



THE U.S. NAVY AND THE ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION announce the
**PROPOSED PLAN FOR
SOUTH OF RUNWAY 18-36 AREA**

Former Adak Naval Complex, Adak Island, Alaska

December 2005

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 the South of Runway 18-36 Area 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 document is being issued by the Navy, the lead agency for site activities, and the Alaska DEC, the lead regulatory agency. This document summarizes information that can be found in greater detail in the Final Focused Feasibility Study Report for the South of Runway 18-36 Area and other relevant documents referenced in this Proposed Plan. The Navy and the Alaska DEC encourage the public to review the Final Focused Feasibility Study Report and other relevant documents to increase their understanding of the site and the activities that have been conducted there. The Final Focused Feasibility Study Report and other relevant documents cited in this Proposed Plan are available in the information repositories listed on the side bar 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 the South of Runway 18-36 Area 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

Dates to Remember

**PUBLIC COMMENT PERIOD:
December 13, 2005 through
January 13, 2006**

The U.S. Navy and the Alaska Department of Environmental Conservation 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
Adak, AK 99546

Library Reserve Room
University of Alaska, Anchorage
3211 Providence Drive
Anchorage, AK 99501
(907) 786-1871

Naval Facilities Engineering
Command Northwest
19917 Seventh Avenue NE
Poulsbo, WA 98370-7570

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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 the South of Runway 18-36 Area 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.

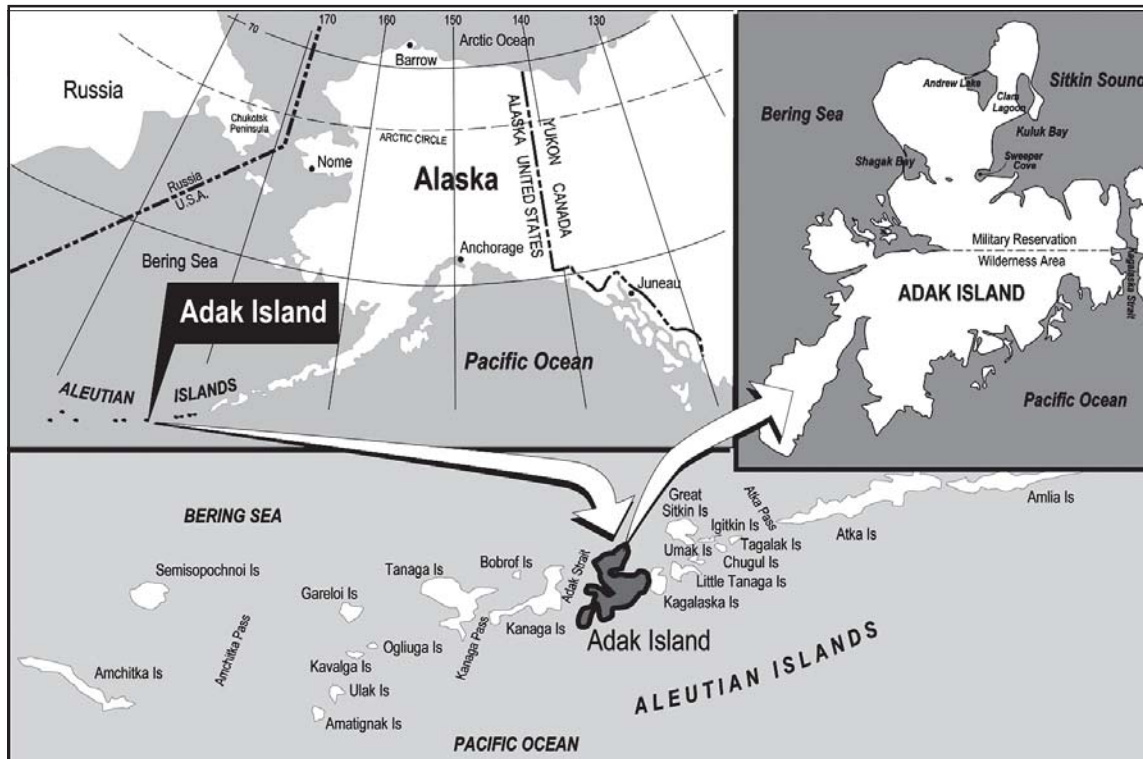
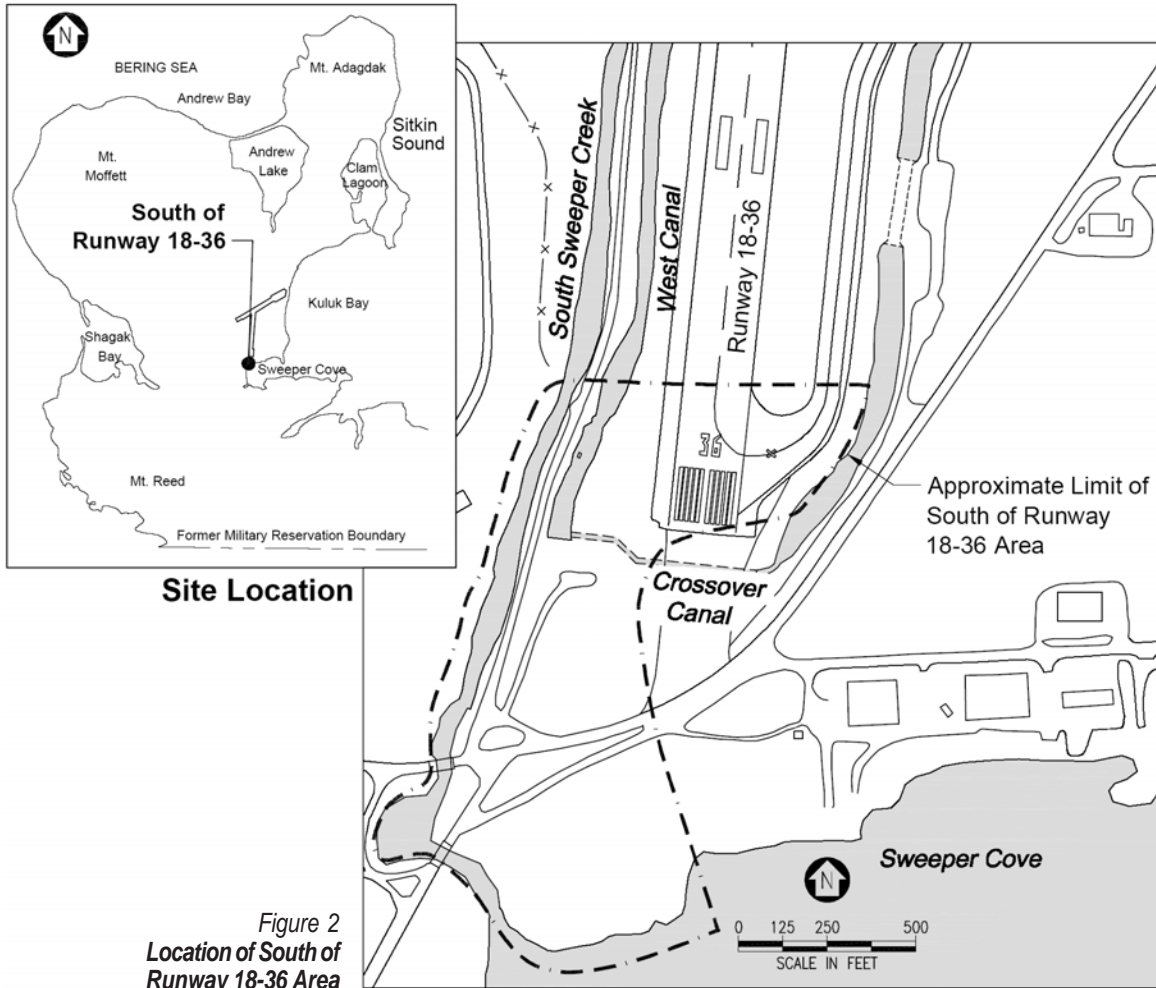


Figure 1
Adak Island and Vicinity

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**Figure 2
Location of South of
Runway 18-36 Area**

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, 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 The Aleut Corporation. 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 petroleum-related chemicals. The institutional controls include notification of intrusive soil excavation activities, groundwater restrictions that prohibit use of the downtown *aquifer* as a drinking water resource, and a fishing advisory. In addition, land use restrictions that pro-

hibit residential use of land are applicable to specific sites on Adak, including the South of Runway 18-36 Area. The Aleut Corporation currently owns the South of Runway 18-36 Area.

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); and the *Administrative Record* file located at Naval Facilities Engineering Command Northwest, Poulsbo, Washington. In addition, a mailing list is maintained and updated to send newsletters, fact sheets, and announcements of upcoming meetings and significant activities, such as public comment periods, to concerned citizens. Public input is obtained through RAB meetings and other formal public meetings, community interviews, requests for public comments, and a telephone hotline.

