed Plan has the following purposes:

- Provide basic background information
- Describe the cleanup options that were evaluated
- Identify the preferred cleanup alternative for remedial action
- Explain the reasons for recommending the preferred cleanup alternative
- Solicit public review of and comment on all the cleanup alternatives
- Provide information on how the public can be involved in the remedy selection process

Contents

Dates to Remember:

PUBLIC COMMENT PERIOD:
August 16 through September 15, 2011

The U.S. Navy will accept written comments on the Proposed Plan during the public comment period.

For more information, see the information repositories at the following locations:

Bob Reeve High School
Mechanic Road
Adak Island, AK 99546
(907) 592-4500

Library Reserve Room
University of Alaska, Anchorage
3211 Providence Drive
Anchorage, AK 99508
(907) 786-1871

Naval Facilities Engineering Command Northwest Website:
https://portal.navfac.navy.mil/portal/page/portal/NAVFAC/NAVFAC_WW_PP/NAVFAC_EFANW_PP

SITE BACKGROUND

The former Adak Naval Complex is located on Adak Island, which is approximately 1,200 air miles southwest of Anchorage, Alaska, in the Aleutian Island chain (Figure 1). Figure 2 shows the location of Area 303 on Adak Island. The former U.S. Navy base occupied 76,800 acres on the northern half of the island. The U.S. Fish and Wildlife Service manages the southern portion of the island, which is a designated wilderness area within the Alaska Maritime National Wildlife Refuge System.

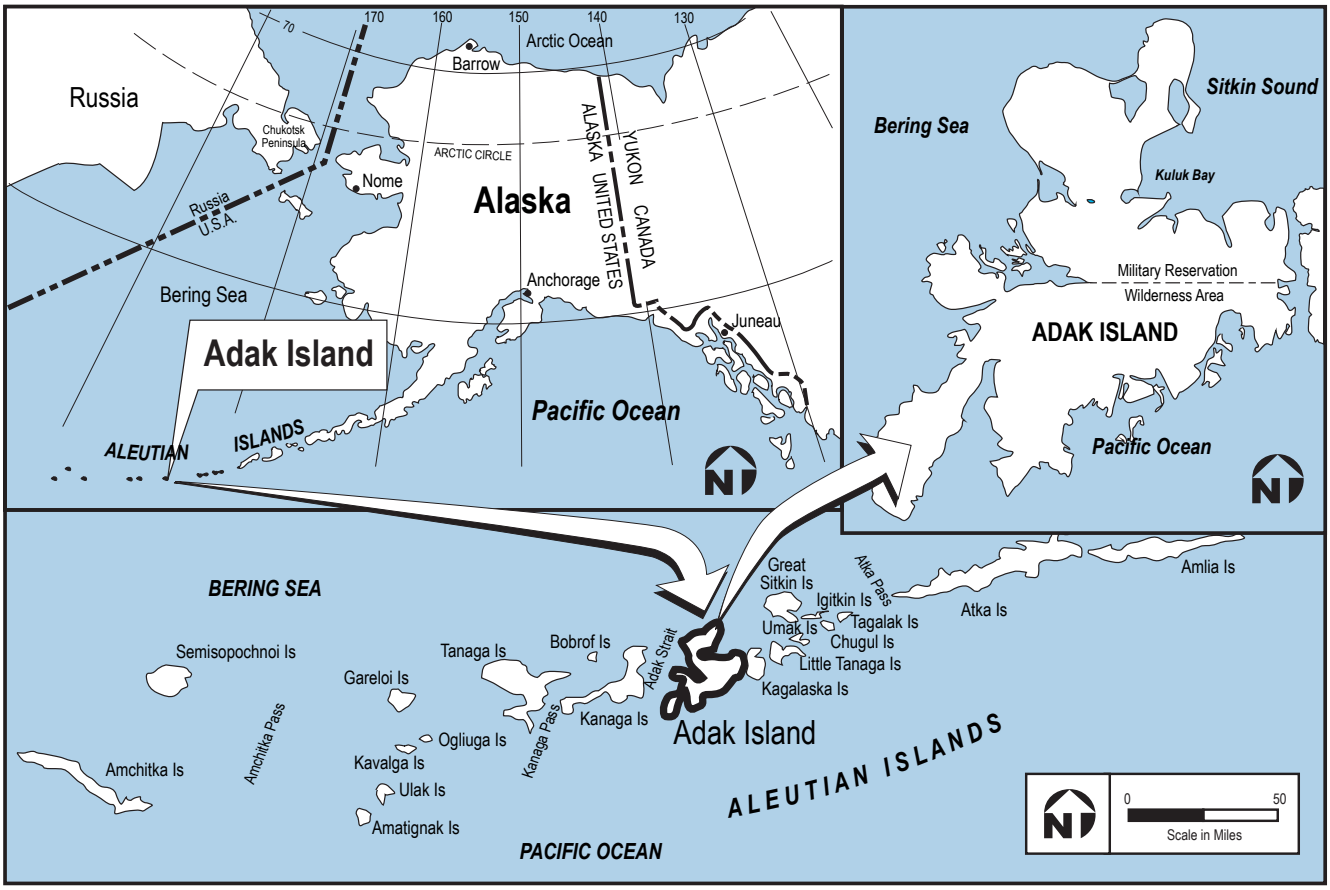


Figure 1 – Adak Island and Vicinity

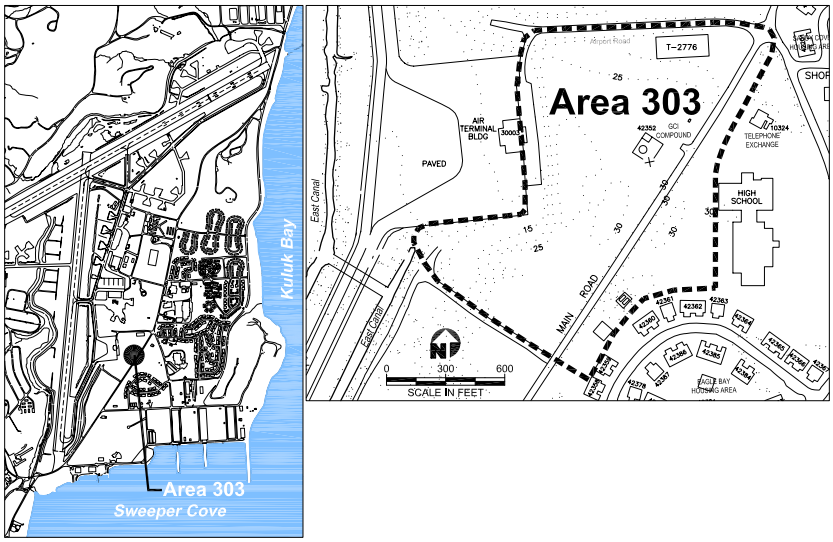


Figure 2 – Site Location and Vicinity, Area 303

All Navy operations ceased at the former Adak Naval Complex on March 31, 1997, when the active Navy mission ended. From April 1997 through September 2000, critical facilities such as the power plant, airfield, and environmental cleanup systems were operated by the Navy through a caretaker contractor. In June 1998, the Navy leased the downtown area and facilities to the Adak Reuse Corporation (ARC). In October 2000, ARC began operation of community facilities such as the airfield and utility systems.

In September 2000, the federal government entered into a *land transfer agreement* with The Aleut Corporation (TAC), an Alaska Native corporation. This agreement set forth the terms and conditions for the conveyance of approximately 47,000 acres of the former Adak Naval Complex property to TAC. The actual conveyance, or transfer, of property occurred on March 17, 2004. The land transfer includes all of the downtown area, housing units, and industrial facilities. The transferred land has *institutional controls* currently in place that limit exposure to chemical *contamination*. The institutional controls include a requirement to notify the Navy of soil excavation activities, groundwater restrictions that prohibit use of the downtown *aquifer* as a drinking water resource, and a fish consumption advisory. The soil excavation notification requirement and the groundwater use restriction are applicable to Area 303. TAC currently owns Area 303.

The Navy established a community involvement program in 1994 to provide Adak residents and other interested Alaska citizens with timely and updated information on the environmental cleanup and the transfer and reuse of Navy land and facilities. The community involvement program also provides a mechanism for public input on environmental cleanup decisions. Information is conveyed to the public via fact sheets and newsletters; Restoration Advisory Board (RAB) meetings and other formal public meetings; a web site (www.adakupdate.com); information repositories on Adak Island (Bob Reeve High School building, second floor) and in Anchorage (University of Alaska library's reserve room); the Naval Facilities Engineering Command Northwest website: https://portal.navfac.navy.mil/portal/page/portal/ NAVFAC/NAVFAC_WW_PP/NAVFAC_EFANW_PP; and the *Administrative Record* file located at Naval Facilities Engineering Command Northwest, Silverdale, Washington. In addition, a mailing list is maintained and updated in order to send concerned citizens, newsletters, fact sheets, and announcements of upcoming meetings and significant activities, such as public comment periods. Public input is obtained through RAB meetings and other formal public meetings, community interviews, requests for public comments, and a telephone hotline.

Various environmental field investigations were performed by the Navy in the vicinity of Area 303 between 1988 and 2010, as summarized in Table 1. Investigations of Area 303 were performed in 2006 and 2010. In addition, several investigations were conducted at the petroleum-release sites located within the Area 303 boundaries or immediately adjacent to Area 303. These sites include the following:

- General Communications, Inc. (GCI) Compound, Underground Storage Tank (UST) GCI-1
- Telephone Exchange Building, UST 10324-A
- Source Area (SA) 79, Main Road Pipeline
- Solid Waste Management Unit (SWMU) 62, New Housing Fuel Leak

Results of these investigations indicated that petroleum-related chemicals, primarily *gasoline-range organics* (GRO), and some *volatile organic compounds* were present in samples of subsurface soil, *soil vapor*, and groundwater collected from various locations near Area 303. However, the specific petroleum sources addressed in this Proposed Plan were not identified until 2003.

