



THE U.S. NAVY AND THE ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION announce the

# PROPOSED PLAN FOR SWMU 62, NEW HOUSING FUEL LEAK SITE

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 Solid Waste Management Unit (SWMU) 62, New Housing Fuel Leak site 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 SWMU 62, New Housing Fuel Leak site 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 SWMU 62, New Housing Fuel Leak site 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). 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 2 shows the location of the SWMU 62, New Housing Fuel Leak site on Adak Island.

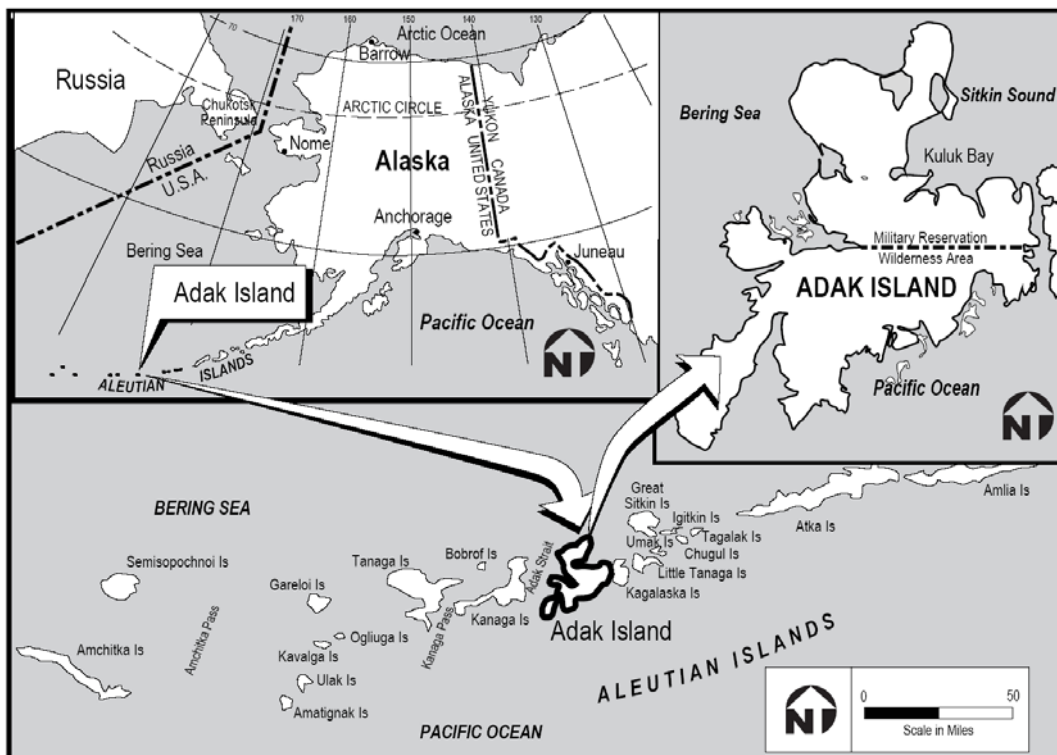


Figure 1  
**Adak Island and Vicinity**

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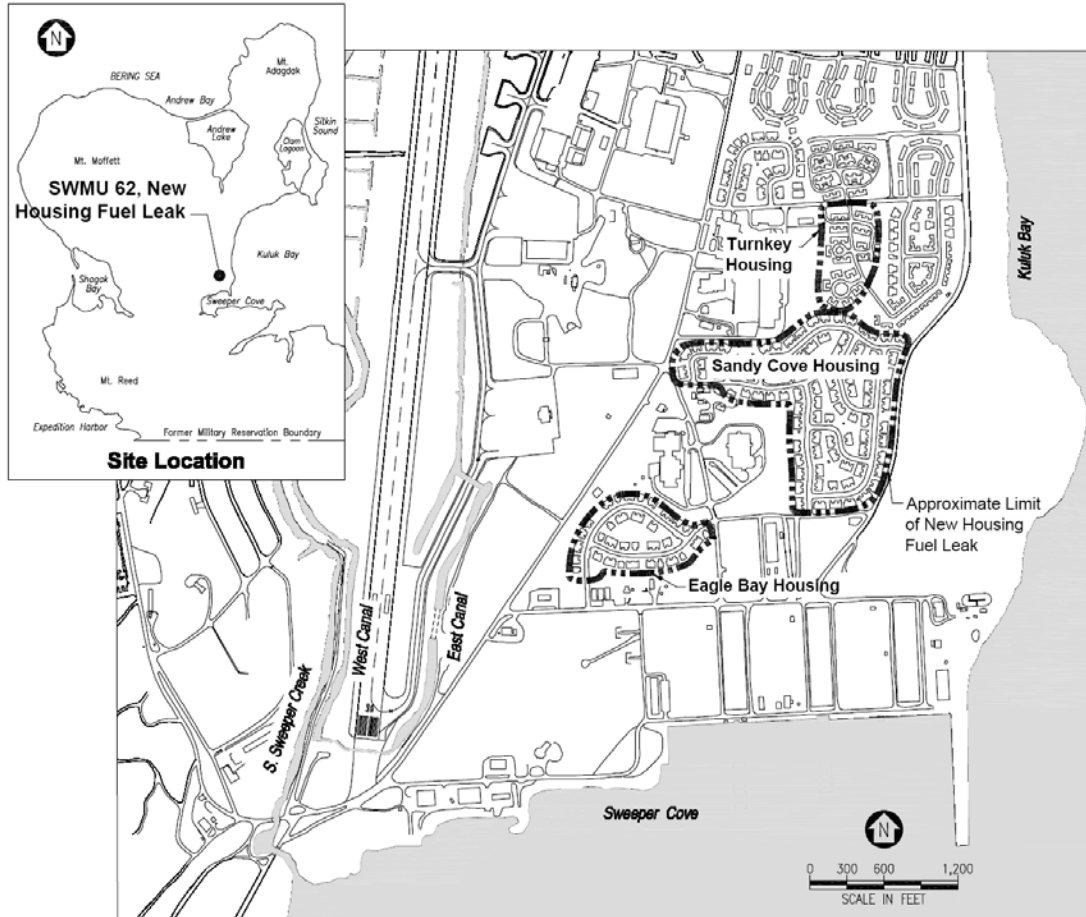


Figure 2  
Location of SWMU 62, New Housing Fuel Leak Site

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. The Aleut Corporation currently owns the SWMU 62, New Housing Fuel Leak site.

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](http://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, Poulso, 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.

Various environmental field investigations were performed by the Navy at the SWMU 62, New Housing Fuel Leak site be-

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tween 1988 and 2001, as indicated in Table 1. Results of these investigations indicated that petroleum-related chemicals were present in samples of subsurface soil and groundwater collected from numerous locations at the SWMU 62, New Housing Fuel Leak site. In addition, *gasoline-range organics* (GRO) have been identified in soil and groundwater at locations between the Main Road and the East Canal of the airport ditch system south of the Air Terminal Building on Adak Island. This area is identified as Area 303 and extends from the intersection of Main Road and Terminal Road on the northeast, south along Main Road to the Eagle Bay Housing Area, and west to the air terminal area and East Canal (Figure 2). The Sandy Cove Housing Area of the SWMU 62, New Housing Fuel Leak site, borders Area 303 to the northeast at the intersection of Main Road and Terminal Road. The Eagle Bay Housing Area of the SWMU 62, New Housing Fuel Leak site, borders Area 303 to the south. Area 303 is currently undergoing investigation, and the objectives of the investigation are to (1) delineate the margins of the dissolved petroleum plume in this area, (2) better determine the source of the GRO concentrations in the groundwater, (3) provide current information that can be used to evaluate the human health and ecological risks posed by petroleum-related chemicals, and (4) provide information that will be used to identify remedial alternatives for the site. GRO contamination from Area 303 impacting the SWMU 62, New Housing Fuel Leak site, is not addressed in this Proposed Plan, but will be addressed as part of the Area 303 investigation.