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Various environmental field investigations were performed by the Navy at the South of Runway 18-36 Area between 1990 and 2001, as indicated in Table 1. Results of these investigations indicated that petroleum-related chemicals and some *volatile organic compounds* were present in samples of subsurface soil, groundwater, sediment, and surface water collected from several locations at the South of Runway 18-36 Area.

Potential sources of the petroleum *hydrocarbons* present at the site include various pipelines that crisscross the site, as identified on Figure 3. A 6-inch-diameter jet petroleum (JP)-5 fuel line located near the southeast corner of Runway 18-36, uncovered during September 1990, was reported to be the source of a subsurface fuel release. This inactive pipeline was cleaned (but not closed) about 5 years ago. Several additional pipelines present at the site may be sources of potential releases. These include one 8-inch-diameter motor vehicle gasoline (mogas) pipeline (the more northerly of the two 8-inch-diameter mogas pipelines), one 4-inch-diameter mogas pipeline, and one 10-inch-diameter aviation gasoline

Table 1. Summary of Environmental Field Investigations, South of Runway 18-36 Area

Date	Investigation Activity
1989	Phased site investigation to evaluate the extent of petroleum fuel released in the vicinity of Tank Farm A
1994	Release investigation in the vicinity of Tank Farm A to supplement the 1989 investigation
1994	Release investigation to evaluate the extent of fuels released in the vicinity of the Main Road Pipeline
1996	Release investigation work plan to summarize site conditions
1999	Preparation of a site summary report to present all site data collected to that point
2001	Remedial investigation to delineate the lateral extent of dissolved-phase petroleum-related chemicals in groundwater at the site

(avgas) pipeline that were cleaned and closed in 2003; one 8-inch-diameter mogas pipeline that was abandoned in the late 1950s, and a 12-inch-diameter diesel fuel transfer pipeline that was also abandoned in the late 1950s. A 1958 Navy drawing shows these two pipelines as abandoned. No specific information is available on whether these two pipelines were cleaned and/or closed.

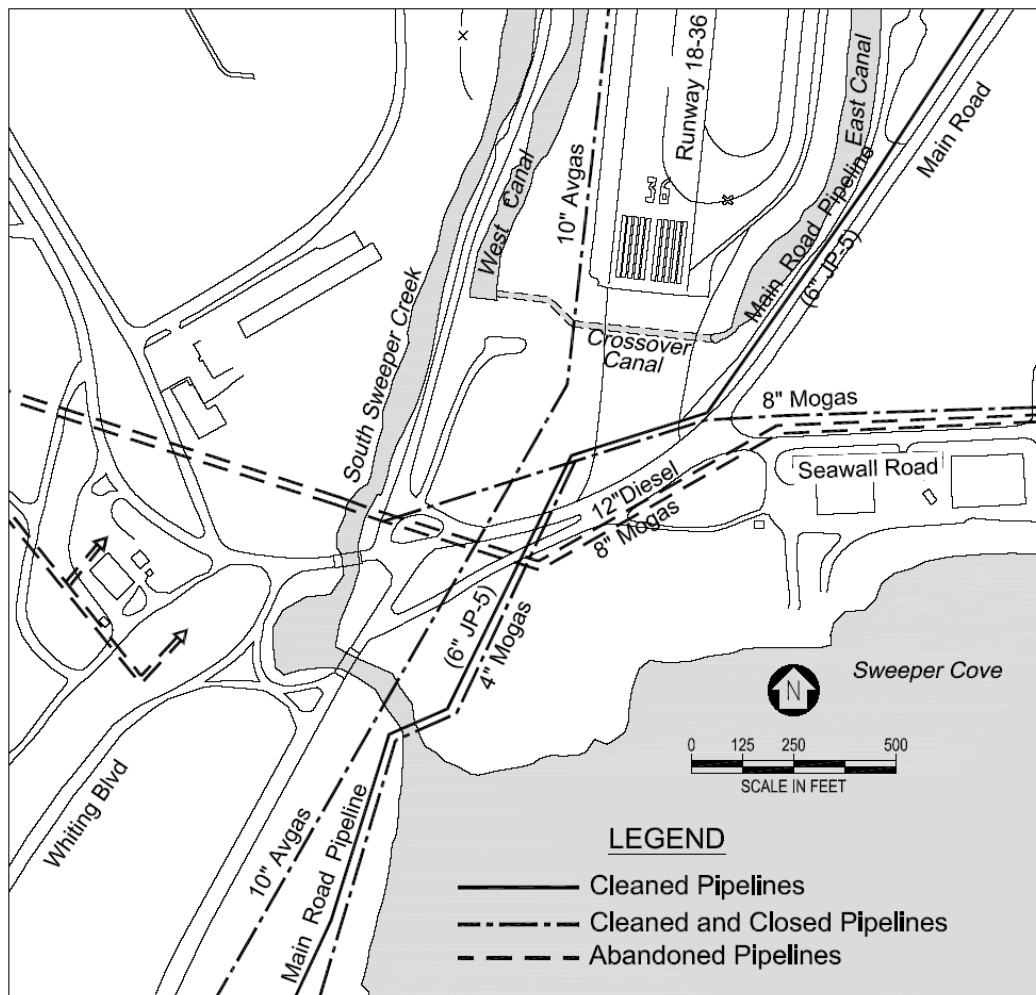


Figure 3
Potential Petroleum Sources at South of Runway 18-36 Area

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Cleanup activities that have been implemented at the South of Runway 18-36 Area include pipeline cleaning and closures, *free-product* removals, contaminated soil excavation, soil capping, sediment removal, replacement of crossover canal with metal culverts, installation of a product interception device, and *natural attenuation* monitoring. A summary of the cleanup activities performed at the site is provided in Table 2. In addition, results of the free-product recovery activities performed at the site are provided in Table 3.

Table 2. Summary of Site Cleanup Activities, South of Runway 18-36 Area

Date	Cleanup Activity
1997 – 2004 ^a	Free-product recovery (total of 215 gallons recovered)
1998	Petroleum aesthetic corrective action that included capping stained soil within West Canal south of Crossover Canal and removing a section of wooden pipeline
1999	Removal, treatment, and disposal of PCB-contaminated sediment from South Sweeper Creek
2001	Installation of two metal culverts in the airport ditch system from existing culverts in Crossover Canal to the south end of West Canal including removal of 70 cubic yards of petroleum-contaminated soil
2001	Installation of product interception device along the bank of South Sweeper Creek near Transit Road Bridge
2002	Natural attenuation monitoring
2003	Cleaning and closure of three pipelines: 10-inch avgas, 8-inch mogas, and 4-inch mogas

^aIntermittent operation

Note:

PCB – polychlorinated biphenyls

Table 3. Free-Product Recovery Data, South of Runway 18-36 Area

Year	Gallons Recovered	Months System Operated
1997	17	7
1998	37	11
1999	9	12
2000	68	11
2001	38	7
2002	41	7
2003	0	0
2004	6	4
Total	215	59

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 underground storage tanks (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, the EPA, and the Alaska DEC in 2000.

The ROD for OU A selected final or interim remedies for each of the 128 petroleum-contaminated sites identified on Adak Island. An interim remedy, free-product recovery, was selected for 14 sites that contained measurable quantities of *free-phase petroleum* product. In addition, the ROD for OU A specified that these 14 sites would require future remedy selection. In 2003, the petroleum sites were transferred from CERCLA authority (managed by EPA) to state authority (managed by Alaska DEC). Therefore, final remedies for the 14 petroleum-contaminated sites will be selected in accordance with Alaska State regulation 18 AAC 75.325 through AAC 75.390, which provides the requirements for petroleum cleanup decisions.

A Proposed Plan and a DD were previously prepared for the 10 sites where the remaining petroleum-related chemicals pose no *risk* to human health or the environment above *target health goals*, provided that institutional controls remain in effect. This Proposed Plan addresses the South of Runway 18-36 Area, which is one of the four sites where petroleum-related chemicals pose a potential risk to human health or the environment above target health goals. The remaining three sites (the Naval Mobile Construction Battalion [NMCB] Building T-1416 Expanded Area site, the Solid Waste Management Unit [SWMU] 62 New Housing Fuel Leak site, and the SWMU 17 Power Plant No. 3 site) where petroleum-related chemicals pose a potential risk are addressed in separate documents. The Proposed Plan for the NMCB Building T-1416 Expanded Area site was issued on August 16, 2005 and the Proposed Plan for the SWMU 62 New Housing Fuel Leak site will be issued concurrent with this Proposed Plan. The Proposed Plan for the SWMU 17 Power Plant No. 3 site is expected to be issued in 2006.

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 northwest quarter of South of Runway 18-36 Area was within the former lagoon. The geology and hydrogeology at the site is described as unconsolidated sand and sandy soils derived from stream, wind, and wave action. The subsurface soils beneath South of Runway 18-36 Area have variable *permeability* and generally consist of sands and gravels with varying portions of silt. The *saturated* soils have a high water-bearing capacity.