Potential sources of the petroleum *hydrocarbons* present at the site are identified on Figure 3. Based on the results of the 2006 remedial investigation and the 2009 pipeline integrity testing, the source of GRO was likely the aviation gasoline (avgas) pipeline distribution system formerly used to provide fuel to truck fuel stands along the airfield and to transfer fuel from the former Fuel Dock No. 7 to Tank Farm B. The other fuel pipelines shown on Figure 3 (diesel and jet petroleum No. 5 [JP 5]) are not considered potential sources of the GRO compounds, because these pipelines were used to transport heavier petroleum hydrocarbon chemicals within the grouping commonly referred to as *diesel-range organics* (DRO).

No cleanup activity has been implemented at Area 303. However, the Navy has completed decommissioning of six pipelines in the downtown area, including the avgas and JP-5 pipelines discussed above. Decommissioning work included integrity testing using a vacuum test; draining, cleaning, and filling the pipelines with grout; removing all aboveground sections of pipeline, valve sheds, valves, and controls; and removing all belowground low-point drains, high-point vents, and valve pits/vaults. Pipeline

Table 1 – Summary of Environmental Field Investigations, Area 303

Date	Investigation Area	Investigation Activity
1988-1989	SWMU 62, New Housing Fuel Leak	Release investigation was conducted to identify and repair petroleum leaks in the fuel distribution system at the site, evaluate the extent of petroleum fuel released, and initiate product recovery.
1994	Main Road Pipeline	Release investigation was conducted to evaluate the extent of fuels released in the vicinity of the Main Road Pipeline.
1995	GCI Compound, UST GCI-1	UST, piping, and dispenser were removed. Free-phase petroleum product was observed during tank removal.
1995	Telephone Exchange Building, UST 10324-A	UST and piping were removed. Free-phase petroleum product was not encountered during excavation.
1999	SWMU 62, New Housing Fuel Leak	Free-product recovery closure report was prepared to demonstrate that the existing free-product recovery system has recovered product to its practicable endpoint
2001 - ongoing	Main Road Pipeline	Limited groundwater monitoring activities were performed. Monitoring activities north of Airport Road were discontinued in 2005 because concentrations of chemicals of concern met endpoint criteria. Monitoring activities south of South Sweeper Creek are continuing.
2002-2003	Area 303	Evaluation of groundwater monitoring program and field investigation of groundwater beneath Area 303 were performed.
2006	Area 303	Remedial investigation was performed to delineate the lateral extent of dissolved-phase, petroleum-related chemicals in the groundwater, including a survey of pipelines within Area 303, and to evaluate conditions for human health and ecological risk assessment.
2010	Area 303	Soil vapor investigation conducted to provide data for a supplemental human health risk assessment that included evaluation of the possible vapor intrusion pathway for all categories of land use, including residential.

Notes:
SWMU - solid waste management unit
UST - underground storage tank

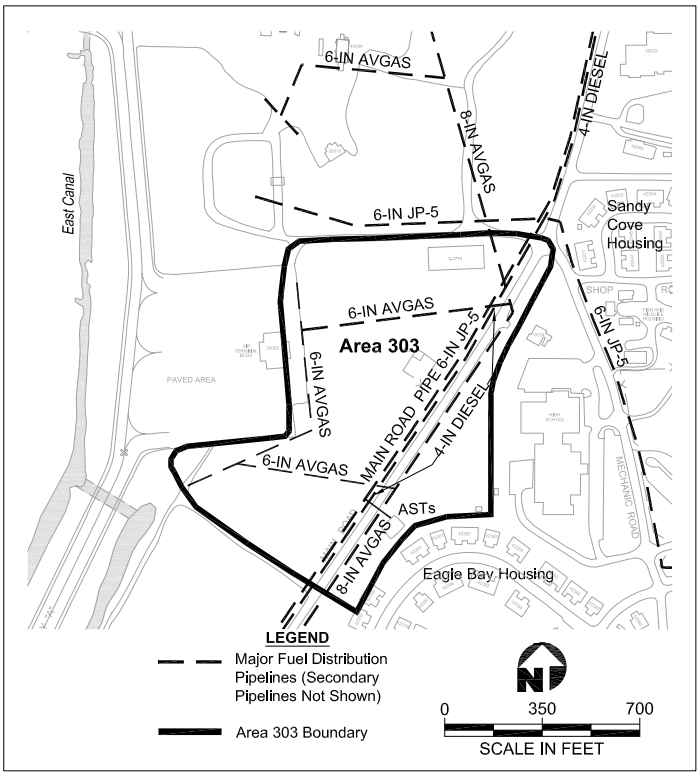


Figure 3 – Potential Petroleum Sources at Area 303

integrity testing results indicated that sections of the 8-inch diameter avgas pipeline and its 6-inch diameter branch were compromised, and therefore it is highly likely that they had leaked. Both of these sections are located in the northern portion of Area 303. This decommissioning work was completed in September 2009. The diesel pipeline was decommissioned prior to 2009.

REGULATORY HISTORY

Investigation and cleanup of petroleum-contaminated sites at the former Adak Naval Complex have been ongoing since 1986. Adak was initially proposed for placement on the *National Priorities List* in 1992 and was officially listed in 1994. The Navy, as lead agency, entered into a three-party *Federal Facilities Agreement* (FFA) with the U.S. Environmental Protection Agency (EPA) and Alaska DEC and a two-party *State-Adak Environmental Restoration Agreement* (SAERA) with the Alaska DEC to facilitate investigation and cleanup activities.

In 1993, the Navy, EPA, and Alaska DEC signed the FFA, which incorporated the EPA's cleanup process under the *Comprehensive Environmental Response, Compensation,*

and Liability Act of 1980 (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act of 1986* (SARA). The CERCLA exclusion of petroleum as a hazardous substance required that cleanup of petroleum-related chemicals would follow State of Alaska regulations. Therefore, the FFA stated that petroleum-contaminated sites, such as those containing USTs and leaking underground fuel lines, would be evaluated under a separate two-party agreement between the Navy and the State of Alaska. This agreement, the SAERA, was signed in April 1994.

In May 1997, the Navy and Alaska DEC agreed to integrate the cleanup decision process for petroleum sites with the cleanup decision process being conducted for hazardous-substance-release sites under CERCLA. As a result, the *Record of Decision* (ROD) for *Operable Unit* A (OU A) was prepared for both the petroleum-contaminated sites and the hazardous-substance-release sites and signed by the Navy, EPA, and Alaska DEC in 2000.

Area 303 was not one of the 128 petroleum-contaminated sites included in the OU A ROD. Area 303 was identified after the OU A ROD was signed during a U.S. Geological Survey (USGS) investigation performed to monitor *natural attenuation* of petroleum in groundwater in the downtown area. This USGS investigation was conducted during May and June 2003 and included collection of groundwater samples from locations between GCI Compound, a known petroleum-release site included in the OU A ROD and the subsequent DD for 10 sites, and the East Canal. The chemical analyses conducted on these samples identified the presence of GRO at concentrations that greatly exceeded the concentrations observed in the GCI Compound source area. As a result, USGS concluded that a second overlapping GRO plume, which had not been previously identified, existed in the vicinity of GCI Compound. The Navy subsequently conducted an investigation of the newly identified Area 303 to characterize the GRO release and prepared an FFS. This Proposed Plan addresses this newly identified site.

SITE CHARACTERISTICS

PHYSICAL CHARACTERISTICS THAT IMPACT REMEDY SELECTION

Adak Island experiences a polar maritime climate characterized by persistently overcast skies, high winds, frequent and often violent storms, and a narrow range of temperature fluctuation throughout the year. The average total annual precipitation for Adak Island is about 60 inches, most of which falls as rain in the lower elevations. Average monthly precipitation varies from a low of about 3 inches during June and July to a high of 7 to 8 inches during November and December. Snowfall averages over 100 inches a year at sea level.

Prior to the military use of Adak Island during World War II, the western portion of the downtown area, was occupied by a back-beach lagoon. The lagoon was separated from Kuluk Bay by a series of sand dunes. The lagoon was filled with sand from dune deposits by the military forces to construct the airfield. The sand dunes were leveled to create the relatively flat area occupied by downtown Adak today, including Area 303. Area 303 is believed to be situated near the eastern shoreline of the former lagoon, outside of the fill area.

The geology and hydrogeology at the site are characterized by sandy soils derived from stream, wind, and wave action. The subsurface soils have variable *permeability* and generally consist of sands and gravels with occasional layers of organic silt and clay. The saturated sands typical in the downtown portion of Adak Island have a high water-bearing capacity. The organic silts and clays have low water-bearing capacity and typically cause shallow water in the subsurface to pond above the primary aquifer as small, perched groundwater zones.

Groundwater is found beneath the site at depths ranging from approximately 10 feet below ground surface (bgs) to as much as 30 feet bgs. Groundwater is found as both a perched (laterally discontinuous) and a regional aquifer beneath the site. Perched groundwater collects on top of the lower permeability, organic-rich silt layers, generally at depths of approximately 10 feet bgs. Below the discontinuous perched water zone, the regional aquifer occurs as a broad, continuous aquifer at depths ranging from approximately 10 feet bgs near the East Canal to 30 feet bgs in the eastern portion of the site. Groundwater in the regional aquifer generally flows west toward the East Canal of the airport ditch system. The groundwater flow pattern in the vicinity of the airfield is controlled by the water levels in the airport ditch, which fluctuate within a small range as a result of ditch pumping.