Potential sources of the petroleum *hydrocarbons* present at the site include the fuel distribution system for the furnaces and water heaters located in the housing units and various other pipelines that crisscross the site, as identified on Figure 3. The major fuel distribution pipelines in the vicinity of the

Table 1. Summary of Environmental Field Investigations, SWMU 62, New Housing Fuel Leak Site

Date	Investigation Activity
1988-1989	Release investigation 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
1993	Corrective action evaluation of the existing product recovery system with additional site characterization to better define the extent of free product released at the site
1993	Investigation to evaluate possible petroleum releases associated with the Main Road pipeline
1999	Preparation of a site summary report to present all site data collected to that point
1999	Free-product recovery closure report to demonstrate that the existing free-product recovery system has recovered product to its practicable endpoint
2000	Pilot study to evaluate the feasibility of low-maintenance, self-sufficient product recovery technologies that do not require external power
2001	Focused feasibility study to identify remaining areas of free product and groundwater contamination and evaluate technologies capable of reducing concentrations of petroleum-related chemicals in soil and groundwater at the site
2001	Groundwater sampling and analyses investigation to address data gaps identified during the focused feasibility study

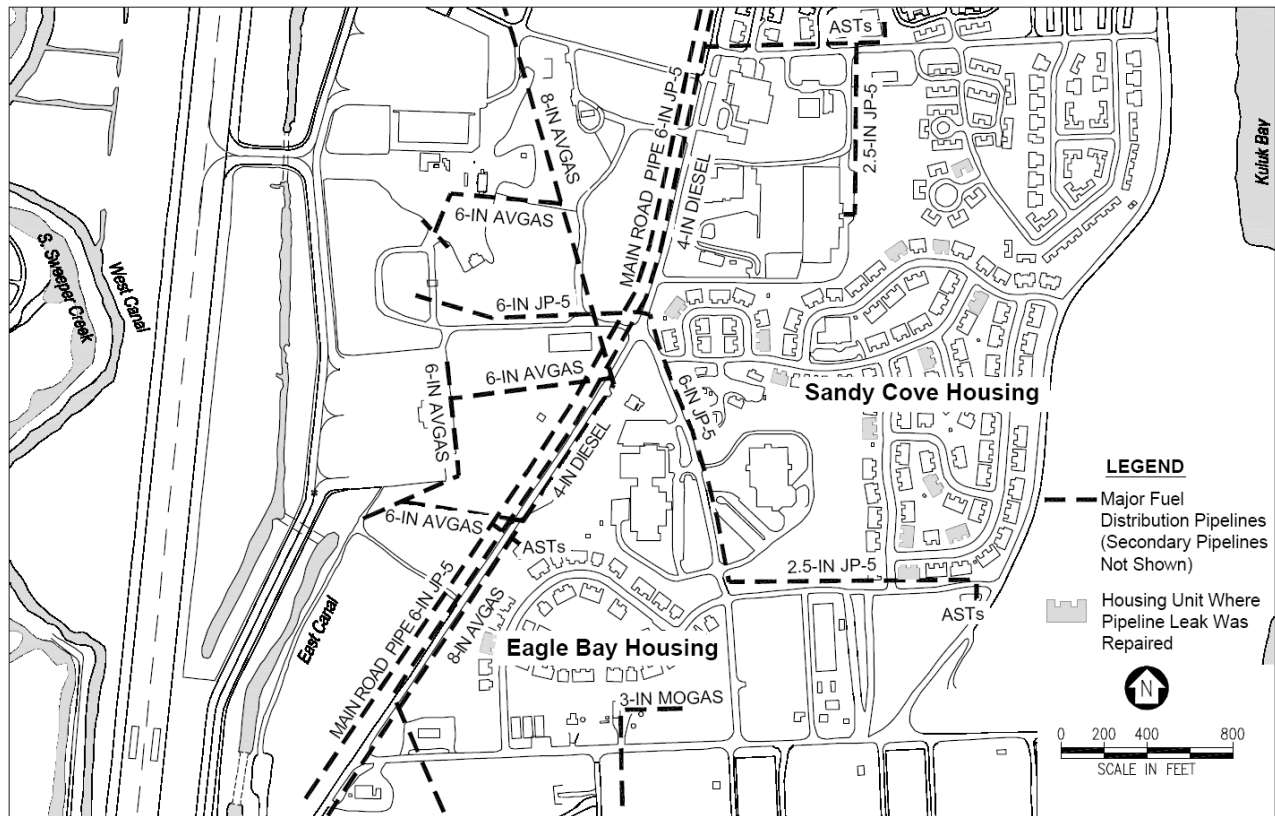


Figure 3  
**Potential Petroleum Sources at SWMU 62, New Housing Fuel Leak Site**

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SWMU 62, New Housing Fuel Leak site include an aviation gasoline (avgas) distribution system formerly used to provide fuel to truck fill stands along the airfield, a 4-inch-diesel pipeline, as well as the primary jet petroleum (JP)5 pipelines and associated above-ground storage tanks (ASTs) that stored fuel for distribution to the individual housing units. Fuel for the SWMU 62, New Housing Fuel Leak site was stored as follows:

- For Sandy Cove Housing, two 30,000-gallon ASTs constructed on raised earthen pads at the junction of Raven Street and Bayshore Highway
- For Eagle Bay Housing, two 12,000-gallon ASTs constructed on raised earthen pads located along Main Road approximately 400 feet southwest of the High School
- For Turnkey Housing, two 37,000-gallon ASTs constructed on raised earthen pads located north of Kagalaska Drive northwest of Turnkey Housing

JP-5 was formerly distributed from the large ASTs to individual housing units by underground iron piping coated with polyvinyl chloride. The piping that distributed fuel to the individual housing units consisted of 2-inch-diameter main trunkline piping connected to 0.75 or 1-inch-diameter lateral lines to the individual housing units. A 0.5-inch-diameter copper pipe supplied fuel from the lateral lines to individual units. The smaller diameter pipelines from the ASTs to the housing units are not shown on Figure 3.

During 1988 and 1989, five piping fuel leaks were discovered and repaired after occupants reported hydrocarbon-like odors in the housing units. Because of the leaks that had been detected, the heating fuel distribution system was pressure tested to assess the extent of potential releases. Sixteen additional piping leaks were detected and repaired as a result of pressure testing. Figure 3 shows the 14 housing units where the 21 piping leaks were identified during inspections

and pressure testing. The volume of fuel released to the environment from the heating fuel distribution system at the SWMU 62, New Housing Fuel Leak site has not been determined.