Groundwater is found as a regional aquifer beneath the site. The water table is approximately 5 to 10 feet below ground surface (bgs). Groundwater flow in the lowland area occupied by the site is complex and controlled to a large extent by the water level in the East and West Canals. In general, groundwater flow is toward the nearest surface water body: East Canal, West Canal, South Sweeper Creek, or Sweeper Cove. Nearshore groundwater in the vicinity of Sweeper Cove and South Sweeper Creek is tidally influenced, while mechanical pumping of water from the West Canal into South Sweeper Creek influences groundwater elevations near the airport ditch system. Because of the multidirectional groundwater flow in the vicinity, the East Canal, the West Canal, South Sweeper Creek, and Sweeper Cove are all considered to be *downgradient* surface water bodies.

South Sweeper Creek is located at the western boundary of the site and receives surface water and groundwater from approximately 30 percent of the Sweeper Cove drainage basin. The mouth of South Sweeper Creek forms an estuary where it discharges into Sweeper Cove. The shoreline of Sweeper Cove is sandy near the discharge of South Sweeper Creek. The East Canal and the West Canal of the airport ditch system are steeply sloped, man-made channels lined with tundra grass. The Crossover Canal is totally contained in underground culverts that al-

low water to flow between the East and West Canals. Water in the East Canal flows through the Crossover Canal and into the West Canal (where it is transferred through turbine pumps into South Sweeper Creek). The canals provide drainage and water level control surrounding Runway 18-36.

Land Use

The South of Runway 18-36 Area was formerly a military airstrip and fuel receipt and distribution center and is crossed by six former underground fuel transfer pipelines that are part of this fuel distribution system (see Figure 3). After World War II, the area continued to be used for these purposes until the military drawdown on Adak resulted in a reduction of fuel usage and air traffic.

Future land use at South of Runway 18-36 Area is designated for either aviation or public facilities reuse (Figure 4). The portion of the site north and west of Main Road is designated for aviation reuse. The intent of this category is to provide for aviation or aviation-related commercial/industrial activities. The portion of the site between Main Road and Sweeper Cove is designated for public facilities reuse. This category is intended to provide for and protect areas of public lands or facilities for public uses. This includes roads and harbor facilities present in the vicinity of the South of Runway 18-36 Area.

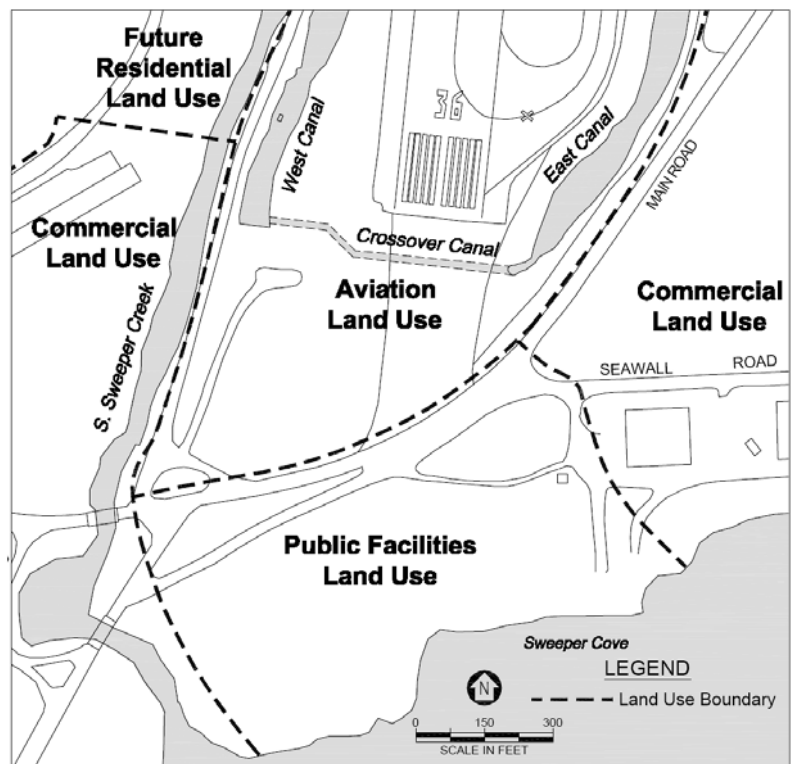


Figure 4
Proposed Future Land Use, South of Runway 18-36 Area

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Groundwater Use

According to Alaska regulations (18 AAC 65.350), 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 potential future source of drinking water. Groundwater has not historically been used as a drinking

water source on Adak Island, nor is it currently being used as such. Groundwater is not considered a reasonably expected potential future drinking water source at the site, because saltwater was shown to intrude into near-shore groundwater in the vicinity of the South of Runway 18-36 Area in the Saltwater Intrusion Investigation Report. Institutional controls are also in place preventing the future use of any of the downtown groundwater aquifer as a drinking water source.

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 the South of Runway 18-36 Area are provided in Table 4.

Table 4. Soil and Groundwater Screening Criteria and Cleanup Levels, South of Runway 18-36 Area

Chemical	Soil ^a	Groundwater	
	Screening Criteria (Method 2) ^b (mg/kg)	Screening Criteria (Table C) ^b (mg/L)	Ten Times Table C ^c (mg/L)
Total Petroleum Hydrocarbons			
DRO	230	1.5	15
GRO	260	1.3	13
Volatile Organic Compounds			
Benzene	0.02	0.005	0.05
Ethylbenzene	5	0.7	7

^aCleanup levels for soil are not presented here because risks in soil are below target health goals. Cleanup levels for soil are therefore established at existing soil concentrations

^bUsed as screening criteria to determine potential extent of contamination

^cUsed as cleanup levels for remediation

Notes:

DRO - diesel-range organics

GRO - gasoline-range organics

mg/kg - milligram per kilogram

mg/L - milligram per liter

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 the South of Runway 18-36 Area to estimate the potential extent of soil impacted by petroleum 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.

However, the risk assessment for this site established that the existing concentrations in soil do not pose a risk to humans or the environment above target health goals. Therefore, the existing concentrations at the site are protective of human health and the environment, and by default, are the cleanup levels for the site.

The Alaska regulations establish three 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 to estimate the potential extent of groundwater impacted by petroleum contamination at the site. Cleanup levels specified for remediation of groundwater at the South of Runway 18-36 Area are based on 10 times these values because groundwater is not reasonably expected to be a potential future source of drinking water [18 AAC 75.345(b)(2)].

Surface Water and Sediment

For surface water bodies of the state, Alaska regulation 18 AAC Chapter 70 establishes water quality standards based on water use classes and subclasses. Waters of Sweeper Cove and the lower reach of South Sweeper Creek fall within the marine water class and the following subclasses: water supply aquaculture; secondary recreation; and growth and propagation of fish, shellfish, other *aquatic* life, and wildlife. The water quality standards established for this use class (and these subclasses) specify that *total aqueous hydrocarbons* (TAqH) in the water column may not exceed 15 micrograms per liter (µg/L) and that *total aromatic hydrocarbons* (TAH) in the water column may not exceed 10 µg/L. In addition, there may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that 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)]. The canals of the airport ditch system, including the West Canal, fall within the fresh water class, and the secondary recreation subclass. The water quality standards established for this use class and subclass specify that petroleum hydrocarbons, oils, and grease may not cause a film, sheen, or discoloration on the surface or floor of the water body or adjoining shorelines, and surface waters must be virtually free from floating oils [18 AAC 70.020(b)(5)(B)(ii)].

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Since Alaska State Regulations do not establish surface water cleanup levels for individual chemicals, *diesel-range organics* (DRO), or *gasoline-range organics* (GRO); the results of the ecological risk assessment were used to establish additional risk-based cleanup levels for chemicals in surface water that may result in a potential risk to ecological *receptors*. Site-specific risk-based cleanup levels for surface water were calculated for individual chemicals as discussed in the Summary of Site Risks section. The risk-based cleanup levels for surface water are provided in Table 5. These risk-based cleanup levels are additional cleanup levels for surface water, and do not replace the TAqH and TAH criteria specified in 18 AAC Chapter 70. Both the risk-based cleanup levels and the surface water quality criteria established by Alaska regulation 18 AAC Chapter 70 apply to South Sweeper Creek.

Alaska State Regulations do not establish chemical-specific cleanup levels for sediment. Therefore, sediment cleanup levels were established based on the results of the ecological risk assessment. Site-specific risk-based cleanup levels were calculated for individual chemicals as discussed in the Summary of Site Risks section. Risk-based cleanup levels were only established for those chemicals that could potentially pose an unacceptable risk to ecological receptors due to exposure to sediment in South Sweeper Creek. The risk-based cleanup levels for sediment are also provided in Table 5.