The closest surface water body in the vicinity of Area 303 is the East Canal of the airport ditch system. A portion of the East Canal is located at the southwestern boundary of Area 303 (Figure 2). The East Canal is an engineered diversionary structure designed to collect surface runoff from the airfield and surrounding area and convey it

from the airport runway area. Water in the East Canal flows through the Crossover Canal (which is contained in underground culverts) into the West Canal, where it is transferred through turbine pumps into South Sweeper Creek. South Sweeper Creek is located approximately 4,000 feet from Area 303. Currently, petroleum-related chemicals have not been transported from the site to the East Canal. The stormwater conveyances in Area 303 consist primarily of ditches, culverts, catch basin inlets, manholes, and outlets. In general, stormwater west of Main Road flows via ditches or, after percolating into soil, with groundwater toward the East Canal of the airport ditch system and ultimately to South Sweeper Creek.

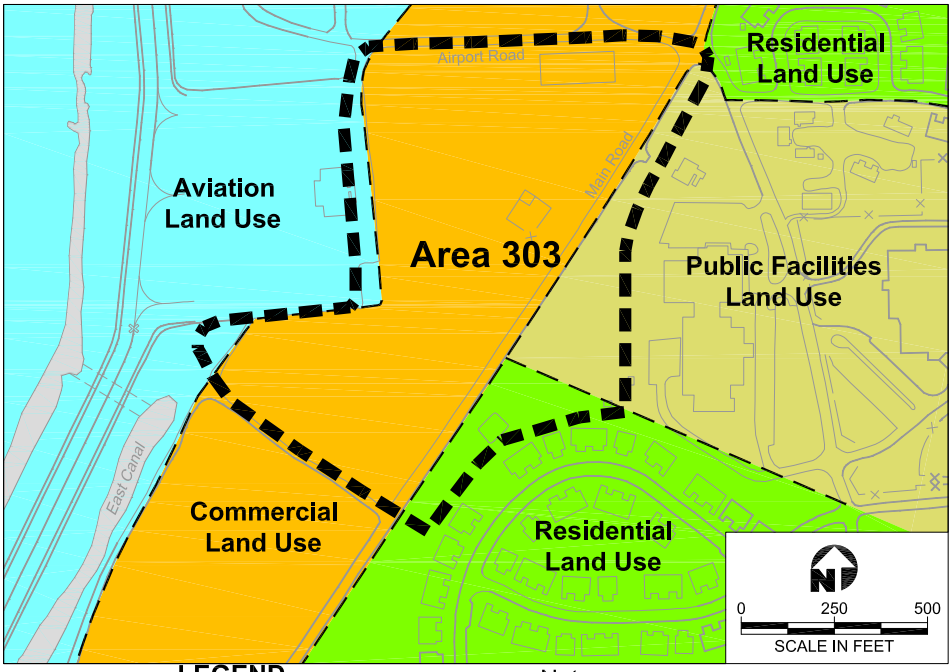
LAND USE

A review of Navy records revealed that land use within Area 303 was restricted to industrial purposes. Maps of military facilities on Adak from 1946 identified the presence of an underground aviation gasoline distribution pipeline traversing the site. A gasoline station (Building 2788) and motor pool structure were formerly located at this site in the vicinity of the GCI Compound. No evidence remains of these earlier buildings. The date of installation for the GCI Compound is estimated to be between 1977 and 1987, based on a review of available aerial photographs.

Future land use at the Area 303 site was specified in the economic reuse study of Adak as commercial, aviation, public facilities, or residential (Figure 4). West of Main Road, the site is classified as commercial land use. Land use west of the site is designated for aviation reuse. East of Main Road, the site is classified as public facilities in the northeast portion and residential in the southeast portion of the site. The adjacent property to the northeast and southeast, consisting of the Sandy Cove and Eagle Bay Housing areas, is classified for residential land use.

GROUNDWATER USE

According to Alaska regulations (18 AAC 75.350), groundwater is considered to be a drinking water source, unless it can be demonstrated that the groundwater is not currently being used as a drinking water source and groundwater is not a reasonably expected future source of drinking water. Although groundwater is not being used as a drinking water source on Adak and institutional controls are in place preventing the use of the downtown aquifer, groundwater is still considered to be a potential future source of drinking water at Area 303 because potable water could be obtained should a well be installed at the site.



LEGEND

- Residential Land Use
- Commercial Land Use
- Public Facilities Land Use
- Aviation Land Use
- Area 303 Boundary
- Land Use Boundary

Note:
Residential land use is prohibited unless specifically authorized in writing by the Department of the Navy according to the Interim Conveyance dated March 7, 2004.

Figure 4 – Land Use in the Vicinity of Area 303

CLEANUP LEVELS

SOIL AND GROUNDWATER

Chemical-specific *screening criteria* and cleanup levels for soil and groundwater have been established for petroleum-contaminated sites at the former Adak Naval Complex in accordance with Alaska DEC regulation 18 AAC Chapter 75. Screening criteria were used to estimate the potential extent of contamination. Cleanup levels are the specified concentrations for remediation. The soil and

groundwater screening criteria and cleanup levels proposed for Area 303 are provided in Table 2.

The Alaska regulations establish four methods for determining cleanup levels for soil (18 AAC 75.340). The Alaska DEC Method Two cleanup levels, the most stringent cleanup levels for soil, were established to prevent migration of contaminants from soil to groundwater in the over 40 inches of rainfall zone (18 AAC 75.341, Tables B1 and B2). The Alaska DEC Method Two cleanup levels were used as screening criteria for Area 303 to estimate the potential extent of soil impacted by petroleum or volatile organic compounds contamination at the site. The Alaska DEC Method Four cleanup levels (18 AAC 75.340[a][4]), which are based on site-specific *risk assessments*, were used to establish cleanup levels for the site. The risk assessment for this site demonstrated that the existing concentrations in soil do not pose a *risk* to humans or the environment above *target health goals*. Therefore, the soil concentrations identified during site investigation and used in the risk assessment are protective of human health and the environment. The soil cleanup levels for the site are the maximum contaminant concentrations identified on Table 3.

The Alaska regulations establish two methods for determining cleanup levels for groundwater (18 AAC 75.345). The tabulated groundwater cleanup levels (18 AAC 75.345[b][1], Table C) were used as screening criteria for all chemicals except trimethylbenzenes to estimate the potential extent of groundwater impacted by petroleum or volatile organic compounds contamination at the site. EPA Regional Screening Levels were used as screening levels for the trimethylbenzenes. Cleanup levels specified for remediation of groundwater at Area 303 are based on the tabulated groundwater cleanup levels, because groundwater is considered to be a reasonably expected potential source of drinking water.

SOIL VAPOR

Vapor intrusion target levels for soil vapor (or soil gas) have been developed by Alaska DEC and are conservative, risk-based screening levels. The screening values used in the risk assessment for soil vapor were one-tenth of the target levels for deep soil gas from Appendix F of the 2009 Alaska DEC Draft Vapor Intrusion Guidance for Contaminated Sites. These screening criteria were used in the supplemental risk assessment for this site to select which chemicals might present a human health risk through the vapor intrusion pathway. The risk evaluation demonstrated that the existing concentrations in soil vapor do not pose a risk to humans above target health goals. Soil vapor locations were selected to provide worst-case vapor data. Therefore, the existing concentrations at the site are protective of human health and, by default, are the cleanup levels for the site.

SURFACE WATER AND SEDIMENT

Although petroleum hydrocarbons released in Area 303 have not impacted the East Canal, migration of petroleum hydrocarbons or volatile organic compounds in groundwater may result in a future exceedance of Alaska surface water quality standards. As specified in 18 AAC 75.345(f), groundwater that is closely connected hydrologically to nearby surface water may not cause an exceedance of the surface water quality standards in the nearby surface water body. 18 AAC Chapter 70 establishes water quality standards for surface water bodies of the state based on water use classes and subclasses. Unless a surface water body has been reclassified in accordance with 18 AAC 70.230, the water body is protected for all water use classes and subclasses. Because the canals of the airport ditch system, including the East Canal, have not been reclassified, all subclasses of the freshwater class apply to these water bodies. Therefore, the water quality standards potentially applicable to the airport ditch system, including the East Canal, are the following:

- *Total aqueous hydrocarbons* (TAqH) in the water column may not exceed 15 micrograms per liter (µg/L).
- *Total aromatic hydrocarbons* (TAH) in the water column may not exceed 10 µg/L.
- Petroleum hydrocarbons in shoreline or bottom sediments may not cause deleterious effects to aquatic life.
- Surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration (18 AAC 70.020[b][17][A][i], 18 AAC 70.020[b][17][B][ii], and 18 AAC 70.020[b][17][C]).

Alaska State regulations do not establish cleanup levels for sediment. Therefore, sediment cleanup levels are established based on the results of the ecological risk assessment conducted for the site. A screening-level ecological risk assessment was performed to identify the contaminants and environmental media, if any, that warranted detailed evaluation in a baseline risk assessment.

The results of the screening-level risk assessment indicated that no ecological threat exists for any ecological receptor from any petroleum-release product at Area 303, and preparation of a detailed risk assessment was not warranted. Therefore, cleanup levels are not necessary for sediment.