Cleanup activities that have been implemented at the SWMU 62, New Housing Fuel Leak site include *free-product* removals, contaminated soil excavation, 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, SWMU 62, New Housing Fuel Leak Site

Date	Cleanup Activity
1989	Removal of approximately 100 cubic yards of contaminated soil from under housing units where heating fuel leaked and installation of vapor barriers to seal housing unit foundations
1989-2000 <sup>a</sup>	Free-product recovery (total of approximately 154,000 gallons recovered)
2002	Natural attenuation monitoring

<sup>a</sup>Intermittent operation

Table 3. Free-Product Recovery Data, SWMU 62, New Housing Fuel Leak Site

Year	Gallons Recovered
1989	70,000
1990	12,000
1991	6,500
1992	3,000
1993	0
1994	26,000
1995	11,000
1996	13,400
1997	9,500
1998	1,600
1999	500
2000	0
<b>Total</b>	<b>154,000</b>

## 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.

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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 SWMU 62, New Housing Fuel Leak site, 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 South of Runway 18-36 Area 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 South of Runway 18-36 Area site is being 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. Aerial photos of Adak Island taken prior to the arrival of military forces indicate the presence of small lakes or ponds within low-lying areas between the dunes. The lagoon was filled with sand and rock by the military forces to construct the airfield. The site occupied by the SWMU 62, New Housing Fuel Leak site was the source of a substantial portion of the fill material placed into the lagoon. The low-lying areas containing small lakes or ponds were also filled. The subsurface soils beneath SWMU 62, New Housing Fuel Leak site have variable *permeability* and generally consist of sands and gravels with varying portions of silt. However, interbedded layers of organic-rich silt and clay were also encountered between 2 and 18 feet below ground surface (bgs). These organic-rich silt layers are believed to represent bottom sediments deposited within the former lagoon, lakes, or ponds. The *saturated* soils have a high water-bearing capacity.

Groundwater is found as both a perched (laterally discontinuous) and a regional aquifer beneath the SWMU 62, New Housing Fuel Leak site. Perched groundwater occurs approximately 8 to 12 feet bgs beneath Sandy Cove and Turnkey Housing.

This perched groundwater collects on top of the lower permeability, organic-rich silt layers. Below the perched water zone, the regional aquifer is encountered between approximately 18 feet bgs in the vicinity of Unit 139 (northeast of the Elementary School) to about 30 feet bgs west of Eagle Bay Housing. Groundwater in the area appears to flow toward three *downgradient* surface water bodies: Kuluk Bay, the East Canal of the airport ditch system, and Sweeper Cove.

Because of the multidirectional groundwater flow in the vicinity of the site and the hydraulic connection between the airport ditch system (including the East Canal) and South Sweeper Creek; Kuluk Bay, the East Canal, South Sweeper Creek, and Sweeper Cove are all considered to be downgradient surface water bodies. Kuluk Bay is a marine environment located approximately 1,200 feet east of the housing units in Turnkey Housing and the north-eastern portion of Sandy Cove Housing. It is the closest downgradient surface water to these housing units. Sweeper Cove is a large saltwater inlet off Kuluk Bay. It is located approximately 1,700 feet south of the southern-most portion of Sandy Cove Housing and Eagle Bay Housing. The East Canal of the airport ditch system is the closest surface water body to the western portions of the SWMU 62, New Housing Fuel Leak site. It is located about 800 feet west of the western-most Eagle Bay Housing units and about 1,700 feet west of the western-most Sandy Cove Housing units. The East Canal is an engineered diversionary structure designed to collect surface runoff from the airfield and surrounding area. Water in the East Canal flows through the Crossover Canal (which is totally 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 3,800 feet from the Eagle Bay Housing Area, and is considered the closest ecological exposure point for *aquatic* organisms potentially exposed to petroleum-related chemicals that were released at the site and transported to the East Canal.

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### Land Use

Specific historical land uses at the SWMU 62, New Housing Fuel Leak site are uncertain. Aerial photographs taken from 1943 to 1946 indicate that the area was heavily used during this time period. Land uses included storage, housing, offices, and other activities, including commercial and industrial. As time passed, the intensity of land use decreased, as is evidenced in aerial photographs dated from 1946 to 1973. Future land use at the SWMU 62, New Housing Fuel Leak site is designated to remain residential or future residential by ARC (Figure 4). Proposed uses for land surrounding the SWMU 62, New Housing Fuel Leak site are designated for either commercial, future residential, or public facilities reuse.

### 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. 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 the SWMU 62, New Housing Fuel Leak site because potable water could be obtained from a well installed at the site.

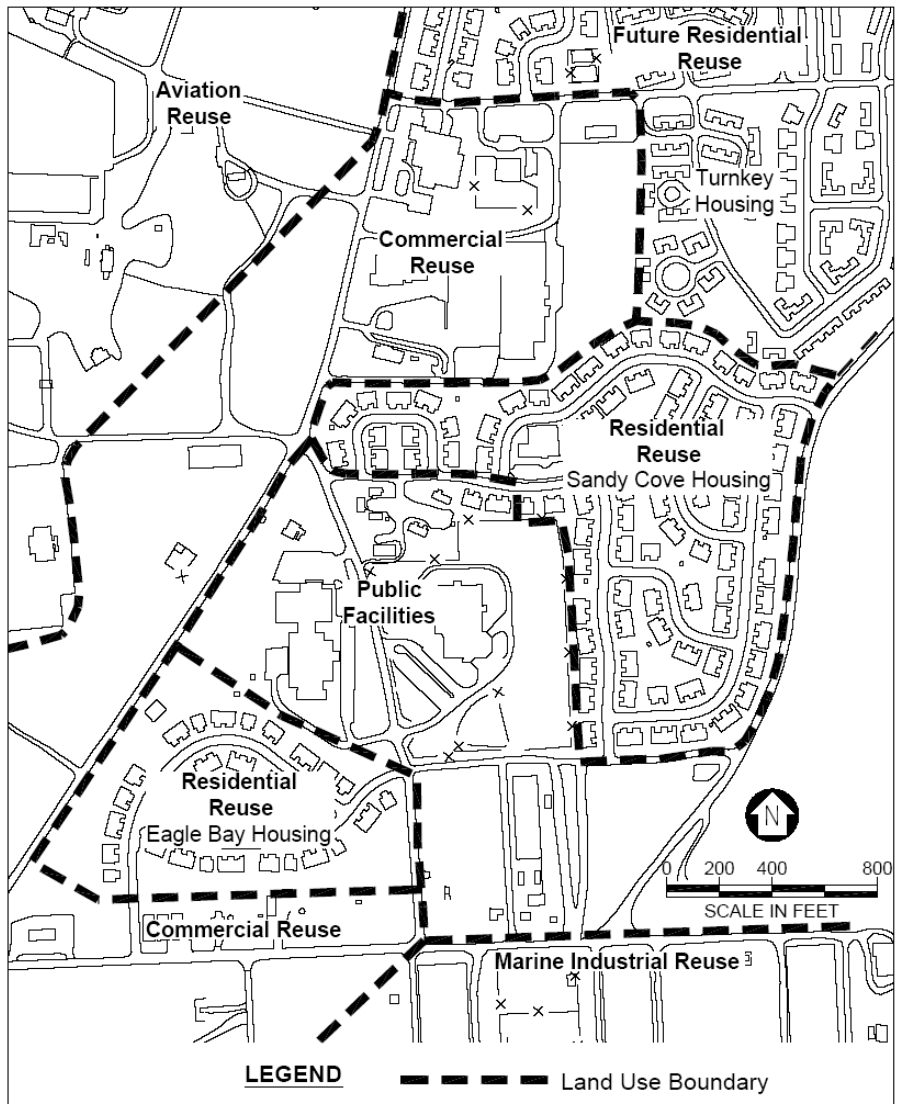


Figure 4  
Proposed Future Land Use, SWMU 62, New Housing Fuel Leak Site

## 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 SWMU 62, New Housing Fuel Leak site are provided in Table 4.

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 contami-

nants 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 SWMU 62, New Housing Fuel Leak site to estimate the potential extent of soil impacted by petroleum contamination at the site. *Alternative cleanup levels (ACLs)* are specified for remediation of soil and are based on Alaska DEC Method Four [18 AAC 75.340(a)(4)], which uses site-specific *risk assessments* to establish cleanup levels. Site-specific ACLs were calculated for surface soil because child exposures to surface soil exceeded the target health goals (see Summary of Site Risks section). The ACLs were established at concentrations such that risks from hazardous substances do not exceed the following target health goals: cumulative carcinogenic risk of 1 in 100,000 and the cumulative noncarcinogenic *hazard index* of 1.0 (18 AAC 75.325(h)). Site-specific ACLs were not