Table 5. Sediment and Surface Water Cleanup Levels, South of Runway 18-36 Area

Chemical	Sediment	Surface Water	
	Risk-Based Cleanup Levels ^{a,b} (mg/kg)	Risk-Based Cleanup Levels ^{a,b} (µg/L)	Alaska DEC Quality Standards ^b (µg/L)
Total Petroleum Hydrocarbons			
DRO	90.6	0.014	NA
GRO	12.2	114	NA
TAH	NA	NA	10
TAqH	NA	NA	15
Polycyclic Aromatic Hydrocarbon Compounds			
2-Methylnaphthalene	0.0202	NC	NA
Indeno(1,2,3-cd)pyrene	NC	0.28	NA
Phenanthrene	0.225	NC	NA

^aUsed as screening criteria to determine potential extent of contamination

^bUsed as cleanup levels for remediation

Notes:

DRO - diesel-range organics

GRO - gasoline-range organics

mg/kg - milligram per kilogram

µg/L - microgram per liter

NA - not applicable

NC - not calculated, risk less than target health goal

RBSC - risk-based screening criteria

TAH - total aromatic hydrocarbons

TAqH - total aqueous hydrocarbons

EXTENT OF CONTAMINATION

Various environmental field investigations were performed at the South of Runway 18-36 Area between 1989 and 2001. Based upon the results of these field investigations, the potential extent of contamination was estimated for free product, groundwater, surface water, and sediment. Potential extent of contamination for soil and groundwater was estimated by comparing site concentrations to the screening criteria as discussed in the previous section. More detailed site characterization information is provided in the Final Focused Feasibility Study Report for the South of Runway 18-36 Area.

Free Product

Between November 1992 and December 2004, monitoring wells within the vicinity of the South of Runway 18-36 Area

were gauged periodically for the presence of free product. During this time, free product was detected in 19 of the 26 wells installed at the site. The maximum measured *free-product thickness* reported at the site was 2.15 feet, in well E-216 on May 11, 2002. Figure 5 shows the estimated extent of residual free product at the site based on the maximum measured free-product thickness reported in each well during three monitoring periods: November 1992 through October 2000, January 2001 through October 2003, and August through December 2004. The maximum estimated extent of free product occurred during the initial monitoring period (November 1992 through October 2000), and the minimum estimated extent of free product occurred during the second monitoring period (January 2001 through October 2003).

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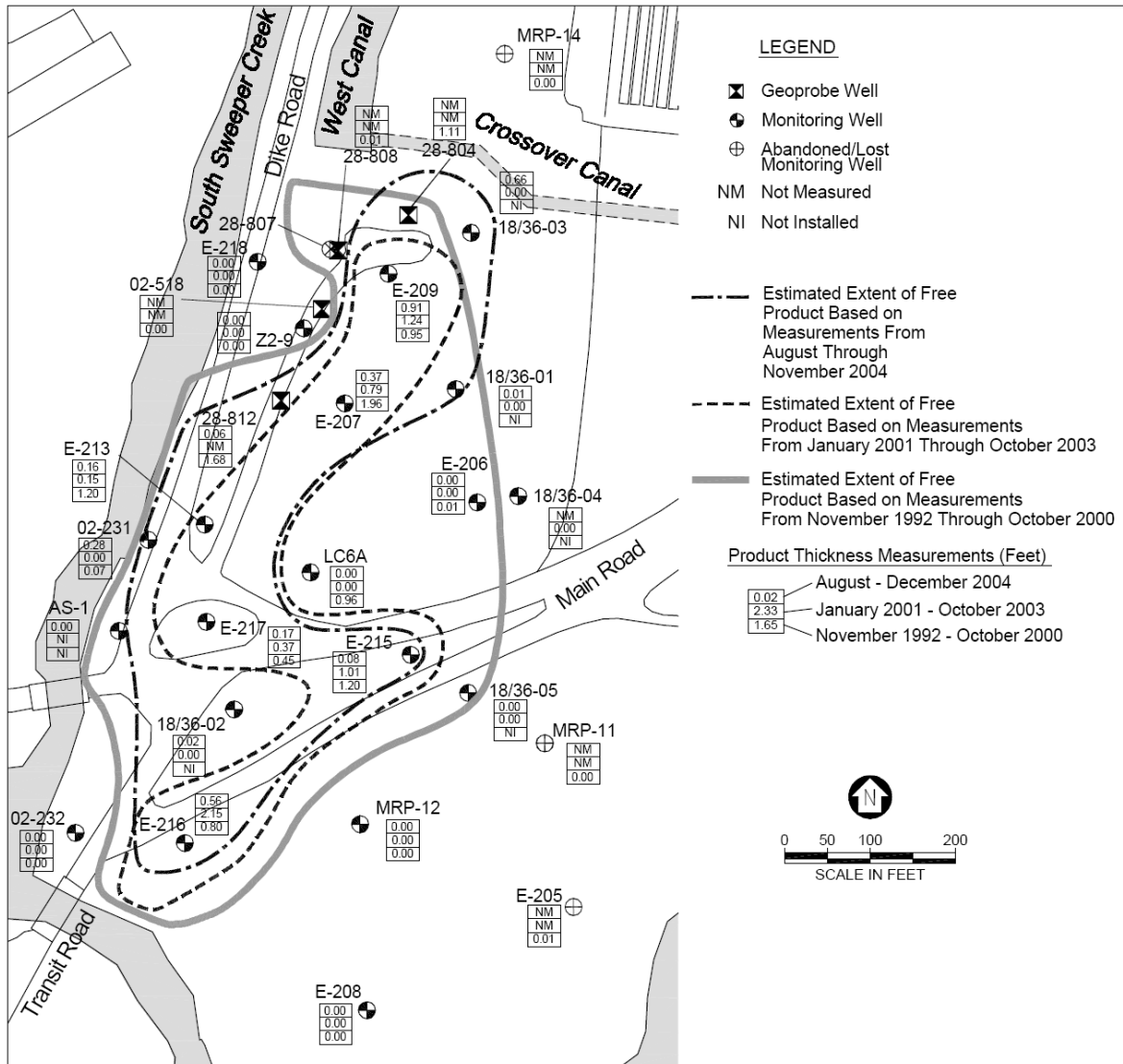


Figure 5
Estimated Extent of Residual Free Product, South of Runway 18-36 Area

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Soil and Groundwater

The extent of soil and groundwater impacted by petroleum contamination at the South of Runway 18-36 Area 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 6):

- DRO
- GRO
- benzene
- ethylbenzene

For groundwater, both the maximum detected analytical result and the most recent analytical result available for each chemical at each location were compared to the screening

criteria to determine the extent of groundwater contamination. The most recent analytical results represent the current conditions at the site. For groundwater, the following chemicals were detected in groundwater above the screening criteria (see Table 6):

- DRO
- GRO
- benzene

If only the most recent groundwater data are compared to the screening criteria, one chemical (GRO) would be removed from the list above. Concentrations of chemicals in soil and groundwater above the screening criteria do not represent a human or ecological health risk as discussed in the Summary of Site Risks section below.

Table 6. Chemicals Detected in Soil and Groundwater at Concentrations Greater than Alaska DEC Screening Criteria, South of Runway 18-36 Area

Chemical	Maximum Soil Concentration (mg/kg)	Screening Criteria (Alaska DEC Method 2) (mg/kg)	Maximum Groundwater Concentration (mg/L)	Maximum Groundwater Concentration During Most Recent Sampling Event (mg/L)	Screening Criteria (Alaska DEC Table C) (mg/L)
Total Petroleum Hydrocarbons					
DRO	<i>75,000</i>	230	<i>45</i>	<i>7.1</i>	1.5
GRO	<i>2,700</i>	260	<i>2.8</i>	0.9	1.3
Volatile Organic Compounds					
Benzene	<i>1.67</i>	0.02	<i>0.039</i>	<i>0.033</i>	0.005
Ethylbenzene	<i>15.8</i>	5	.097	0.052	0.7

Notes:

Concentrations shown in bolded italics exceed the screening criteria

DEC - Department of Environmental Conservation

DRO - diesel-range organics

GRO - gasoline-range organics

mg/kg - milligram per kilogram

mg/L - milligram per liter

Surface Water and Sediment

The extent of surface water that poses a potential unacceptable risk to ecological receptors or exceeds the surface water quality standards was estimated by comparing analytical results to the risk-based cleanup levels and the Alaska DEC surface water quality standards described in the Cleanup Levels section. For surface water, the following chemicals were detected above the risk-based cleanup levels or the Alaska DEC surface water quality standards (see Table 7):

- Indeno(1,2,3-cd)pyrene
- GRO
- DRO
- TAqH
- TAH

The extent of sediment that poses a potential unacceptable risk to ecological receptors was estimated by comparing analytical results to the risk-based cleanup levels described in the Cleanup Levels section. For sediment, the following chemicals were detected above the risk-based cleanup levels (Table 7):

- 2-Methylnaphthalene
- Phenanthrene
- GRO
- DRO

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Table 7. Chemicals Detected in Sediment and Surface Water at Concentrations Greater than Risk-Based Cleanup Levels or Alaska Surface Water Quality Standards, South of Runway 18-36 Area