Table 2 – Soil, Groundwater, and Soil Vapor Screening Criteria and Cleanup Levels, Area 303

Chemical	Soil[a] Screening Criteria (Method Two)[b] (mg/kg)	Groundwater Cleanup Criteria (Table C)[b,c] (mg/L)	Soil Vapor[a] Screening Criteria (1/10 of Appendix F)[f,g] (µg/m^3)
Total Petroleum Hydrocarbons			
DRO	230	1.5	NA
GRO	260	1.3	35,000
Petroleum Hydrocarbon Fractions			
C6-C10 Aliphatics	240	1.3	NA
C8-C10 Aromatics	130	7.3 (C6-C10)	NA
C10-C21 Aliphatics	6,400	0.1 (C10-C25)	NA
C10-C21 Aromatics	90	1.5 (C10-C25)	NA
Volatile Organic Compounds			
Benzene	0.02	0.005	160
Toluene	4.8	1	219,000
Ethylbenzene	5	0.7	1,100
Isopropylbenzene	NA	NA	17,500
Tetrachloroethene	NA	NA	210
Total Xylenes	69	10	4,400
1,2,4-Trimethylbenzene	NE	0.012[d,e]	310
1,3,5-Trimethylbenzene	NE	0.012[d,e]	310
Carcinogenic Polycyclic Aromatic Hydrocarbons			
Dibenz(a,h)anthracene	5	0.0001	NA
Metals			
Total Lead	400	0.015	NA
Dissolved Lead	NA	0.015	NA

[a]Cleanup levels for soil and soil vapor are not presented here because risks in soil and soil vapor are below target health goals. Cleanup levels for soil and soil vapor are therefore established at existing soil and soil vapor concentrations.
[b]Used as screening criteria to determine potential extent of contamination
[c]Used as cleanup levels for remediation
[d]2007 EPA Region 6 tap water screening level
[e]Alaska DEC cleanup level is 1.85 mg/L for 1,2,4- and 1,3,5-trimethylbenzene
[f]Screening values in the supplemental risk assessment were one-tenth of the levels from 2009 Alaska DEC vapor intrusion guidance Appendix F, Target Levels for Deep Soil Gas (Commercial). For petroleum compounds, screening values were calculated consistent with the methodology described in the Alaska DEC vapor intrusion guidance.
[g]Screening criteria were used to assess potential risks at locations with highest potential soil vapor concentrations.

Notes:
DEC - Department of Environmental Conservation
DRO - diesel-range organics
GRO - gasoline-range organics
µg/m^3 - microgram per cubic meter
mg/kg - milligram per kilogram
mg/L - milligram per liter
NA - not applicable
NE - not established

EXTENT OF CONTAMINATION

Based upon the results of the environmental field investigation of groundwater and soil performed at Area 303 in 2006 and the soil vapor investigation in 2010, the potential extent of contamination was estimated for *free product*, soil, and groundwater. Potential extent of contamination for soil and groundwater was estimated by comparing site concentrations to the screening criteria, as discussed in the Cleanup Levels section. Soil vapor data were collected from the worst-case areas to identify whether soil vapors might represent a health concern. Because the worst-case soil vapor data do not represent a health concern, further characterization of the extent of vapors in the subsurface is not required. More detailed site investigation and characterization information is provided in the final FFS report for Area 303.

FREE PRODUCT

In July 2006, 35 monitoring wells within the vicinity of Area 303 were measured for the presence of free product. Free product was observed in four wells at thicknesses ranging from 0.01 to 0.12 foot. Free product was observed on the groundwater surface at wells HMW-303-5, HMW-303-11, MW-303-30, and MW-303-31, as shown on Figure 5. The maximum *free-product thickness* (0.12 foot) was measured in well MW-303-30, which is located in the south-central portion of the investigated area. Free product was measured at 0.09 foot in well MW-303-31, which is located approximately 300 feet northeast of MW-303-30. Wells HMW-303-5 and HMW-303-11 are located in the extreme southern portion of the investigated area, and product thickness was measured at 0.03 and 0.01 foot in these wells, respectively. Since free product was not observed in wells 03-107, HMW-303-6, and MW-303-29, the free product observed at wells HMW-303-5 and HMW-303-11 is thought to be a result of the release(s) from the SWMU 62 Eagle Bay Housing area.

SOIL AND GROUNDWATER

The extent of soil and groundwater impacted by petroleum or volatile organic compounds contamination at Area 303 was estimated by comparing analytical results to the screening criteria as discussed in the Cleanup Levels section. For soil, the following chemicals were detected above the screening criteria (see Table 3):

- DRO
- GRO
- C6-C10 aliphatics
- C8-C10 aromatics
- C10-C21 aromatics
- Benzene
- Toluene
- Ethylbenzene
- Total xylenes

For groundwater, the analytical results from the 2006 investigation were compared to the screening criteria to determine the extent of groundwater contamination. The following chemicals were detected in groundwater above the screening criteria (see Table 3):

- DRO
- GRO
- C6-C10 aliphatics
- C10-C21 aliphatics
- Benzene
- Toluene
- Ethylbenzene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- Dibenz(a,h)anthracene
- Total lead
- Dissolved lead

Concentrations of chemicals in soil and groundwater above the screening criteria do not represent a current unacceptable human or ecological health risk, as discussed in the Summary of Site Risks section.

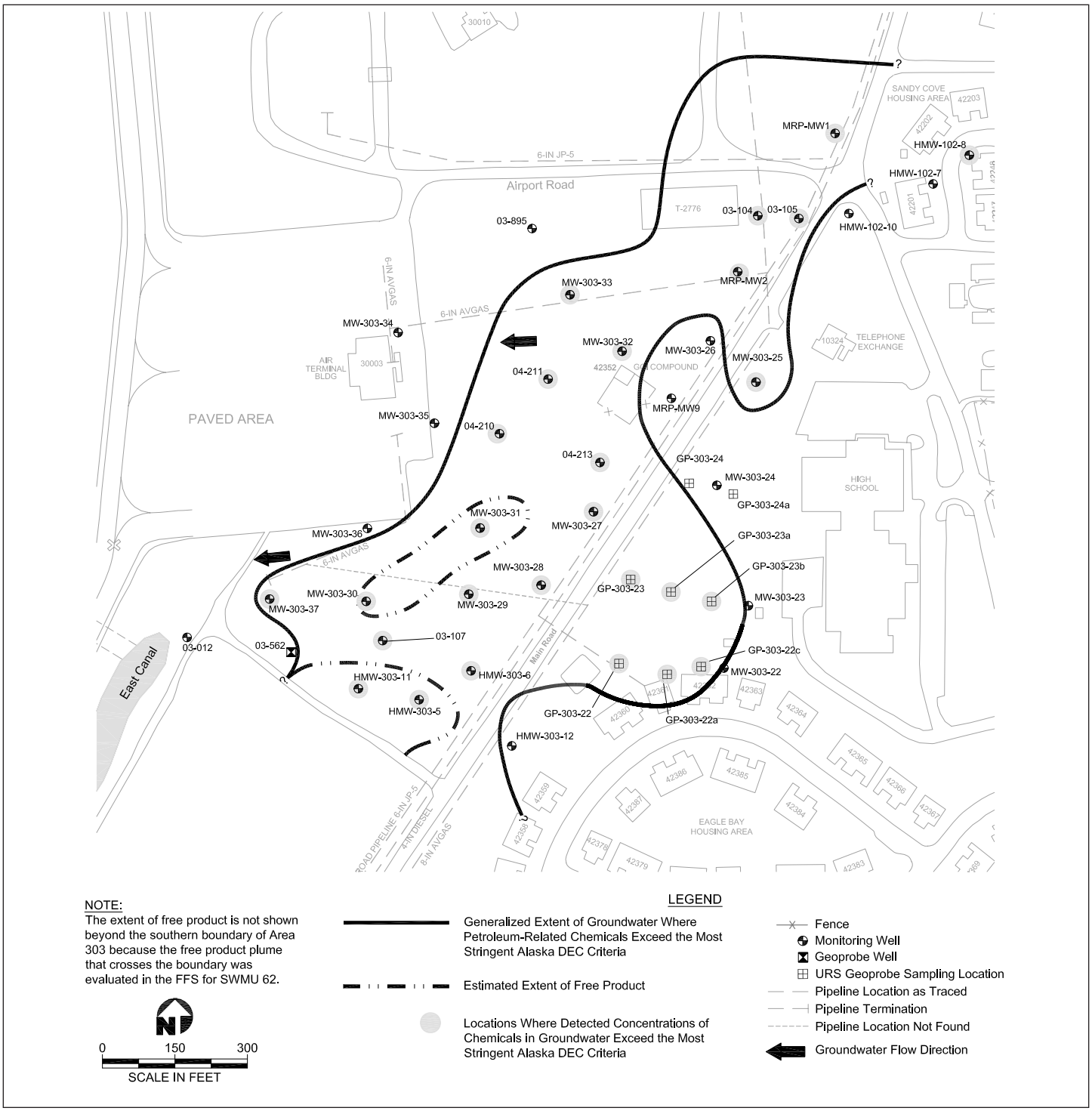


Figure 5 – Estimated Extent of Free Product and Groundwater Contamination, Area 303

SOIL VAPOR

The chemicals that might represent a human health concern from soil vapor impacted by petroleum or volatile organic compound contamination at Area 303 were selected for evaluation in the risk assessment by comparing analytical results to the screening criteria, as discussed in the Cleanup Levels section. For soil vapor, the following chemicals were detected above the screening criteria (see Table 3):

- Benzene
- Ethylbenzene

- GRO
- Isopropylbenzene
- m,p-Xylene
- Tetrachloroethene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

Concentrations of chemicals in soil vapor above the screening criteria do not represent a current unacceptable human health risk, as discussed in the Summary of Site Risks section below.