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calculated for subsurface soil because the risk assessment established that the existing concentrations in subsurface soil do not pose a risk to construction workers. Therefore, the existing concentrations at the site are protective of construction workers, and by default, are the cleanup levels for subsurface soil at the site (see Table 5 for maximum soil concentrations).

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 SWMU 62, New Housing Fuel Leak site are also based on the tabulated groundwater cleanup levels because groundwater is considered to be a reasonably expected potential future source of drinking water.

### Surface Water and Sediment

The East Canal of the airport ditch system is the only surface water body impacted by releases from the SWMU 62, New Housing Fuel Leak site. For surface water bodies of the state, Alaska regulation 18 AAC Chapter 70 establishes water quality standards based on water use classes and subclasses. The canals of the airport ditch system, including the East 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)]. Based on the results of the risk assessment (see Summary of Site Risks section), no ecological threat exists for any ecological

Table 4. Soil and Groundwater Screening Criteria and Cleanup Levels, SWMU 62, New Housing Fuel Leak Site

Chemical	Soil		Groundwater
	Screening Criteria (Method 2) <sup>a</sup> (mg/kg)	Surface Soil ACL (Method 4) <sup>b, c, d</sup> (mg/kg)	Screening Criteria and Cleanup Levels (Table C) <sup>a, b</sup> (mg/L)
<b>Total Petroleum Hydrocarbons</b>			
DRO	230	6,111	1.5
GRO	260	NC	1.3
<b>Volatile Organic Compounds</b>			
Benzene	0.02	NC	0.005
Ethylbenzene	5	NC	0.7
Toluene	4.8	NC	1
Trichloroethene	0.02	NC	0.005

<sup>a</sup>Used as screening criteria to determine potential extent of contamination

<sup>b</sup>Used as cleanup levels for remediation

<sup>c</sup>Surface soil is soil less than two feet deep

<sup>d</sup>ACLs for subsurface soil are not presented here because risks to construction workers from exposure to subsurface soil are below target health goals.

Cleanup levels for subsurface soil are therefore established at existing soil concentrations (see Table 5 for maximum soil concentrations).

Notes:

ACL - alternative cleanup level

DRO - diesel-range organics

GRO - gasoline-range organics

mg/kg - milligram per kilogram

mg/L - milligram per liter

NC - not calculated, risk less than target health goal

receptor from petroleum hydrocarbons released at the SWMU 62, New Housing Fuel Leak site. Therefore, no risk-based cleanup levels were calculated for surface water or sediment at the site.

## EXTENT OF CONTAMINATION

Various environmental field investigations were performed at the SWMU 62, New Housing Fuel Leak site between 1988 and 2001. Based upon the results of these field investigations, the potential extent of contamination was estimated for free product, soil, and groundwater. In addition, a petroleum seep into the East Canal of the airport ditch system was identified west of the Eagle Bay Housing Area. 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 SWMU 62, New Housing Fuel Leak site.

### Free Product

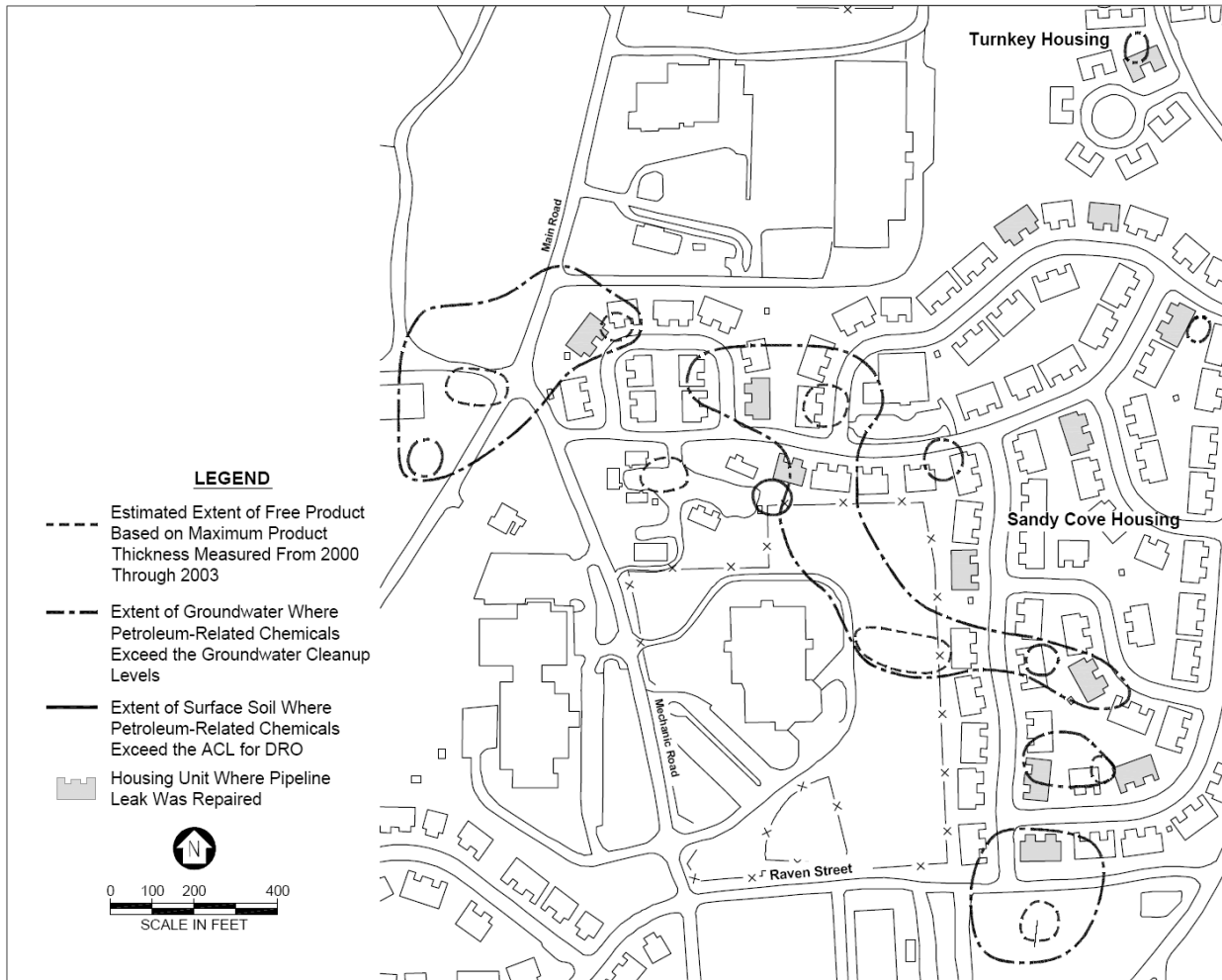
Between November 1992 and October 2003, more than 200 monitoring wells within the vicinity of the SWMU 62, New Housing Fuel Leak site were gauged periodically for the pres-

ence of free product. During this time period, free product was observed at a measurable thickness in 112 wells. The maximum measured *free-product thickness* reported at the site was 5.63 feet in RW-303-9 on February 16, 1996. Well RW-303-9 is located within the Eagle Bay Housing Area. The maximum measured free-product thickness in the Sandy Cove Housing Area was 3.74 feet, in well RW-107-1 on March 27, 1997. Figure 5 shows the estimated extent of residual free product in the Eagle Bay Housing Area based on the maximum measured free-product thickness reported in each well from 2000 through 2003. Figure 6 shows the estimated extent of residual free product in the Sandy Cove Housing Area based on the maximum measured free-product thickness reported in each well from 2000 through 2003. Free product has not been detected in the Turnkey Housing Area.