Chemical	Sediment		Surface Water	
	Maximum Concentration (mg/kg)	Risk-Based Cleanup Level (mg/kg)	Maximum Concentration (µg/L)	Risk-Based Cleanup Level or WQS ^a (µg/L)
Total Petroleum Hydrocarbons				
DRO	9,380	90.6	79,000	0.014
GRO	28	12.2	650	114
TAH ^a	NA	NA	27.7	10
TAqH ^a	NA	NA	60.5	15
Polycyclic Aromatic Hydrocarbon Compounds				
2-Methylnaphthalene	13 J	0.0202	1.5 J	NC
Indeno(1,2,3-cd)pyrene	0.4	NC	0.32 J	0.28
Phenanthrene	1.4 J	0.225	ND	NC

Notes:

Concentrations shown in bolded italics exceed the cleanup level or water quality standard

DRO - diesel-range organics

GRO - gasoline-range organics

J - estimated concentration

mg/kg - milligrams per kilogram

µg/L - microgram per liter

NA - not applicable

NC - not calculated, risk less than target health goal

ND - not detected

TAH - total aromatic hydrocarbons

TAqH - total aqueous hydrocarbons

WQS - Alaska Department of Environmental Conservation surface water quality standards

^aTAH and TAqH cleanup levels are based on the Alaska Department of Environmental Conservation Water Quality Standards (18 AAC 70). All other cleanup levels are based on results of the risk assessment.

SUMMARY OF SITE RISKS

A human health risk assessment and an ecological risk assessment were conducted to determine if residual petroleum at the South of Runway 18-36 Area would pose a potential unacceptable risk to human health or the environment if no cleanup actions were to take place. Risks (human health only) and *hazards* (human health and ecological) from exposure to petroleum compounds were estimated for each *complete exposure pathway*. More detailed information on the risk assessment is provided in the Final Focused Feasibility Study Report for the South of Runway 18-36 Area.

Human health risks and hazards due to exposure to petroleum compounds in soil and groundwater were estimated for each complete exposure pathway. The complete exposure pathways evaluated include ingestion, dermal contact, and inhalation of chemicals in soil by construction workers; and dermal contact and inhalation of chemicals in groundwater by construction workers. Potential human health risks and hazards due to exposure to petroleum compounds in the surface water and sediment of South Sweeper Creek were not estimated because human exposures to surface water and sediment during possible recreational activities were not significant. Risks and hazards due to exposure to soil and groundwater were estimated based on proposed land use (Figure 4) and groundwater not being used as a drinking water source because institutional controls prohibit the use of groundwater. The potential risks to construction workers resulting from exposure to subsurface soil and groundwater were found to be below target health goals. Therefore, residual petroleum-related chemicals at the site pose no unacceptable risks provided that institutional controls prohibiting the use of groundwater as a drinking water source remain in effect. While exposures to free product cannot be quantitatively evaluated in risk assessments, exposures to free product may represent an unacceptable health risk to construction workers. Therefore, in the event free product is encountered during construction, appropriate measures should be implemented to minimize contact and exposure.

No site-specific cleanup levels were calculated for soil and groundwater at the South of Runway 18-36 Area because risks and hazards were below target health goals. However, analytical data collected from monitoring wells at the site indicated that concentrations of petroleum hydrocarbons exceeded the proposed groundwater cleanup levels discussed in the Cleanup Levels section. The proposed groundwater cleanup levels for the South of Runway 18-36 Area are the Alaska DEC cleanup levels established for groundwater not currently used for, or not reasonably expected to be used for drinking water, because the water is not potentially potable (i.e., saltwater intrusion makes the water undrinkable). In addition, institutional controls are currently in place for groundwater, which restrict the use of groundwater as a drinking water source. Figure 6 shows the extent of groundwater contamination exceeding the proposed groundwater cleanup levels.

Ecological hazards due to exposure to petroleum compounds in surface soil, surface water, and sediment were estimated for each complete exposure pathway (see Table 8). The complete exposure pathways evaluated include ingestion and dermal contact/root uptake of chemicals in soil for *terrestrial* receptors and ingestion, dermal contact/root uptake, and food web of chemicals in surface water and/or sediment for aquatic receptors. Concentrations of petroleum compounds in surface soil were less than *risk-based screening concentrations* (RBSCs). Therefore, hazards were not estimated for surface soil. Ecological hazards due to exposure to surface water exceeded the target health goal of 1 for two chemicals, indeno(1,2,3-cd)pyrene and GRO. In addition, the concentration of DRO in surface water exceeded the RBSC. Ecological hazards due to exposure to sediment exceeded the target health goal for four chemicals: 2-methylnaphthalene, phenanthrene, DRO, and GRO.

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Table 8. Summary of Ecological Risk Assessment, South of Runway 18-36 Area

Receptor	Affected Medium	Exposure Pathways	Chemical	Hazard Quotient
Aquatic Organisms	Surface Water	Ingestion, dermal contact, food web	Indeno(1,2,3-cd)pyrene	1.14
			GRO	5.7
	Sediments	Ingestion, dermal contact/root uptake, food web	2-Methylnaphthalene	6.4
			Phenanthrene	6.2
			DRO	13.2
			GRO	2.3

Notes:

DRO – diesel-range organics

GRO – gasoline-range organics

Because concentrations of petroleum hydrocarbons in surface water and sediment exceeded target health goals, site-specific risk-based cleanup levels were established at concentrations equal to the RBSCs. For surface water, the risk-based cleanup levels are 0.28 µg/L for indeno(1,2,3-cd)pyrene, 0.014 µg/L for DRO, and 114 µg/L for GRO. The RBSC for DRO is based on the maximum solubility of the chemical due to the possibility that exceedances of solubility could produce a sheen. As discussed in the Cleanup Levels section, these risk-based cleanup levels for surface water are additional cleanup levels that do not replace the TAqH and TAH criteria specified in 18 AAC Chapter 70. Both the risk-based cleanup levels and the surface water quality criteria established by Alaska regulation 18 AAC Chapter 70 apply to South Sweeper Creek. For sediment, the risk-based cleanup levels are 0.02 milligram per kilogram (mg/kg) for 2-methylnaphthalene, 0.225 mg/kg for phenanthrene, 90.6 mg/kg for DRO, and 12.2 mg/kg for GRO. The extent of surface water and groundwater contamination exceeding the risk-based cleanup levels and/or the surface water quality standards is also depicted in Figure 6.

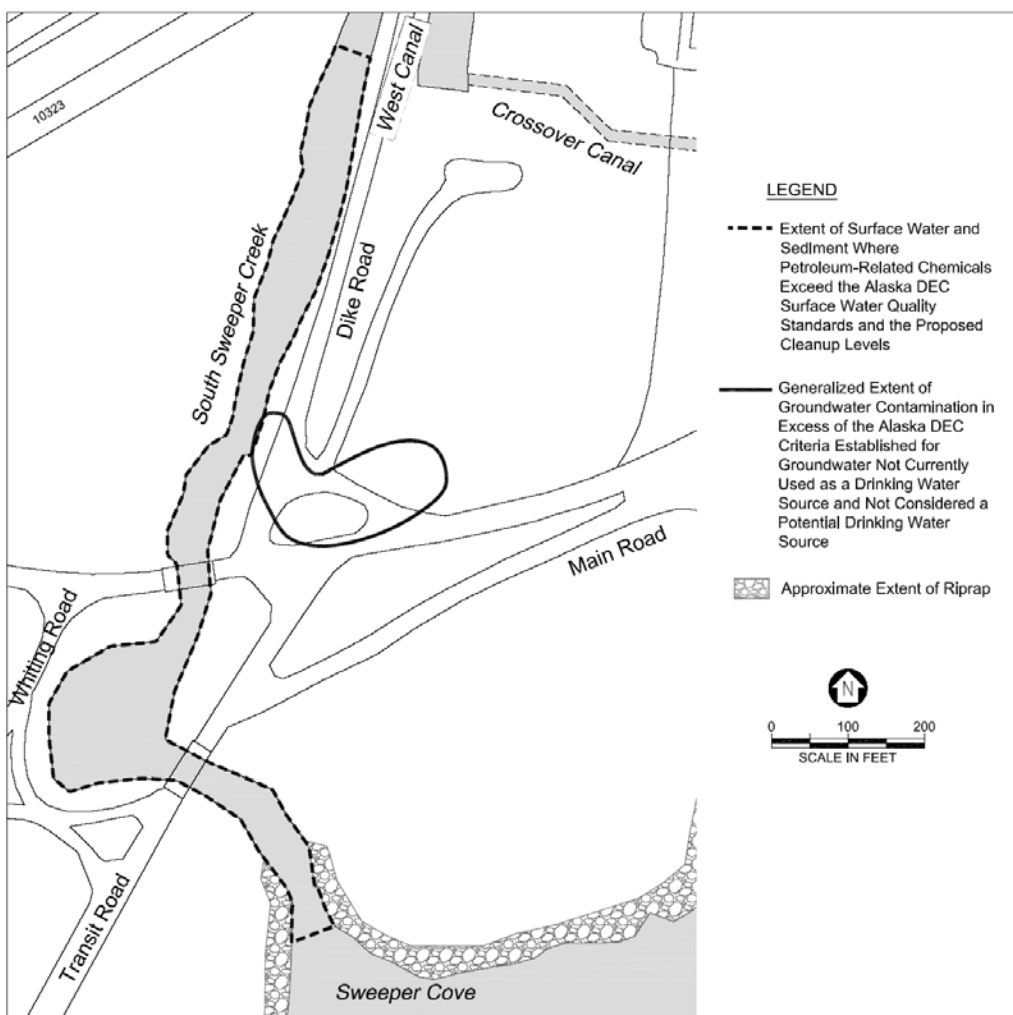


Figure 6
Extent of Groundwater, Surface Water, and Sediment Contamination, South of Runway 18-36 Area