Tetrachloroethene was detected in deep soil vapor above the screening level at only one location. The single detection indicates that if the chemical is present in groundwater, concentrations are likely low. While groundwater beneath Area 303 has not been tested for tetrachlorethene, there are plans to sample for tetrachloroethene and daughter products during the next round of groundwater sampling to provide additional source characterization information for tetrachloroethene.

SUMMARY OF SITE RISKS

Human health and ecological risk assessments were conducted to assess whether petroleum or volatile organic compounds at Area 303 would pose a potential unacceptable risk to human health or the environment if no cleanup action was to take place. Risks (human health only) and *hazards* (human health and ecological) from exposure to petroleum compounds or volatile organic compounds were estimated for each *complete exposure pathway*. More detailed information on the risk assessments are provided in the final FFS report for Area 303.

There is no current human or ecological exposure to petroleum chemicals or volatile organic compounds at the site. People are not currently using Area 303 and there is no existing building and no ecological exposure to the deep soil and groundwater contaminants. The complete future exposure pathways evaluated in the original human health risk assessment conducted in 2007 assumed that the land would be developed solely for commercial purposes, although no development is currently planned. The pathways evaluated in 2007 included ingestion, dermal contact, and inhalation of chemicals in soil by construction workers and dermal contact and inhalation of chemicals in groundwater by construction workers. Exposure pathways from use of groundwater as a drinking water source were not evaluated because institutional controls prohibit the use of groundwater for drinking.

After the 2010 vapor sampling, a supplemental risk assessment was conducted to evaluate residential exposures to indoor air in the residential land use portion of the site (east of Main Road). In addition, future commercial worker indoor air exposures and construction worker outdoor air exposures for the commercial portion of the site (west of Main Road) were reevaluated in the supplemental assessment using the soil vapor data. See Figure 4 for the land use designations for Area 303.

Both the 2007 and the 2010 risk evaluations found no risk or hazard in excess of target health goals for commercial workers or residents. Therefore, petroleum-related chemicals and volatile organic compounds at the site pose no unacceptable risk for commercial workers or residents, provided that institutional controls remain in effect that prohibit the use of groundwater as a drinking water source. The potential risks to construction workers resulting from exposure to subsurface soil and groundwater were found to be below target health goals. However, the presence of free product cannot be quantitatively evaluated in risk assessments, and exposures to free product may represent an unacceptable health risk to construction workers. The presence of free product has been detected in monitoring wells where groundwater is approximately 22 to 25 feet bgs. In addition, the deep vapor sample located in the vicinity of free product close to the water table (greater than 15 feet bgs) also indicated the presence of a potential inhalation hazard for workers if future construction activities would result in soil disturbance at levels deeper than 15 feet bgs. Because construction activities are assumed to not occur deeper than 15 feet bgs, direct exposure to free product during construction activities is very unlikely, but exposures to vapors might be a concern in the 10- to 15 foot-depth interval in a deep excavation in this area. Therefore, in the event a construction project is planned in the free-product area where there could be potential soil disturbances at depths greater than 10 to 15 feet bgs, appropriate measures should be implemented to minimize contact and exposure. Additional institutional controls that would be required include soil excavation notification to the Navy prior to any excavation or intrusive work at the site.

No site-specific cleanup level was calculated for soil, groundwater, or soil vapor at Area 303, because risks and hazards were below target health goals. Therefore, for soil and soil vapor, the existing concentrations at the site are

Table 3 - Chemicals Detected in Soil, Groundwater, and Soil Vapor at Concentrations Greater Than Alaska DEC Screening Criteria, Area 303

Chemical	Maximum Soil Concentration[a] (mg/kg)	Screening Criteria (Alaska DEC Method Two) (mg/kg)	Maximum Groundwater Concentration (mg/L)	Cleanup Criteria (Alaska DEC Table C) (mg/L)	Maximum Soil Vapor Concentration[g] (µg/m^3)	Screening Criteria (Alaska DEC 1/10 Appendix F, Commercial[h]) (µg/m^3)
Total Petroleum Hydrocarbons						
DRO	***1,000***	230	***21.4 J***	1.5	NA	NE
GRO	***6,830 J***	260	***36.6 J***	1.3	**100,000,000**	35,000
Petroleum Hydrocarbon Fractions						
C6-C10 Aliphatics[b]	***6,100 J***	240	***7.6 J***	1.3	NA	NE
C8-C10 Aromatics[c]	***1,090 J***	130	7.25 J	7.3 (C6-C10)	NA	NE
C10-C21 Aliphatics[d]	934 J	6,400	***0.642 J***	0.1 (C10-C25)	NA	NE
C10-C21 Aromatics[e]	***281.2 J***	90	1.465	1.5 (C10-C25)	NA	NE
Volatile Organic Compounds						
Benzene	***0.555***	0.02	***0.0434***	0.005	**3,600 U**	160
Toluene	***216***	4.8	***1.98***	1	75,000	219,000
Ethylbenzene	***203***	5	***1.79***	0.7	**77,000**	1,100
Isopropylbenzene	NA	NA	NA	NA	**94,000**	17,500
Tetrachloroethene	NA	NA	NA	NA	**3,500**	210
Total Xylenes	***833***	69	4.19	10	**93,000**[i]	4,400[i]
1,2,4-Trimethylbenzene	160	NE	***0.258***	0.012[f]	**2,400**	310
1,3,5-Trimethylbenzene	76.6	NE	***0.0916***	0.012[f]	**3,000**	310
Carcinogenic Polycyclic Aromatic Hydrocarbons						
Dibenz(a,h)anthracene	0.1	5	***0.0005***	0.0001	NA	NE
Metals						
Total Lead	23.3 J	400	***0.0776***	0.015	NA	NE
Dissolved Lead	NA	NA	***0.0561***	0.015	NA	NE

[a]Maximum soil concentrations detected were used in developing exposure point concentrations for the human health risk assessment that resulted in no risk above target health goals.
[b]The C6-C8 and C8-10 concentration values are summed and reported as C6-C10 aliphatics.
[c]C8-C10 aromatics are reported as provided by analytical laboratory.
[d]The C10-C12, C12-C16, and C16-C21 concentration values are summed and reported as C10-C21 aliphatics.
[e]The C10-C12, C12-C16, and C16-C21 concentration values are summed and reported as C10-C21 aromatics.
[f]2007 EPA Region 6 tap water screening level
[g]Maximum Soil Vapor concentrations are from locations west of Main Road (concentrations east of Main Road did not exceed screening criteria).
[h]Soil Vapor Criteria listed are from Alaska DEC 2009 vapor intrusion guidance and are for commercial land use based on the proposed land use in the location of the maximum concentrations. For petroleum compounds, screening values were calculated consistent with the methodology described in the Alaska DEC vapor intrusion guidance.
[i]Soil vapor concentration is for m,p-xylene, and the screening criterion is for total xylenes.

Notes:
Concentrations shown in bolded italics exceed the screening criteria.
DEC - Department of Environmental Conservation
DRO - diesel-range organics
EPA - U.S. Environmental Protection Agency
GRO - gasoline-range organics
J - estimated concentration
µg/m^3 - microgram per cubic meter
mg/kg - milligram per kilogram
mg/L - milligram per liter
NA - not analyzed
ND - not detected
NE - not established
U - not detected above reporting limit

protective of human health and the environment and, by default, are the soil and soil vapor cleanup levels for the site. However, analytical data collected from monitoring wells at the site indicated that concentrations of petroleum hydrocarbons and volatile organic compounds exceeded the proposed groundwater cleanup levels discussed in the Cleanup Levels section. Figure 5 shows the extent of groundwater contamination exceeding the proposed groundwater cleanup levels.

A screening-level ecological risk assessment was performed to identify the contaminants and environmental media, if any, that warranted detailed evaluation in a baseline risk assessment. Ecological hazards from exposure to petroleum compounds in site surface soil were estimated for *terrestrial receptors*. Site-specific soil data revealed that the only contaminant detected in surface soil (0 to 6 feet bgs) was DRO. All detected concentrations of DRO were less than the *risk-based screening concentration* and, thus, below levels of ecological concern. Therefore, no ecological threat exists for any ecological receptors from DRO or any other petroleum-release products at Area 303, and preparation of a detailed risk assessment was not warranted.

REMEDIAL ACTION OBJECTIVES

Based on the risk analysis conducted for this site and the regulatory requirements, the following *remedial action objectives* (RAOs) were developed for the protection of human health at Area 303:

- Reduce petroleum hydrocarbons or volatile organic compounds in groundwater to concentrations less than or equal to the Alaska DEC groundwater cleanup levels established for groundwater used as a drinking water source.
- Minimize exposure to *free-phase product*.
- Prevent migration of petroleum hydrocarbons or volatile organic compounds to surface water that would result in an exceedance of the Alaska DEC surface water quality standards.

Based on the site-specific screening-level ecological risk assessment, no RAO was found to be necessary for the protection of ecological receptors at Area 303. Preventing the migration of free product to surface water and preventing the migration of chemicals in groundwater from reaching surface water at concentrations greater than Alaska DEC surface water quality standards will protect ecological receptors in East Canal in the future.

REMEDIAL ACTION ALTERNATIVES

The list of cleanup alternatives developed for petroleum-release sites during the 1998 FFS, and amended in 1999, was used as the starting point for identifying alternatives for Area 303. As discussed in the Site Background section, there are institutional controls currently in place on Adak that limit exposure to chemical contamination. These institutional controls apply to Area 303, and additional institutional controls will not be required for Area 303. The alternatives developed during the 1998 FFS, as amended in 1999, are presented below.