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*Figure 5  
Eagle Bay Housing Area, Estimated Extent  
of Groundwater Contamination and Residual Free Product*



*Figure 6  
Turnkey and Sandy Cove Housing Areas, Estimated Extent of  
Surface Soil and Groundwater Contamination, and Residual Free Product*

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## Soil and Groundwater

The extent of soil and groundwater impacted by petroleum contamination at the SWMU 62, New Housing Fuel Leak site 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 5):

- diesel-range organics (DRO)
- gasoline-range organics

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 5):

- DRO
- GRO
- benzene
- ethylbenzene
- toluene
- trichloroethene

If only the most recent groundwater data are compared to the screening criteria, no changes would be made to the list above. Concentrations of chemicals in soil and groundwater above the screening criteria may not represent a human or ecological health risk as determined by the risk assessments (see the Summary of Site Risks section below).

Table 5. Chemicals Detected in Soil and Groundwater at Concentrations Greater than Alaska DEC Screening Criteria, SWMU 62, New Housing Fuel Leak Site

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)
<b>Total Petroleum Hydrocarbons</b>					
DRO	<i>31,000 J</i>	230	<i>3,150 J</i>	<i>3,150 J</i>	1.5
GRO	<i>410</i>	260	<i>44.1</i>	<i>44.1</i>	1.3
<b>Volatile Organic Compounds</b>					
Benzene	ND	0.02	<i>0.25</i>	<i>0.152</i>	0.005
Ethylbenzene	2.4	5	<i>2.6</i>	<i>1.86</i>	0.7
Toluene	4.3	4.8	<i>5.69</i>	<i>5.69</i>	1
Trichloroethene	NA	0.02	<i>0.18</i>	<i>0.18</i>	0.005

Notes:

*Concentrations shown in bolded italics exceed the screening criteria*

DEC - Department of Environmental Conservation

DRO - diesel-range organics

GRO - gasoline-range organics

J - estimated concentration

mg/kg - milligram per kilogram

mg/L - milligram per liter

NA - not analyzed

ND - not detected

## Surface Water and Sediment

Petroleum hydrocarbons were detected in surface water samples and sediment samples collected from East Canal. In addition, a petroleum seep into the East Canal of the airport ditch system was identified west of the Eagle Bay Housing Area. The detected petroleum hydrocarbons in surface water and sediment in East Canal do not represent a human or ecological health risk as determined by the risk assessments (see the Summary of Site Risks section below).

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**SUMMARY OF SITE RISKS**

A human health risk assessment and an ecological risk assessment were conducted to determine if residual petroleum at the SWMU 62, New Housing Fuel Leak site 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 assessments is provided in the Final Focused Feasibility Study Report for the SWMU 62, New Housing Fuel Leak site.

Human health risks and hazards due to exposure to petroleum compounds in soil, groundwater, surface water, and sediment were estimated for each complete exposure pathway. The following complete exposure pathways were selected for quantitative evaluation:

- Construction workers potentially disturbing soil in the course of construction activity could be exposed through incidental ingestion, dermal contact, and inhalation of *fugitive dust* and *volatile chemicals* in soil (to a depth of 15 feet).
- Construction workers conducting intrusive subsurface work could be exposed to chemicals in shallow groundwater (less than 15 feet bgs) through dermal contact and inhalation of volatile chemicals.

- On-site workers occupying Building T-2776 could be exposed to vapors in indoor air volatilizing from groundwater beneath the building. In addition, on-site workers could be exposed to chemicals in surface soil through incidental ingestion and dermal contact.
- Current and future child and adult residents of the SWMU 62, New Housing Fuel Leak site could be exposed to vapors in indoor air volatilizing from groundwater beneath the housing units. In addition, residents could be exposed to chemicals in surface soil through incidental ingestion and dermal contact.
- Elementary school-aged child trespassers could be exposed to chemicals in surface water and sediment of the East Canal of the airport ditch system through incidental ingestion and dermal contact.

Risks and hazards due to exposure to soil, groundwater, surface water, and sediment 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.

Risks and hazards for construction workers, building workers, residents, and trespassers are presented in Table 6. The cumulative risks and hazards for the construction workers, building workers, adult residents, and trespassers did not

Table 6 Summary of Human Health Risk Assessment, SWMU 62, New Housing Fuel Leak Site

Receptor	Affected Medium	Receptor Age	Exposure Pathways	Non-TPH Hazards/Risks		TPH Hazards
				Hazard Index	Cancer Risk	Hazard Index
Construction Worker	Soil	adult	Inhalation (ambient air), ingestion, dermal contact	—	—	0.1
	Groundwater	adult	Inhalation (ambient air), dermal contact	0.05	5 x 10 <sup>-8</sup>	0.01
	<b>Total</b>	adult	See above	0.05	5 x 10 <sup>-8</sup>	0.1
Building Worker	Indoor Air	adult	Inhalation	0.04	5 x 10 <sup>-7</sup>	0.06
	Surface Soil	adult	Ingestion, dermal contact	—	—	0.5
	<b>Total</b>	adult	See above	0.04	5 x 10 <sup>-7</sup>	0.6
Resident	Indoor Air	child	Inhalation	0.08	—	0.5
		child/adult	Inhalation	0.04	1 x 10 <sup>-6</sup>	0.3
	Surface Soil	child	Ingestion, dermal contact	—	—	<b>2</b>
		child/adult	Ingestion, dermal contact	—	—	0.7
	<b>Total</b>	child	See above	0.08	—	<b>3</b>
		child/adult	See above	0.04	1 x 10 <sup>-6</sup>	0.9
Trespasser	Surface Water (East Canal)	elementary aged child	Ingestion, dermal contact	0.0002	3 x 10 <sup>-9</sup>	0.01
	Sediment (East Canal)	elementary aged child	Ingestion, dermal contact	—	7 x 10 <sup>-8</sup>	0.05
	<b>Total</b>	elementary aged child	See above	0.0002	8 x 10 <sup>-8</sup>	0.06

Notes:

*Hazards/risks shown in bolded italics exceed the target health goals*

— No value

TPH - total petroleum hydrocarbons

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exceed target health goals. Alaska DEC target health goals for cancer chemicals are no more than a  $1 \times 10^5$  chance of developing cancer and target health goals for noncancer chemicals are a *hazard quotient* (HQ) of 1. The cumulative hazard for the child residential scenario (exposure to both indoor air and surface soil) for the non-*total petroleum hydrocarbon* (TPH) chemicals was 0.08 (for noncancer effects), while the TPH chemical noncancer hazards were 3. Therefore, the hazard due to the TPH chemicals exceeded the target health goal. 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.