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 the South of Runway 18-36 Area:

- Reduce petroleum hydrocarbons in groundwater to concentrations less than or equal to the Alaska DEC groundwater cleanup levels established for groundwater not currently used for, or not reasonably expected to be used for drinking water
- Minimize exposure to free-phase product

Based on the risk analysis conducted for this site and the regulatory requirements, the following RAOs were developed for the protection of the environment at the South of Runway 18-36 Area:

- Prevent the migration of petroleum hydrocarbons to sediments that would result in adverse health effects to ecological receptors
- Prevent the migration of petroleum hydrocarbons to surface water that would result in adverse health effects to ecological receptors and/or an exceedance of the Alaska surface water quality standards
- Prevent ecological exposure to petroleum hydrocarbons in surface water and sediment that would result in adverse health effects to ecological receptors and/or an exceedance of the Alaska surface water quality standards

REMEDIAL ACTION ALTERNATIVES

Cleanup technologies were identified and screened to identify those applicable to the South of Runway 18-36 Area. This screening evaluation was conducted using three criteria identified in Alaska DEC guidance: *protectiveness*, *ability to meet cleanup levels*, and *implementability*. The cleanup technologies that passed the screening were combined to form candidate remedial alternatives for the South of Runway 18-36 Area. These candidate remedial alternatives represent the most effective combination of actions for meeting the RAOs. Brief descriptions of the candidate remedial alternatives, including costs, are as follows:

Alternative 1 – No Action:

No action or monitoring would be implemented with this alternative. Institutional controls (*land use restrictions* and a fishing advisory), as described in the Institutional Control Management Plan, are currently in place for the site. Land use restrictions applicable to this site include restrictions on land development (i.e., residential land development would be prohibited), the downtown groundwater use prohibition, and the soil excavation notification requirements. This alternative would rely solely on natural attenuation and natural recovery to reduce concentrations of petroleum in the groundwater, surface water, and sediment. However, because monitoring is not included as part of this alternative, there would be no way to verify whether the cleanup levels and RAOs had been achieved. This alternative was retained as the baseline alternative with which the other alternatives were compared.

Cost: \$0

Alternative 2 – Institutional Controls, Passive Free-Product Recovery and Containment, Monitored Natural Attenuation (MNA) for Groundwater, and Natural Recovery for Surface Water and Sediment:

This alternative consists of institutional controls that are already in place as described in the Institutional Control Man-

agement Plan, installation of one free-product collection/containment trench to protect surface water, disposal of excavated trench soil, installation of seven new monitoring wells for free-product recovery and groundwater monitoring, free-product recovery from the free-product collection/containment trench and new and existing wells, MNA for groundwater, and natural recovery for surface water and sediment. Free product would be removed from the free-product collection/containment trench and 17 wells (7 new and 10 existing) using automated passive skimmers, passive skimmers, and sorbent socks; petroleum concentrations in groundwater, surface water, and sediment would be reduced through natural attenuation and natural recovery; and institutional controls would be used to protect human health and the environment as long as groundwater, surface water, and sediment concentrations were greater than cleanup levels and surface water quality standards.

Cost: Capital – \$1.8 million, Annual operation and maintenance (O&M) for Free-Product Recovery in Free-Product Collection/Containment Trenches – \$150,000 for years 1-2 and \$100,000 for years 3-20, Annual O&M for Free-Product Recovery in Wells – \$210,000, Annual O&M for MNA in Groundwater - \$66,000, Annual O&M for Natural Recovery in Surface Water and Sediment – \$53,000, Total Present Worth Cost – \$5.0 million

Alternative 3— Institutional Controls, Passive Free-Product Recovery and Containment, Creek Bank Soil Excavation, iSOC™ and MNA for Groundwater, and Natural Recovery for Surface Water and Sediment:

This alternative consists of institutional controls that are already in place as described in the Institutional Control Management Plan, installation of two free-product collection/containment trenches to protect surface water, installation of one *in situ submerged oxygen curtain* (iSOC™) by Inventures Technologies Inc. to protect surface water from migration of pe-

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roleum compounds dissolved in groundwater, excavation of creek bank soil for eliminating/reducing sheen in South Sweeper Creek, disposal of soil from the creek bank area, installation of six new monitoring wells for free-product recovery and groundwater monitoring, free-product recovery from the free-product collection/containment trenches and new and existing wells, MNA for groundwater, and natural recovery for surface water and sediment. Free product would be removed from the 2 free-product collection/containment trenches and 15 wells (6 new and 9 existing) using automated passive skimmers, passive skimmers, and sorbent socks; petroleum concentrations in surface water would be reduced through groundwater treatment using iSOC™; petroleum concentrations in groundwater, surface water, and sediment would be reduced through natural attenuation and natural recovery; and institutional controls would be used to protect human health and the environment as long as groundwater, surface water, and sediment concentrations were greater than cleanup levels and surface water quality standards.

Cost: Capital – \$2.7 million, Annual O&M for Free-Product Recovery in Free-Product Collection/Containment Trenches – \$200,000 for years 1-2 and \$140,000 for years 3-18, Annual O&M for Free-Product Recovery in Wells – \$190,000, Annual O&M for iSOC™ System – \$62,000, Annual O&M for MNA in Groundwater – \$66,000, Annual O&M for Natural Recovery in Surface Water and Sediment - \$53,000, Total Present Worth Cost – \$6.5 million

Alternative 4— Institutional Controls, Passive Free-Product Recovery and Containment, Creek Bank/Hot Spot Soil Excavation, iSOC™ and MNA for Groundwater, Sediment Removal, and Natural Recovery for Surface Water:

This alternative consists of institutional controls that are already in place as described in the Institutional Control Management Plan, installation of three free-product collection/containment trenches to protect surface water, installation of one iSOC™ to protect surface water from migration of petroleum compounds dissolved in groundwater, excavation of creek bank soil for eliminating/reducing sheen in South Sweeper Creek, excavation of hot spot soil in source areas to reduce the volume of petroleum hydrocarbons, excavation of sediment to protect ecological receptors, disposal of soil from creek bank/hot spot soil areas and sediment, installation of nine new monitoring wells for free-product recovery and groundwater monitoring, free-product recovery from the free-product collection/containment trenches and new and existing wells, MNA for groundwater, and natural recovery for surface water. Free product would be removed from 3 free-product collection/containment trenches and 7 wells (3 new and 4 existing) using automated passive skimmers, passive skimmers, and sorbent socks; petroleum concentrations in surface water would be reduced through groundwater treatment using iSOC™; petroleum concentrations in groundwater and surface water would be reduced through natural attenuation and natural recovery; and institutional controls would be used to protect human health and the environment as long as groundwater, surface water, and sediment concentrations were greater than cleanup levels and surface water quality standards.

Cost: Capital – \$16 million, Annual O&M for Free-Product Recovery in Free-Product Collection/Containment Trenches – \$260,000 for years 1-2 and \$190,000 for years 3-12, Annual O&M for Free-Product Recovery in Wells – \$110,000, Annual O&M for iSOC™ System – \$62,000, Annual O&M for MNA in Groundwater – \$66,000, Annual O&M for Natural Recovery in Surface Water – \$36,000, Total Present Worth Cost – \$19 million

EVALUATION OF ALTERNATIVES

Each alternative for the South of Runway 18-36 Area was evaluated using four of the five criteria of the Alaska DEC Guidance on Decision Documentation Under the Site Cleanup Rules: protectiveness; practicability; short- and long-term effectiveness; and regulations. These criteria are summarized in Table 9. Public input as a criterion will be evaluated after receipt of the public comments on this Proposed Plan and will be presented in the DD. Each remedial alternative was assessed and assigned a rating of poor, fair, good, excellent, or superior for each evaluation criteria as presented in Table 10. Based on the evaluation of the individual criteria, each alternative was also given an overall rating (poor, fair, good, excellent, or superior).