Alternative 1, No Action. This alternative is included as a baseline to represent current conditions. No remedial actions are included with this alternative. It is used for comparison to the other alternatives.

Alternative 2, Limited Groundwater Monitoring. Groundwater monitoring would be conducted to confirm that petroleum-related chemicals and volatile organic compounds in groundwater are declining.

Alternative 3, *Monitored Natural Attenuation* (MNA) and Institutional Controls. Groundwater monitoring would be conducted to evaluate whether petroleum-related chemicals and volatile organic compounds in groundwater are attenuating to concentrations below applicable Alaska DEC groundwater cleanup levels. Petroleum-related chemicals and volatile organic compounds that currently exceed applicable Alaska DEC cleanup levels would be monitored, as well as natural attenuation indicator compounds. This approach to cleanup relies on naturally occurring processes to reduce petroleum and volatile organic compounds concentrations in groundwater. This alternative also includes institutional controls as an additional means of reducing potential exposure to petroleum or volatile organic compounds contamination.

Alternative 4, Product Recovery. Free product on the groundwater surface would be collected to the *maximum extent practicable* using skimmers.

Alternative 5, Limited Soil Removal/Source Removal and Thermal Desorption. Petroleum-contaminated soil would be excavated and then heated to drive off the petroleum compounds.

Alternative 6, *Ex Situ* Bioremediation of Soil. Petroleum-contaminated soil would be excavated and placed in a lined pile for treatment. Air, water, and nutrients would be added to the soil to encourage

microorganisms to break down the petroleum compounds to harmless chemicals.

Alternative 7, *In Situ* Bioremediation of Soil, MNA, and Institutional Controls. Petroleum-contaminated soil would be treated in the ground. This alternative relies on the same naturally occurring microorganisms as natural attenuation. However, the growth of the microorganisms is encouraged by increasing air flow in the ground either by blowing air into the ground or by pulling air through the soil. This alternative would also include institutional controls.

Alternative 8, Soil Cover, MNA, and Institutional Controls. Contaminated surface soil would be covered with a layer of clean soil to prevent human contact with petroleum or volatile organic compounds. Institutional controls would be used to further limit contact with petroleum chemicals and volatile organic compounds in soil and groundwater. Natural attenuation would cause the petroleum and volatile organic compounds concentrations to decrease.

Alternative 9, Soil Vapor Extraction/Air Sparging, MNA, and Institutional Controls. A vacuum system would be used to cause light petroleum compounds to move to vapor extraction wells. It is only effective for lighter petroleum materials such as those present in gasoline. Institutional controls would be used to limit potential contact with petroleum and volatile organic compounds.

EVALUATION OF ALTERNATIVES

The results of the 1998 FFS were applied to the analysis of remedial alternatives for Area 303. The criteria used to complete the alternative evaluation in the 1998 FFS were based on EPA guidance. A comparison of the nine EPA criteria to the Alaska DEC guidance criteria is included in Table 4. This comparison clearly demonstrates that evaluations performed using CERCLA criteria are inclusive of Alaska DEC's criteria, and thus meet the requirements of Alaska DEC's regulations. State and community acceptance will be evaluated after public and state comments are received on the proposed cleanup actions. Therefore, these two criteria were not evaluated in the 1998 FFS or in this Proposed Plan.

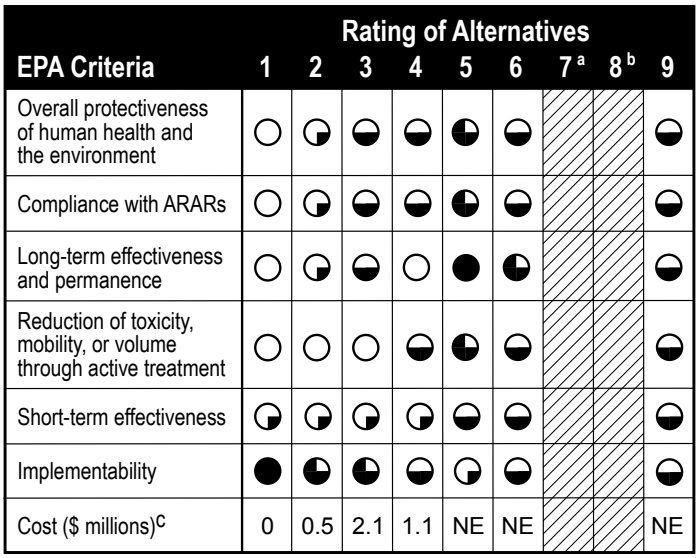
An evaluation of alternatives using the EPA criteria was performed separately for each of the 128 petroleum-release sites at the former Adak Naval Complex in the 1998 FFS. To summarize the results of the evaluations for the 128 petroleum-release sites, the January 1998 Proposed Plan for Cleanup Action at Petroleum Sites on Adak Island presented the evaluations for nine categories of sites. Sites that had similar characteristics were grouped together into the nine categories and a single alternative evaluation was presented for each category. The categories applicable to Area 303 are the following:

- Category 1 – Free-product sites
- Category 2 – Gasoline only sites

The alternative evaluation performed for the Category 1 sites in the 1998 Proposed Plan is applicable to Area 303, because free product has been detected at the site and free-product recovery activities have not been implemented at the site. The alternative evaluation that was performed for the Category 2 sites is applicable to Area 303, because gasoline is the main contaminant at the site. The evaluations performed for Category 1 and 2 sites were used as the starting point for the evaluation of alternatives for Area 303. The resulting evaluation for Area 303 is included in Figure 6. Note that Alternatives 7 and 8 are not applicable to the Category 2 sites, and, therefore, evaluations of these alternatives are not provided in Figure 6. Alternative 7 is not applicable, because this alternative applies only to sites with heavier petroleum compounds, such as diesel. Alternative 8 is not applicable because this alternative applies only to sites with surface soil contamination.

Table 4 – CERCLA Criteria

U.S. Environmental Protection Agency Criteria	Comparable Alaska Department of Environmental Conservation Criteria	Description
Overall protection of human health and the environment	Protectiveness	Whether a cleanup action provides adequate protection and how potential risks are eliminated, reduced, or controlled through treatment or control
Compliance with regulations	Regulations	Whether a cleanup action will meet all potential cleanup levels
Long-term effectiveness and permanence	Short- and long-term effectiveness	The ability of a cleanup action to reliably protect human health and the environment over time
Reduction of toxicity, mobility, or volume through active treatment	None	How well treatment technologies that may be used in a cleanup action work; how well the cleanup treatment may work to make the chemicals less harmful, make them less likely to spread, or reduce the amount of contaminated material
Short-term effectiveness	Short- and long-term effectiveness	How quickly the cleanup action is able to protect human health and the environment and what is its potential to create adverse effects during construction and implementation
Implementability	Practicable	How readily the cleanup can be accomplished: Are needed materials and services available? How appropriate is the solution to the problem?
Cost	Practicable	Costs to build, operate, and maintain the cleanup remedy
State acceptance	None	Whether, based on its review of the project documents and proposed plan, the state agrees with, opposes, or has no comment on the preferred alternative
Community acceptance	Public input	Whether the public agrees with, opposes, or has no comment on the preferred alternative (determined after reviewing the public comments received on this proposed plan)



Alternatives

1 No Action
2 Limited Groundwater Monitoring
3 Monitored Natural Attenuation and Institutional Controls
4 Product Recovery
5 Limited Soil Removal/Source Removal and Thermal Desorption
6 Ex Situ Bioremediation of Soil
7 In Situ Bioremediation of Soil, Monitored Natural Attenuation, and Institutional Controls
8 Soil Cover, Monitored Natural Attenuation and Institutional Controls
9 Soil Vapor Extraction/Air Sparging, Monitored Natural Attenuation, and Institutional Controls

Legend

Superior
Excellent
Good
Fair
Poor
Technology and/or alternative not applicable for Category 2 sites
NE Not estimated

[a] This alternative only applies to sites with heavier petroleum compounds, such as diesel. Since gasoline is the main contaminant at Area 303, this alternative does not apply.

[b] This alternative only applies to sites with surface soil contamination. Since surface soil is not contaminated at Area 303, this alternative does not apply.

[c] The cleanup timeframe for Alternatives 2 and 3 is estimated to be 40 years. The cleanup timeframe for Alternative 4 is estimated to be 2 years.