Because child exposures to DRO in surface soil exceeded the target health goal for the residential scenario, an ACL was calculated for DRO in surface soil as allowed under 18 AAC 75.340. The proposed ACL for DRO is 6,111 milligram per kilogram (mg/kg). This ACL is protective of child residential exposures including the two complete exposure pathways: ingestion and dermal contact. No chemicals in groundwater exceeded target health goals or contributed to exceedances

above target health goals. Therefore, no ACLs were calculated for chemicals in groundwater. However, recent monitoring well results were compared to the proposed groundwater cleanup levels as discussed in Extent of Contamination section. The proposed groundwater cleanup levels for the SWMU 62, New Housing Fuel Leak site are the Alaska DEC cleanup levels established for groundwater that is considered to be a reasonably expected potential future source of drinking water. Figure 6 shows the extent of surface soil at the site where chemical contaminants are present at detected concentrations greater than ACLs. The extent of groundwater contamination exceeding the proposed groundwater cleanup levels is depicted in Figures 5 and 6, for the Eagle Bay Housing Area and the Sandy Cove Housing Area, respectively.

Based on the results of the ecological risk assessment, no complete exposure pathways were identified for any ecological receptors that warranted quantitative risk assessment. Several minor or insignificant exposure pathways were present, none of which resulted in any ecologically significant exposure to contaminants at the site, and none of which required quantitative evaluation. Therefore, no ecological threat exists for any ecological receptor from petroleum products released at the SWMU 62, New Housing Fuel Leak site.

## 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 SWMU 62, New Housing Fuel Leak site:

- Prevent human exposure to petroleum hydrocarbons in surface soil that would result in adverse health effects
- Reduce petroleum hydrocarbons 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 in soil, groundwater, and surface water
- Prevent migration of free product to surface water that would result in an exceedance of the Alaska DEC surface water quality standard for sheen

Since no significant ecological threat exists for any ecological receptor at the SWMU 62, New Housing Fuel Leak site, no RAOs were developed for the protection of the environment. Reducing chemical concentrations in surface soil and surface water based on addressing the human health RAOs will ultimately also benefit ecological receptors.

## REMEDIAL ACTION ALTERNATIVES

Cleanup technologies were identified and screened to select those applicable to the SWMU 62, New Housing Fuel Leak site. 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 SWMU 62, New Housing Fuel Leak site. 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 al-

ternative. Institutional controls (*land use restrictions*), as described in the Institutional Control Management Plan, are currently in place for the site. Land use restrictions applicable to this site include 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 soil and groundwater and reduce the sheen on East Canal. 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

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

This alternative consists of institutional controls that are already in place as described in the Institutional Control Management Plan, installation of one free-product collection/containment trench to protect surface water, disposal of excavated trench soil, installation of four new monitoring wells for free-product recovery and/or groundwater monitoring, surface soil excavation and disposal, free-product recovery from the free-product collection/containment trench and new and existing wells, sorbent boom maintenance, and MNA for groundwater. Free product would be removed from the free-product collection/containment trench and 38 wells (1 new and 37 existing) using automated passive skimmers, passive skimmers, and sorbent socks; surface soil exceeding target health goals would be excavated and disposed of; petroleum concentrations in groundwater would be reduced through natural attenuation; and institutional controls would be used to protect human health and the environment as long as soil and groundwater concentrations are greater than cleanup levels and surface water no longer exceeds the Alaska DEC water quality standards for sheen.

**Cost:** Capital – \$1.1 million, Annual Operation and Maintenance (O&M) for Free-Product Collection/Containment Trench – \$150,000 for the first 2 years and \$100,000 for years 3 to 18, Annual O&M for Passive Free-Product Recovery in Wells – \$410,000 for the first 2 years and \$350,000 for years 3 to 5, Annual O&M for sorbent boom maintenance – \$33,000, Annual O&M for MNA in Groundwater – \$70,000, Total Present Worth Cost – \$5.5 million

**Alternative 3 – Institutional Controls, Free-Product Containment and *Active Recovery*, Canal Bank Soil and Surface Soil Excavation, and MNA for Groundwater:**

This alternative consists of institutional controls that are already in place as described in the Institutional Control Management Plan, installation of one free-product collection/containment trench, surface soil and canal bank excavation, disposal of soil from the surface soil and canal bank excavation areas, installation of seven new recovery wells, modification and start up of the existing *total fluids free-product recovery system* at Eagle Bay Housing, passive free-product recovery from the free-product collection/containment trench and existing wells, installation of four new monitoring wells for groundwater monitoring, and MNA for groundwater. Active free-product recovery in the Eagle Bay Housing Area using the existing total fluids recovery system would occur in 11

wells (7 new and 4 existing); free product would be removed from the free-product collection/containment trench and 10 existing wells in the Sandy Cove Housing Area using automated passive skimmers, passive skimmers, and sorbent socks; surface soil exceeding target health goals would be excavated and disposed of; petroleum concentrations in groundwater would be reduced through natural attenuation; and institutional controls would be used to protect human health and the environment as long as soil and groundwater concentrations are greater than cleanup levels and surface water no longer exceeds the Alaska DEC water quality standards for sheen.

**Cost:** Capital – \$2.6 million, Annual O&M for Free-Product Collection/Containment Trench – \$150,000 for the first 2 years and \$97,000 for years 3 to 13, Annual O&M for Active Free-Product Recovery System – \$1.4 million, Annual O&M for Passive Free-Product Recovery in Wells – \$140,000, Annual O&M for MNA in Groundwater – \$70,000, Total Present Worth Cost – \$7.5 million

**Alternative 4 – Institutional Controls, Passive Free-Product Recovery, Surface Soil Excavation, *In Situ Steam Stripping*, and MNA for Groundwater:**

This alternative consists of institutional controls that are already in place as described in the Institutional Control Management Plan, surface soil excavation and disposal, in situ steam stripping in the Eagle Bay Housing area, installation of 10 new wells to replace wells that would be abandoned prior to in situ steam stripping for groundwater monitoring, passive free-phase product recovery in existing wells, installation of three new groundwater monitoring wells in the Eagle Bay Housing Area, MNA for groundwater, and sorbent boom maintenance. In situ steam stripping would be implemented in the Eagle Bay Housing Area, the area with the majority of the remaining free product and the area impacting the East Canal; free product would be removed from 10 existing wells in the Sandy Cove Housing Area using automated passive skimmers, passive skimmers, and sorbent socks; surface soil exceeding target health goals would be excavated and disposed of; petroleum concentrations in groundwater would be reduced through natural attenuation; and institutional controls would be used to protect human health and the environment as long as soil and groundwater concentrations are greater than cleanup levels and surface water no longer exceeds the Alaska DEC water quality standards for sheen.

**Cost:** Capital – \$18 million, Annual O&M for Passive Free-Product Recovery in Wells – \$140,000, Annual O&M for sorbent boom maintenance – \$33,000, Annual O&M for MNA in Groundwater – \$70,000, Total Present Worth Cost – \$19 million

## EVALUATION OF ALTERNATIVES

Each alternative for the SWMU 62, New Housing Fuel Leak site was evaluated using four of the five criteria of Alaska DEC Guidance on Decision Documentation under the Site Cleanup Rules: protectiveness; practicability; short- and long-term effectiveness; and regulations. These criteria are summa-

rized in Table 7. 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

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Table 8. 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 overall ratings of good. Alternative 2 provides superior implementability and excellent short-term effectiveness and is protective of human health and the environment. However, this alternative requires more time to achieve groundwater cleanup goals than Alternatives 3 and 4. Although Alternative 3 provides excellent long-term effectiveness and protectiveness, it received ratings of good for cost effectiveness, short-term effectiveness, time to achieve cleanup goals, and compliance with regulations. This alternative is capable of achieving the groundwater cleanup goals more quickly than Alternative 2; however, there are additional short-term risks and costs associated with this alternative when compared to Alternative 2.