Alternatives 2 and 3 were both given an overall rating of good. Alternative 2 was given an overall rating of good for different reasons than Alternative 3. Alternative 2 provides superior implementability and excellent cost effectiveness and short-term effectiveness. In addition, it provides good protectiveness, long-term effectiveness, and compliance with regula-

tions. Although Alternative 2 takes longer to achieve the RAOs, this alternative costs significantly less than Alternative 3 and is easier to implement on Adak Island, given the remoteness of this island. Alternative 3 was given an overall rating of good, because it provides excellent protectiveness, long-term effectiveness, and compliance with regulations, and good short-term effectiveness and time to achieve cleanup goals. Alternative 3 is capable of achieving the surface water and sediment cleanup goals in significantly less time than Alternative 2, and protection of both human and ecological receptors is expected within five years of the creek bank soil excavation and iSOC™ and free-product collection/containment trench installation. However, there are additional short-term risks and costs associated with this alternative when compared to Alternative 2.

Alternative 4 was given an overall rating of fair. This alternative was rated lower than Alternatives 2 and 3 because of the difficulty of implementing this complex alternative on Adak Island, the high cost, and the additional short-term risks as-

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sociated with this alternative. This alternative received superior ratings for long-term effectiveness and regulations and an excellent rating for protectiveness and time to achieve cleanup goals. Although this alternative provides superior long-term effectiveness, it achieves that through additional remedial actions, which have additional short-term risks and costs.

Table 9 Alaska DEC Criteria for Evaluating Remedial Alternatives

Criteria	Description
Protectiveness	Whether the remedial alternatives protect human health and the environment both during and after the cleanup actions by eliminating, reducing, or controlling exposures to hazardous substances or contaminants and by protecting human health from physical and other hazards directly associated with the cleanup action
Practicable	Whether the remedial alternatives can be designed, constructed, and implemented in a reliable and cost-effective manner. For ease of evaluation, this criterion is subdivided into two separate criteria: implementability and cost.
Short- and Long-term Effectiveness	Ability of the alternatives to protect human health and the environment during the construction/implementation phase (short-term) and after completion of the cleanup (long-term). The speed with which the alternatives achieve the cleanup goals is also evaluated. For ease of evaluation, this criterion is subdivided into three separate criteria: short-term effectiveness, time to achieve cleanup goals, and long-term effectiveness.
Regulations	Ability of alternatives to attain federal and state applicable or relevant and appropriate requirements or to provide justification for invoking a waiver.
Public input	Whether the public agrees with, opposes, or has no comment on the preferred alternative. Public input will be evaluated after receipt of the public comments on this proposed plan.

Note:
DEC - Department of Environmental Conservation

Alternative 1 was given a rating of poor. This alternative received poor ratings for protectiveness, time to achieve cleanup goals, regulations, and long-term effectiveness. Although this alternative would be easy to implement and would cost nothing, the alternative would not be protective of human health and the environment.

Table 10 Evaluation of Remedial Alternatives, South of Runway 18-36 Area

	Rating of Alternatives			
	Alternative 1 No Action	Alternative 2 Institutional Controls, Free-Product Recovery, MNA, and Natural Recovery	Alternative 3 Free-Product Recovery, Creek Bank Excavation, ISOC, MNA, and Natural Recovery	Alternative 4 Free-Product Recovery, Creek Bank, Hot Spot and Sediment Excavation, ISOC, MNA, and Natural Recovery
Alaska DEC Criteria				
Protectiveness	○	◐	◑	◒
Practicable - Implementability	◑	●	◐	○
Practicable - Cost Effectiveness	●	◐	◑	○
Short- and Long-term Effectiveness Short-term Effectiveness	●	◑	◐	○
Short- and Long-term Effectiveness Time to Achieve Cleanup Goals	○	◑	◐	◒
Short- and Long-term Effectiveness Long-term Effectiveness	○	◐	◑	●
Regulations	○	◐	◑	●
Overall	○	◐	◑	◒

Notes:
MNA - monitored natural attenuation
ISOC - in situ Submerged Oxygen Curtain by Inventures Technologies Inc.

○ Poor ◐ Fair ◑ Good ◒ Excellent ● Superior

PREFERRED CLEANUP ALTERNATIVE

Alternative 2 – Institutional Controls, Free-Product Recovery, MNA, and Natural Recovery – is the preferred cleanup alternative for the South of Runway 18-36 Area (see Figure 7). This alternative will provide an appropriate, cost-effective remedy that protects human health and the environment and that can be implemented at the earliest possible time. The Alaska DEC concurs with the selection of this alternative as the Preferred Alternative.

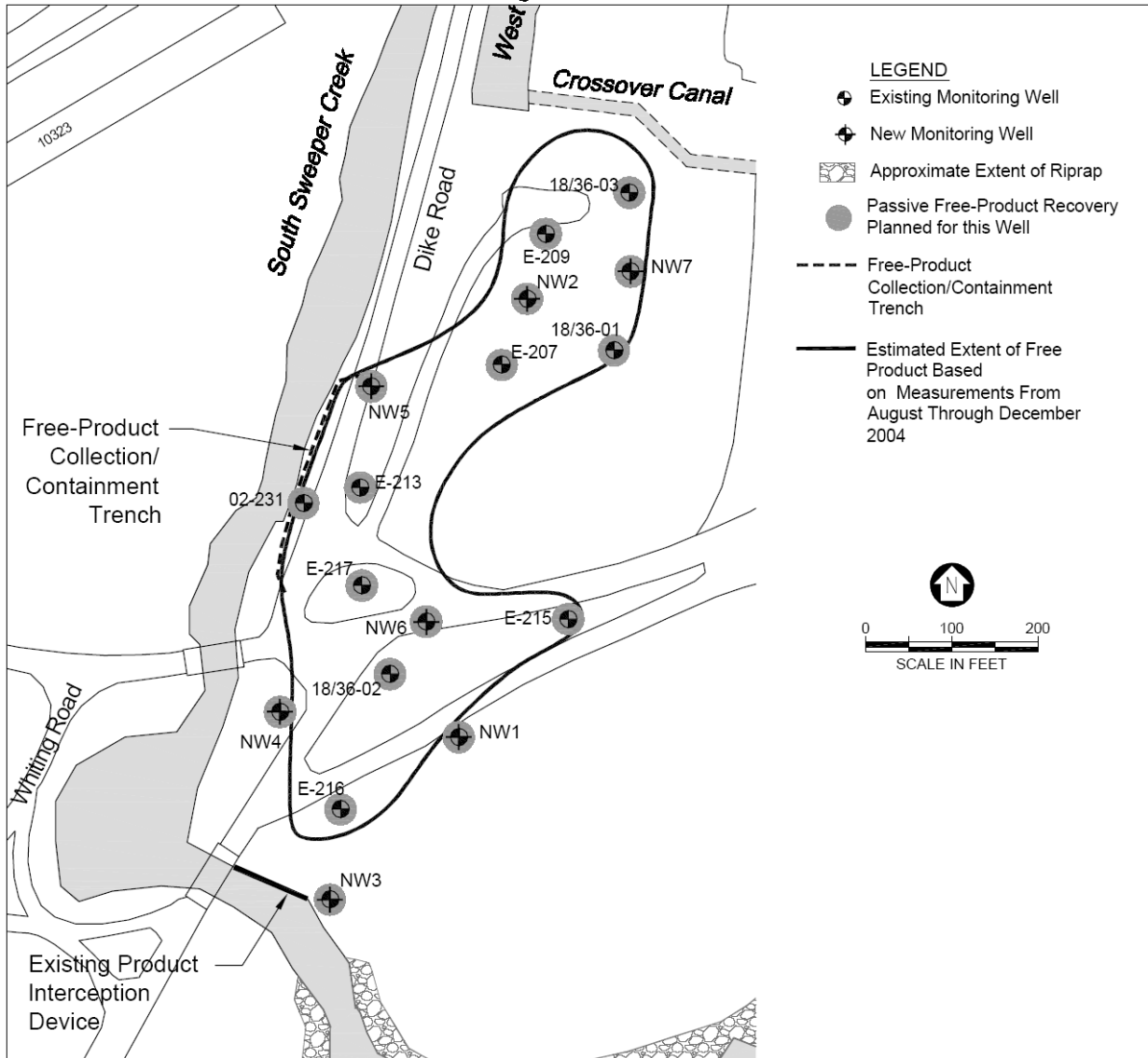
Alternatives 2 and 3 both received the highest overall rating in the Final Focused Feasibility Study Report. Therefore, only these two alternatives were considered for selection at the South of Runway 18-36 Area. A summary of the issues at the South of Runway 18-36 Area and how Alternatives 2 and 3 address these issues is provided in Table 11. A summary of the advantages and disadvantages of these two alternatives is provided in Table 12.