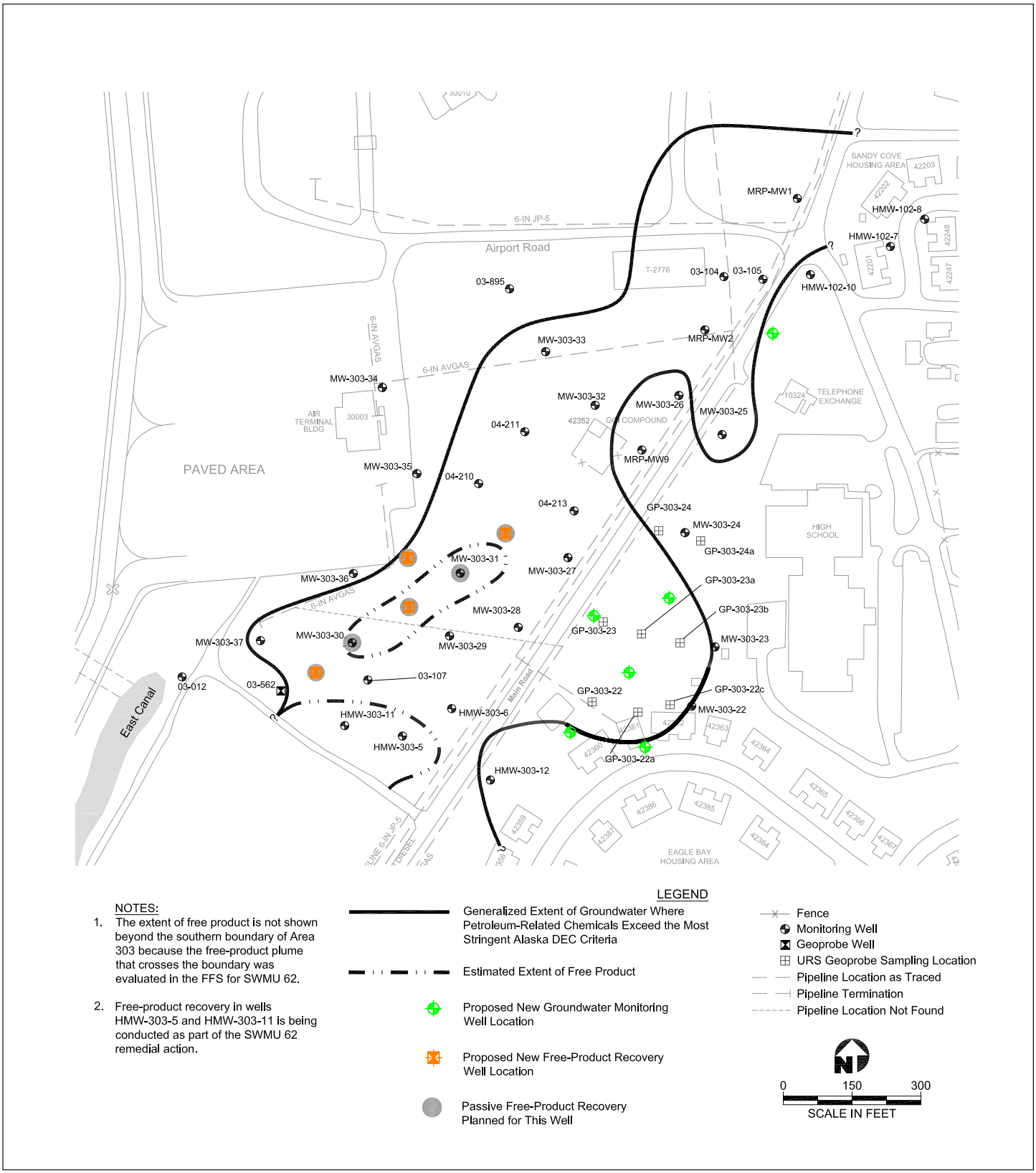
Figure 6 – Evaluation of Alternatives for Area 303

PREFERRED CLEANUP ALTERNATIVE

The preferred cleanup alternatives for Area 303 are Alternative 3, MNA and Institutional Controls, and Alternative 4, Product Recovery (see Figure 7). To maintain consistency with cleanup decisions made in the OU A ROD, the 1998 FFS, the 1998 Proposed Plan, and the OU A ROD were reviewed to determine what factors or criteria were used to select the preferred remedy for the 128 sites addressed in these documents. These factors or criteria are the suitability criteria listed in Table 5. Because site conditions do not currently pose an unacceptable risk to human health or the environment at Area 303, remedial alternatives developed for sites that do pose a risk above target health goals (Alternatives 5, 6, and 9) were eliminated as potential preferred remedial alternatives. In addition, concentrations of petroleum hydrocarbons in soil above the most stringent Alaska DEC cleanup levels were generally found in soils at depths greater than 15 feet. As a result, Alternatives 5 and 6, which require excavation and ex situ treatment of soil, were eliminated as potential preferred remedial alternatives for this reason as well. Therefore, the list of preferred remedial alternatives that may be selected for this site is limited to Alternatives 1, 2, 3, or 4.

The preferred cleanup alternatives for this site were selected based on a comparison of site-specific conditions to the criteria used to evaluate the suitability of an alternative, as presented in Table 5. A solid bullet in this table adjacent to a suitability criterion indicates that site-specific conditions match the alternative's suitability criterion. An alternative is identified as the preferred remedy when site-specific conditions most closely match the alternative's suitability criteria.

Based on these comparisons, Alternative 3, MNA and Institutional Controls, and Alternative 4, Product Recovery, are the preferred remedial alternatives for Area 303. These alternatives will provide appropriate, cost-effective remedies that protect human health and the environment and can be implemented at the earliest possible time. Alternative 3 is selected for this site because groundwater concentrations are above the Alaska DEC cleanup levels. MNA will help demonstrate whether contaminant concentrations decrease to below the Alaska DEC cleanup levels, and institutional controls are needed as long as concentrations are above Alaska DEC cleanup levels. MNA will also be used to determine if dissolved petroleum compounds and volatile organic compounds are migrating toward the East Canal. Selected existing wells and six new wells, installed at locations east of the Main Road (see Figure 7), will be used to monitor natural attenuation. The new wells will be installed in areas where GRO were detected at high concentrations in temporary wells during the remedial investigation or areas requiring further definition of the extent of contamination. The areas requiring further delineation are upgradient of the areas with the highest detected concentrations. Although institutional controls are already in place preventing the use of the downtown aquifer and requiring notification of excavation activities in the downtown area, Area 303 would be added to the Institutional Control Management Plan to ensure that compliance with the groundwater use prohibition and soil excavation notification requirements are verified annually at the site. Furthermore, verification that land use remains commercial to the west of Main Road, and public facilities and residential to the east of Main Road would also be performed annually at the site and documented in the annual institutional control site inspection report. Therefore, Alternative 3 is protective of human health and the environment and complies with Alaska regulations. Alternative 4 is selected as a preferred remedial alternative at the site, because free product has been detected at the site. Removal of free product will reduce the risk of exposure to free product, will reduce the risk of free product migrating to the East Canal and will be documented in the annual free product summary report. Monitoring in wells downgradient of the free-product plume and upgradient of surface water will be used to determine if free product is migrating toward the East Canal and will be documented in the annual groundwater monitoring report. Alternative 4 will be performed concurrently with Alternative 3. Free-product recovery will comply with Alaska regulations and will reduce the source of petroleum dissolving into groundwater.



NOTES:

1. The extent of free product is not shown beyond the southern boundary of Area 303 because the free-product plume that crosses the boundary was evaluated in the FFS for SWMU 62.
2. Free-product recovery in wells HMW-303-5 and HMW-303-11 is being conducted as part of the SWMU 62 remedial action.

LEGEND

- Generalized Extent of Groundwater Where Petroleum-Related Chemicals Exceed the Most Stringent Alaska DEC Criteria
- Estimated Extent of Free Product
- Proposed New Groundwater Monitoring Well Location
- Proposed New Free-Product Recovery Well Location
- Passive Free-Product Recovery Planned for This Well
- Fence
- Monitoring Well
- Geoprobe Well
- URS Geoprobe Sampling Location
- Pipeline Location as Traced
- Pipeline Termination
- Pipeline Location Not Found

Figure 7 – Preferred Cleanup Alternative Activities, Area 303

Table 5 – Evaluation of Suitability of Cleanup Alternatives, Area 303

Criteria to Determine the Suitability of Alternative	Area 303
Alternative 1: No Action	
Petroleum-related chemicals and volatile organic compounds do not pose an imminent threat to human health or the environment.	●
Petroleum-related chemicals and volatile organic compounds on site do not exceed Alaska DEC soil or groundwater cleanup levels.	○
Selected as Preferred Alternative	NO
Alternative 2: Limited Groundwater Monitoring	
Petroleum-related chemicals and volatile organic compounds do not pose an imminent threat to human health or the environment (exclusive of the human health groundwater ingestion pathway).	●
Groundwater at the site is not a reasonably expected potential future source of drinking water based on 18 AAC 75.350(2).	○
Groundwater that is closely connected hydrologically to nearby surface water does not cause a violation of the Alaska Water Quality Standards, 18 AAC 70.	●
Soil contains petroleum-related chemicals at concentrations above Alaska DEC soil cleanup levels.	●
Groundwater monitoring indicates the presence of petroleum-related chemicals at concentrations below Alaska DEC groundwater cleanup levels established for groundwater used as drinking water.	○
Selected as Preferred Alternative	NO
Alternative 3: Monitored Natural Attenuation and Institutional Controls	
Petroleum-related chemicals and volatile organic compounds do not pose an imminent threat to human health or the environment (exclusive of the human health groundwater ingestion pathway).	●
Groundwater at the site is a reasonably expected potential future source of drinking water based on 18 AAC 75.350(2).	●
Groundwater that is closely connected hydrologically to nearby surface water does not cause a violation of the Alaska Water Quality Standards, 18 AAC 70.	●
Soil contains petroleum-related chemicals at concentrations above Alaska DEC soil cleanup levels.	●
Groundwater monitoring indicates the presence of petroleum-related chemicals and volatile organic compounds at concentrations above Alaska DEC groundwater cleanup levels.	●
Selected as Preferred Alternative	YES
Alternative 4: Product Recovery	
Site has quantities of residual free product on the groundwater surface that are considered practicable to recover.	●
Selected as Preferred Alternative	YES

● true
○ false
Notes:
AAC - Alaska Administrative Code
DEC - Department of Environmental Conservation

COMMUNITY PARTICIPATION

The dates of the public comment period and the locations of the information repositories are provided on the front page of this Proposed Plan. Comments from the public will be used by the Navy and the Alaska DEC to help determine what action to take. We invite you to comment on this Proposed Plan. You may submit written comments during the public comment period by sending them via mail, fax, or e-mail to:

Grady May
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315
Fax: (360) 396-0857
grady.may@navy.mil

After considering public comments, the Navy and the Alaska DEC will select the final cleanup remedy. The preferred cleanup remedy may be modified from the remedy presented in the Proposed Plan, based on public comments or new information. The chosen remedy will be described in a DD. The Navy will respond to comments on the Proposed Plan in a responsiveness summary. The responsiveness summary will be part of the DD, which will be available for review in the information repositories at the locations listed on the front page of this plan.