Table 7 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 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, the high cost, and the additional short-term risks associated with this alternative. This alternative received superior ratings for time to achieve cleanup goals and long-term effectiveness, and excellent ratings for protectiveness and regulations. Although this alternative provides superior long-term effectiveness, it achieves that through additional remedial actions, which have additional short-term risks and costs.

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 8 Evaluation of Remedial Alternatives, SWMU 62, New Housing Fuel Leak Site

Alaska DEC Criteria	Rating of Alternatives			
	Alternative 1 No Action	Alternative 2 Institutional Controls, Free-Product Containment and Passive Recovery, Surface Soil Excavation, and MNA for Groundwater	Alternative 3 Institutional Controls, Free-Product Containment and Active Recovery, Canal Bank/Surface Soil Excavation, and MNA for Groundwater	Alternative 4 Institutional Controls, Passive Free-Product Recovery, Surface Soil Excavation, In-Situ Steam Stripping, and MNA for Groundwater
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	○	◐	◑	◒

Note:  
 MNA - monitored natural attenuation  
 ○ Poor   ◑ Fair   ◐ Good   ◒ Excellent   ● Superior

## PREFERRED CLEANUP ALTERNATIVE

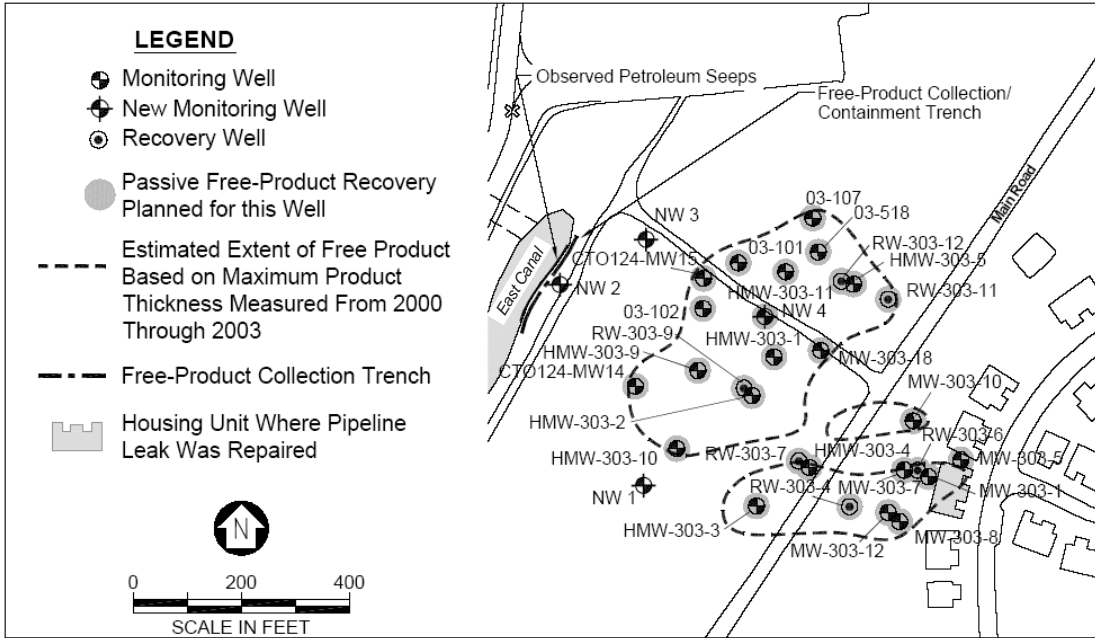
Alternative 2 – Institutional Controls, Free-Product Containment and Passive Recovery, Surface Soil Excavation, and MNA for Groundwater - is the preferred cleanup alternative for the SWMU 62, New Housing Fuel Leak site (see Figures 7 and 8). This alternative will provide an appropriate, cost-effective 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 SWMU 62, New Housing Fuel Leak site. A summary of the issues at the SWMU 62, New Housing Fuel Leak site and how Alternatives 2 and 3 address these issues is provided in Table 9. A summary of the advantages and disadvantages of these two alternatives is provided in Table 10.

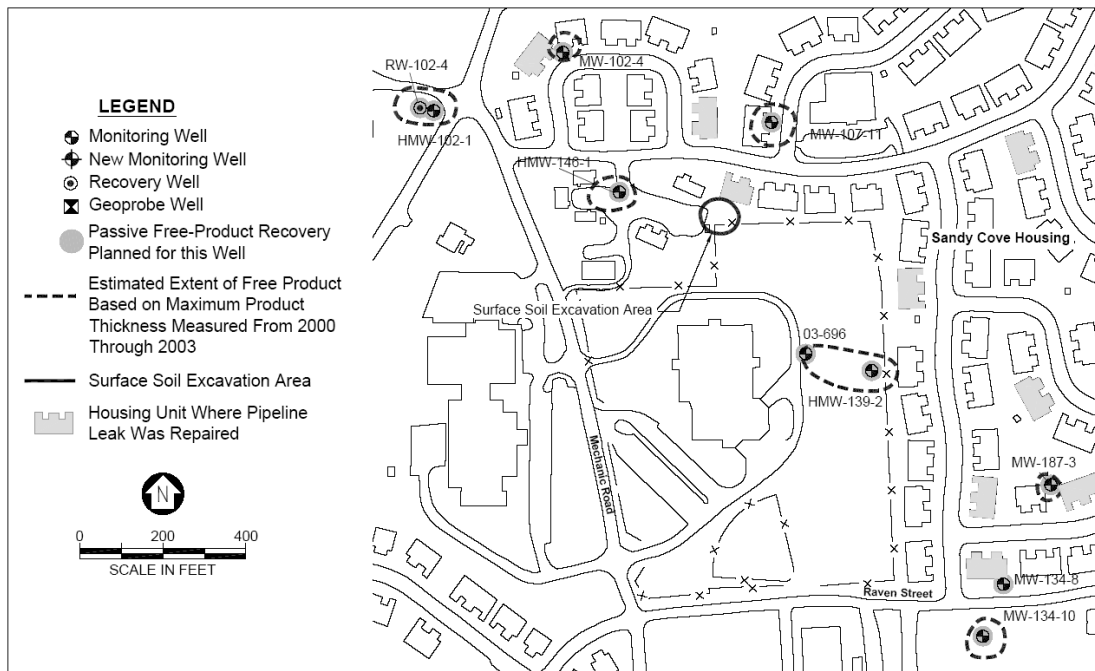
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Alternative 2 is proposed for SWMU 62, New Housing Fuel Leak site because the additional cleanup activities and costs associated with Alternative 3 are not warranted given that Alternative 2 is protective of human health and the environment. Both Alternatives 2 and 3 effectively protect child residents through excavation and disposal of surface soil. Risks due to construction worker exposure to free product may be

slightly higher for Alternative 2 than 3, because the passive free-product recovery activities proposed for Alternative 2 will require more time to reduce measurable quantities of free product in the subsurface when compared to the active free-product recovery activities proposed for Alternative 3. However, appropriate measures can be easily implemented to minimize contact and exposure as long as free product is