Alternative 2 is proposed for South of Runway 18-36 Area because the additional costs associated with Alternative 3 are not warranted given that Alternative 2 is protective of human health in the short term and long term and the environment in the long term. Although risks to ecological receptors may not be effectively controlled in the short term with Alternative 2, calculated risks are based on data collected between 1996 and 1998 and actual risks currently present at the site are expected to be lower due to free-product recovery activities and other cleanup activities that were implemented after the surface water and sediment data were collected. In addition, potential risks would be reduced with time through additional passive free-product recovery activities and natural recovery. TAqH concentrations were above water quality criteria in only one sample from South Sweeper Creek in 1998, and none of the measured TAH concentrations in South Sweeper Creek exceeded water quality criteria. The exceedance of the TAqH water quality criteria was prior to a majority of the free-prod-

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uct recovery activities at the site and all other cleanup activities implemented at the site. Finally, groundwater concentrations of TAH in the well closest to the surface water exceedance of TAqH have shown a steady decline since 1998 (no TAqH concentration data available). If concentrations of TAqH are not currently below water quality criteria, the concentrations should decline below water quality criteria with the free-product

recovery efforts and MNA included as part of Alternative 2. Because Alternative 2 would be much easier to implement and more cost-effective than Alternative 3 and Alternative 2 would be protective of human health and the environment in the long term, Alternative 2 is the preferred cleanup alternative for the South of Runway 18-36 Area.



*Figure 7
Preferred Cleanup Alternative Activities,
South of Runway 18-36 Area*

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Table 11 What are the Real Issues at South of Runway 18-36 Area and How Do the Alternatives Address These Issues?

Issue	How is the Issue Addressed?	
	Alternative 2	Alternative 3
Free product in groundwater and sheen in South Sweeper Creek	Institutional controls (excavation notification), passive free-product recovery and containment, and natural recovery	Institutional controls (excavation notification), passive free-product recovery and containment, creek bank excavation, and natural recovery
Groundwater concentrations exceed groundwater cleanup levels (10 times Table C values)	Institutional controls (downtown groundwater use prohibition), passive free-product recovery, and monitored natural attenuation	Institutional controls (downtown groundwater use prohibition), passive free-product recovery, and monitored natural attenuation
Unacceptable ecological risks in surface water and sediment	Passive free-product recovery and containment and natural recovery	Creek bank excavation, passive free-product recovery and containment, iSOC, and natural recovery
Historical surface water concentrations exceed water quality standards for TAH and TAqH	Passive free-product recovery and containment and natural recovery	Creek bank excavation, passive free-product recovery and containment, iSOC, and natural recovery

Notes:

iSOC™ – in situ Submerged Oxygen Curtain by Inventures Technologies

TAH – total aromatic hydrocarbons

TAqH – total aqueous hydrocarbons

Table 12 Summary of Advantages and Disadvantages of Alternatives 2 and 3, South of Runway 18-36 Area

Advantages and Disadvantages	Alternative 2 – Institutional Controls, Free-Product Recovery and Containment, Monitored Natural Attenuation (MNA), and Natural Recovery	Alternative 3—Institutional Controls, Free-Product Recovery and Containment, Creek Bank Excavation, iSOC™, MNA, and Natural Recovery
Advantages	<ul style="list-style-type: none"> Effectively controls exposure to groundwater through institutional controls Reduces volume of free product in subsurface through passive free-product recovery and containment Reduces sheen on surface water through free-product containment Reduces groundwater concentrations through passive free-product recovery and natural attenuation Reduces migration of petroleum hydrocarbons to sediments and surface water through free-product containment Reduces surface water and sediment concentrations through natural recovery Relatively inexpensive Easy to implement 	<ul style="list-style-type: none"> Effectively controls ecological risk through creek bank excavation, free-product containment, and iSOC™ Effectively controls exposure to groundwater through institutional controls Reduces volume of free product in subsurface through passive free-product recovery and containment Reduces sheen on surface water through creek bank excavation and free-product containment Reduces groundwater concentrations through passive free-product recovery and natural attenuation Reduces migration of petroleum hydrocarbons to sediments and surface water through creek bank excavation, free-product containment, and iSOC™ Reduces surface water and sediment concentrations through natural recovery TAH and TAqH concentrations in surface water reduced through creek bank excavation, iSOC™, and natural recovery
Disadvantages	<ul style="list-style-type: none"> Risks to ecological receptors may not be effectively controlled in the short term. However, <ul style="list-style-type: none"> Calculated risks based on concentration data collected between 1996 and 1998 before the majority of the free-product recovery activities had occurred and before all other cleanup activities were implemented at the site Passive free-product recovery and containment and natural recovery may require time to reduce TAH and TAqH concentrations in surface water to below water quality criteria. However, <ul style="list-style-type: none"> Only one location within South Sweeper Creek had TAqH concentrations that exceeded the water quality standards and no locations had TAH concentrations that exceeded water quality standards Surface water samples were collected and analyzed for TAH and TAqH in 1998 before the majority of the free-product recovery activities had occurred and before all other cleanup activities were implemented at the site Groundwater concentrations of TAH in the well closest to the surface water exceedance of TAqH have shown a steady decline since 1998 (no TAH concentration data available) 	<ul style="list-style-type: none"> Relatively expensive Relatively difficult to implement for the following reasons: <ul style="list-style-type: none"> Creek bank soil excavation below the groundwater table complicated by dewatering and shoring requirements and creek diversion Soil excavation on Adak complicated by the high rainfall Treatment of water from excavation dewatering complicated because of the extensive treatment required to meet marine surface water quality criteria Implementation of iSOC™ adds complexity

Notes:

iSOC™ – in situ Submerged Oxygen Curtain by Inventures Technologies

TAH – total aromatic hydrocarbons

TAqH – total aqueous hydrocarbons

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 to:

Mark Wicklein, P.E.
Naval Facilities Engineering Command Northwest
19917 Seventh Avenue NE
Poulsbo, WA 98370-7570
Phone: (360) 396-0226
Fax: (360) 396-0857
mark.wicklein@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 the South of Runway 18-36 Area, please contact:

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ACRONYMS

AAC	Alaska Administrative Code	MNA	monitored natural attenuation
ARC	Adak Reuse Corporation	mogas	motor vehicle gasoline
avgas	aviation gasoline	NMCB	Naval Mobile Construction Battalion
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	O&M	operation and maintenance
DD	Decision Document	OU	Operable Unit
DEC	Department of Environmental Conservation	RAB	Restoration Advisory Board
DRO	diesel-range organics	RAO	remedial action objective
EPA	Environmental Protection Agency	RBSC	risk-based screening concentration
FFA	Federal Facilities Agreement	ROD	Record of Decision
bgs	below ground surface	SAERA	State-Adak Environmental Restoration Agreement
GRO	gasoline-range organics	SARA	Superfund Amendments and Reauthorization Act
iSOC™	in situ submerged oxygen curtain by Inventures Technologies Incorporated	SWMU	Solid Waste Management Unit
JP	jet petroleum	TAH	total aromatic hydrocarbons
mg/kg	milligrams per kilogram	TAqH	total aqueous hydrocarbons
µg/L	micrograms per liter	TPH	total petroleum hydrocarbons
		UST	underground storage tank

GLOSSARY

Ability to meet cleanup levels. This criterion for evaluating potential cleanup technologies considers the effectiveness of technologies in handling the estimated areas or volumes of environmental media (soil, groundwater, and surface water) and in meeting the appropriate cleanup levels and remedial action objectives (RAOs).

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.

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

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

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 underground storage tank), (2) an environmental medium (e.g., groundwater) that retains or transports the contaminant, (3) a point of potential human/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.

Downgradient. In the same direction as a stream or other flow, or toward the direction in which the flow is moving.

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 petroleum. 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.

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Free product/free-product. See free-phase petroleum 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.

Implementability. This criterion considers the ability to obtain necessary permits for off-site actions; the availability of treatment, storage, and disposal services; and the availability of necessary equipment and skilled workers to implement the technology.

In situ submerged oxygen curtain (iSOC™). A method of cleaning up a site where oxygen is injected into the subsurface to promote microbial degradation of contaminants.

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

Interim Conveyance document. Legally binding document that transfers land ownership from one party to another. May include restrictions on certain activities on the transferred land.

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

Land use restrictions. Institutional controls that rely on legal and administrative mechanisms to limit access to contaminated media. Includes restrictions on land development, prohibitions on groundwater use, and requirements for excavation notification. Land use restrictions are the same as equitable servitude restrictions.

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 which 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.

Protectiveness. This criterion considers the potential impacts on human health and the environment during the construction and implementation phase and how proven and reliable the process is with respect to site conditions.

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 probability 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.

PROPOSED PLAN FOR SOUTH OF RUNWAY 18-36 AREA
FORMER ADAK NAVAL COMPLEX - ADAK ISLAND, ALASKA

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.

Saturated. Void spaces filled with water.

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.

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 1×10^{-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. 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). Total petroleum hydrocarbons 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 TPH 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 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.

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.

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Return Address

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Environmental Operations Team, Code 05ER
Naval Facilities Engineering Command Northwest
19917 Seventh Avenue NE
Poulsbo, WA 98370-7570

Attention: Mark Wicklein, P.E.