For further information on Area 303, please contact:

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ACRONYMS

AAC	Alaska Administrative Code
ARC	Adak Reuse Corporation
avgas	aviation gasoline
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DD	Decision Document
DEC	Department of Environmental Conservation
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
FFS	focused feasibility study
GCI	General Communications, Inc.
GRO	gasoline-range organics
JP-5	jet petroleum No. 5
µg/L	micrograms per liter
MNA	monitored natural attenuation
NMCB	Naval Mobile Construction Battalion
OU	operable unit
RAB	Restoration Advisory Board
RAO	remedial action objective
ROD	Record of Decision
SA	Source Area
SAERA	State-Adak Environmental Restoration Agreement
SARA	Superfund Amendments and Reauthorization Act
SWMU	Solid Waste Management Unit
TAC	The Aleut Corporation
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
USGS	U.S. Geological Survey
UST	underground storage tank

GLOSSARY

Administrative Record. All the documents supporting a government agency's decision. The Administrative Record contains all documents, data, and descriptions of site-specific actions or observations that are used to make decisions about the site.

Aliphatic. Hydrocarbons in which the carbon-hydrogen groupings are arranged in open chains that may be branched. The term includes paraffins and olefins and provides a distinction from aromatics and naphthenes, which have at least some of their carbon atoms arranged in closed chains or rings.

Aquatic. Living or growing in, on, or near the water: aquatic animals and plants.

Aquifer. An underground layer of earth, gravel, or porous stone that yields water.

Aromatic. Hydrocarbons in which the carbon atoms are arranged in double-bonded rings. Aromatics may also contain hydrogen, sulfur, nitrogen, and oxygen.

Complete exposure pathway. A path from the source(s) of a contaminant to humans and other species (animals and plants) via soil, water, or food. A complete exposure pathway consists of the following four elements: (1) a contaminant source and a mechanism of chemical release (e.g., a leaking UST), (2) an environmental medium (e.g., groundwater) that retains or transports the contaminant, (3) a point of potential human or ecological contact with the affected environmental medium, and (4) a means of entry into the body at the contact point. If any of these four elements is missing, the pathway is incomplete and there is no exposure to the chemical.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Also known as Superfund, a federal law authorizing action to respond to the release, or substantial threat of release, into the environment of hazardous substances, pollutants, or contaminants that may present an imminent and substantial danger to public health or welfare. CERCLA's emphasis is on the cleanup of old/inactive hazardous substance sites. It does not include cleanup of spills of petroleum, oil, and lubricants.

Contamination. Any physical, chemical, biological, or radiological substance or matter that is present in soil, groundwater, air, or a combination of these media at a concentration that is greater than regulated levels.

Decision Document (DD). A legal document describing the remedial actions selected for a site by the lead regulatory agency (Alaska DEC).

Diesel-range organics (DRO). See the *total petroleum hydrocarbons* definition.

Ex situ. A method of cleaning up sites where soil and groundwater are removed from the ground and treated aboveground.

Federal Facilities Agreement (FFA). An agreement between the Navy, EPA, and the Alaska DEC that ensures that the environmental impacts associated with past and present activities at the facility are thoroughly investigated and that appropriate remedial actions are taken as necessary to protect the public health, welfare, and the environment.

Free-phase product. Petroleum that is present at a site as a separate liquid, which is usually found as a floating layer on groundwater. Does not include petroleum adsorbed onto soil or dissolved in groundwater.

Free product. See free-phase product definition.

Free-product thickness. A measure of thickness of the floating layer of petroleum on groundwater.

Gasoline-range organics (GRO). See the total petroleum hydrocarbons definition.

Hazard. Noncarcinogenic effects resulting from exposure to a chemical.

Hazard index. The sum of *hazard quotients*.

Hazard quotient. A measure of the noncarcinogenic hazard from exposure to a chemical from a site, which is calculated as the ratio of estimated exposure to a chemical from a site to the estimated safe dose level of that chemical.

Hydrocarbons. A large group of chemical compounds composed of only carbon and hydrogen.

In situ. A method of cleaning up a site without excavating soil or extracting groundwater. Soil and groundwater are treated in place.

Institutional controls. Administrative controls that prevent human exposure to contaminated soils through community education, soil excavation restrictions, groundwater use restrictions, etc.

Land transfer agreement. An agreement to transfer the land ownership from one party to another. Such an agreement may include restrictions on certain activities on the transferred land.

Maximum extent practicable. Capable of being designed, constructed, and implemented in a reliable, cost-effective manner, taking into consideration existing technology, site location, and logistics.

Monitored natural attenuation (MNA). Essentially the same as natural attenuation (see below), but includes a monitoring component, such that the reduction in concentrations of contaminants can be verified.

National Priorities List. A federal listing of hazardous waste sites requiring cleanup through the CERCLA program.

Natural attenuation. The process by which the concentration of contaminants in the environment is reduced by natural processes such as volatilization, dispersion, and microbial degradation.

Operable unit (OU). A separate unit or geographic subarea of a site based on geography, geology, or type of contaminants that is investigated and evaluated separately from other units at the site.

Permeability. A measure of how easily water passes through soil. The greater the permeability, the more easily water moves through soil.

Proposed Plan. A document used to facilitate public involvement in the remedy selection process. The document presents the lead agency's preliminary recommendation concerning how best to address contamination at the site, presents alternatives that were evaluated, and explains the reasons the lead agency recommends the preferred alternative.

Receptor. A person or species evaluated for exposure to a contaminant.

Record of Decision (ROD). A legal document describing the remedial actions selected for a site by the lead regulatory agency (EPA).

Remedial action objectives (RAOs). The objectives of the remedial action at a contaminated site.

Risk. A measure of the likelihood that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

Risk assessment. A process for characterizing the current and potential threats to human health and the environment that may be posed by contaminants migrating to groundwater or surface water, being released to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain. The primary purpose of a risk assessment is to provide risk managers with an understanding of the actual and potential risks to human health and the environment posed by a site and any uncertainties associated with the assessment. This information may be useful in determining whether there is a current or potential threat to human health or the environment that warrants remedial action.

Risk-based screening concentration (RBSC). A conservative concentration that meets the target health goals and is protective of ecological receptors. Concentrations greater than RBSCs may result in unacceptable hazards.

Screening criteria. Criteria used to determine the potential extent of contamination. These criteria may or may not be used as the cleanup levels for remediation of a site.

Soil vapor. Soil vapor or soil gas is the air that is present between soil particles in the subsurface. Vapors are typically collected from within 5 feet of the ground surface down to the water table.

State-Adak Environmental Restoration Agreement (SAERA). An agreement between the Navy and the Alaska DEC to implement site characterization and remediation of petroleum sites on Adak.

Superfund Amendments and Reauthorization Act of 1986 (SARA). Modifications to CERCLA enacted on October 17, 1986.

Target health goals. Maximum numeric risk levels established by a regulatory agency as allowable risks that do not require further action. When a risk assessment is conducted, the numeric site-specific risk estimates must be equal to or below regulatory target health goals in order for the risk to be considered "acceptable." In Alaska, the target health goal for a carcinogenic compound is 1 x 10-5 (a risk of contracting cancer of 1 in 100,000), and the target health goal for noncancer chemicals is a hazard quotient or *hazard index* of one.

Terrestrial receptors. Organisms or species that live on land.

Total aqueous hydrocarbons (TAqH). The total concentration of benzene, toluene, ethylbenzene, total xylenes, and polynuclear aromatic hydrocarbons (multi-ring aromatic compounds) in a sample.

Total aromatic hydrocarbons (TAH). The total concentration of benzene, toluene, ethylbenzene, and total xylenes in a sample.

Total petroleum hydrocarbons (TPH). TPH is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of petroleum compounds at a site. TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water. These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals. The grouping of relatively heavier (or intermediate range) petroleum hydrocarbon chemicals is often referred to as "diesel-range," whereas the grouping of lighter petroleum hydrocarbon chemicals is often referred to as "gasoline-range." These two ranges of petroleum hydrocarbons are typically analyzed separately in the laboratory, using slightly different methods.

Vapor intrusion. The process by which chemicals in the subsurface soil or groundwater evaporate, move upwards towards the surface, and enter the air of buildings above a contaminated site.

Volatile organic compounds. Volatile organic compounds are organic chemicals that easily form vapors at normal temperature and pressure. The term is generally applied to organic solvents, certain paint additives, aerosol spray can propellants, fuels (such as gasoline and kerosene), petroleum distillates, dry cleaning products, and many other industrial and consumer products ranging from office supplies to building materials. Nitrogen (N), oxygen (O), phosphorus (P) and sulfur (S) are also commonly found in organic chemicals.

COMMENT FORM

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Comments:

Please mail, fax, or e-mail comments on this Proposed Plan to:

Grady May
Environmental Restoration, Code EV3
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315
Fax: (360) 396-0857

If you have special needs or require this document in alternate form, please call Grady May at (360) 396-0011.

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