*Figure 7*  
**Preferred Cleanup Alternative Activities at Eagle Bay Housing, SWMU 62, New Housing Fuel Leak Site**



*Figure 8*  
**Preferred Cleanup Alternative Activities at Sandy Cove Housing, SWMU 62, New Housing Fuel Leak Site**

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**Table 9 What are the Real Issues at SWMU 62, New Housing Fuel Leak Site 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 East Canal	Institutional controls (excavation notification), passive free-product recovery and containment in Eagle Bay and Sandy Cove Housing, and natural recovery	Institutional controls (excavation notification), active free-product recovery and free-product containment in Eagle Bay Housing, passive free-product recovery in Sandy Cove Housing, canal bank excavation, and natural recovery
Unacceptable risks to child residents	Surface soil excavation and disposal	Surface soil excavation and disposal
Groundwater concentrations exceed groundwater cleanup levels (Table C values)	Institutional controls (downtown groundwater use prohibition), passive free-product recovery in Eagle Bay and Sandy Cove Housing, and monitored natural attenuation	Institutional controls (downtown groundwater use prohibition), active free-product recovery in Eagle Bay Housing, passive free-product recovery in Sandy Cove Housing, and monitored natural attenuation

**Table 10 Summary of Advantages and Disadvantages of Alternatives 2 and 3, SWMU 62, New Housing Fuel Leak Site**

Advantages and Disadvantages	Alternative 2 – Institutional Controls, Free-Product Containment and Passive Recovery, Surface Soil Excavation, and MNA for Groundwater	Alternative 3 – Institutional Controls, Free-Product Containment and Active Recovery, Canal Bank Soil and Surface Soil Excavation, and MNA for Groundwater
Advantages	<ul style="list-style-type: none"> <li>Effectively controls exposure to groundwater through institutional controls</li> <li>Effectively controls human health risk through surface soil excavation and disposal</li> <li>Reduces volume of free product in subsurface through passive free-product recovery and containment</li> <li>Reduces sheen on surface water through free-product containment</li> <li>Reduces groundwater concentrations through passive free-product recovery and natural attenuation</li> <li>Less expensive</li> <li>Easy to implement</li> </ul>	<ul style="list-style-type: none"> <li>Effectively controls exposure to groundwater through institutional controls</li> <li>Effectively controls human health risk through surface soil excavation and disposal</li> <li>Reduces volume of free product in subsurface through active free-product recovery, passive free-product recovery, and containment</li> <li>Reduces sheen on surface water through canal bank excavation and free-product containment</li> <li>Reduces groundwater concentrations through active free-product recovery, passive free-product recovery, and natural attenuation</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>Passive free-product containment alone (not including canal bank soil excavation, as is included for Alternative 3) may require time to reduce sheen in surface water to below water quality criteria.</li> <li>Passive free-product recovery may require time to reduce groundwater concentrations to below the Alaska DEC Table C values</li> </ul>	<ul style="list-style-type: none"> <li>More expensive</li> <li>Relatively difficult to implement for the following reasons: <ul style="list-style-type: none"> <li>Canal bank soil excavation below the groundwater table complicated by dewatering and shoring requirements</li> <li>Soil excavation on Adak complicated by the high rainfall</li> <li>Treatment of water from excavation dewatering complicated because of the extensive treatment required to meet marine surface water quality criteria</li> <li>Modification and restart of active free-product recovery system adds complexity</li> </ul> </li> </ul>

Notes:

MNA – monitored natural attenuation

present in the subsurface. Groundwater cleanup levels will be achieved more quickly with Alternative 3 than with Alternative 2, because of the more aggressive free-product recovery activities proposed for Alternative 3. However, human health will be protected in the interim, for either alternative, because institutional controls prevent the use of the groundwater as a drinking water source. Finally, elimination of the sheen on East Canal is anticipated to take longer with Alternative 2 when compared to Alternative 3. This is because Alternative 3 implements canal bank soil excavation, which will more quickly eliminate the source of the sheen when compared to implementation of the free-product recovery/con-

tainment trench alone, as proposed for Alternative 2. However, sorbent booms will be used in the interim to minimize impacts. Achieving the groundwater cleanup levels and Alaska DEC surface water quality standards for sheen more quickly would require implementation of a much more complicated system which would be considerably more difficult to implement due to the remoteness of Adak Island. Because Alternative 2 would be much easier to implement than Alternative 3 and Alternative 2 would be protective of human health and the environment, Alternative 2 is the preferred cleanup alternative for the SWMU 62, New Housing Fuel Leak site.

## 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](mailto: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 SWMU 62 New Housing  
Fuel Leak Site, please contact:**

**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](mailto:mark.wicklein@navy.mil)

**Jason Weigle**

Project Manager, Federal Facilities Environmental Restoration  
Program, Contaminated Sites Program  
Alaska Department of Environmental Conservation  
555 Cordova St.  
Anchorage, AK 99501  
Phone: 907-269-7528  
Fax: 907-269-7649  
[jason\\_weigle@dec.state.ak.us](mailto:jason_weigle@dec.state.ak.us)

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## ACRONYMS

AAC	Alaska Administrative Code	JP	jet petroleum
ACL	alternative cleanup level	mg/kg	milligrams per kilogram
ARC	Adak Reuse Corporation	MNA	monitored natural attenuation
AST	above-ground storage tank	NMCB	Naval Mobile Construction Battalion
avgas	aviation gasoline	O&M	operation and maintenance
bgs	below ground surface	OU	Operable Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	RAB	Restoration Advisory Board
DD	Decision Document	RAO	remedial action objective
DEC	Department of Environmental Conservation	ROD	Record of Decision
DRO	diesel-range organics	SAERA	State-Adak Environmental Restoration Agreement
EPA	Environmental Protection Agency	SARA	Superfund Amendments and Reauthorization Act
FFA	Federal Facilities Agreement	SWMU	solid waste management unit
GRO	gasoline-range organics	TPH	total petroleum hydrocarbons
HQ	hazard quotient	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).

**Active recovery.** A method of recovering free product from the subsurface in which groundwater is pumped as well as free product.

**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.

**Alternative cleanup levels (ACLs).** Site-specific cleanup levels established by risk assessment using Alaska DEC Method Four [18 AAC 75.340(a)(4)].

**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 en-

try 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.

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**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.

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

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

**Fugitive dust.** Dust suspended into air due to wind or other disturbance such as construction activities.

**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* for all chemicals of concern.

**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 steam stripping.** A method of cleaning up a site where steam is injected into the subsurface to mobilize free product to aid its removal via soil vapor extraction and groundwater and free-product pumping.

**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. 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.

**Passive recovery.** A method of recovering free product from the subsurface in which skimmers (automated or passive) or sorbent materials are used to remove the free product floating on the groundwater surface.

**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

**PROPOSED PLAN FOR SWMU 62, NEW HOUSING FUEL LEAK SITE**  
**FORMER ADAK NAVAL COMPLEX - ADAK ISLAND, ALASKA**

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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.

**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  $1 \times 10^{-5}$  (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.

**Total fluids free-product recovery system.** An active recovery system used to remove free product from the subsurface.

**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 chemicals.** Volatile chemicals are chemicals that easily form vapors at normal temperature and pressure.



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Place  
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Here

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

Attention: Mark Wicklein, P.E.