PART I

DECLARATION OF DECISION NO. 1

CLOSED SITES

ENVIRONMENTAL RESTORATION CONTRACT

AMAKNAK AND UNALASKA ISLANDS, ALASKA

FINAL
JANUARY 2002

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TASK ORDER 02—AMAKNAK/UNALASKA

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Signature: _____ **Date:** 07 January 2002
Gary Kiger, Project Manager

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DECLARATION OF SITE CLOSURE DECISION
and
NO FURTHER ACTION
NO DEPARTMENT OF DEFENSE ACTION INDICATED
for
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITE
AMAKNAK AND UNALASKA ISLANDS, ALASKA

SITE NAME AND LOCATIONS

The Amaknak and Unalaska Islands are located in southwestern Alaska, in the Fox Islands Group of the Aleutian Islands chain. The following closed sites are located in and around the City of Unalaska and the community of Dutch Harbor on Amaknak and Unalaska Islands. The 13 closed sites comprise a portion of the Formerly Used Defense Sites (FUDS) that were investigated during 1996 to 2000 on Amaknak and Unalaska Islands.

- UST 1765
- UST 2875
- UST 3160
- UST 3162
- UST 3265
- UST 3360
- UST 3660
- Unalaska Valley Gas Station
- Upper Pyramid Valley UST 5286
- Upper Pyramid Valley Drums
- Margaret Bay Area Suspected Dry Well Outfalls
- Margaret Bay Stockpiles
- East Point Loop Road Pumphouse

STATEMENT OF BASIS

This decision is based on the results of site investigations (SIs), remedial investigations (RIs), and interim removal actions (IRAs) conducted during 1996, 1997, 1998, 1999, and 2000. The accompanying Decision Document No. 1, Part II, summarizes these activities, and they are detailed in the individual investigation reports that are referenced in this document. The Comprehensive Remedial Investigation Report prepared by U.S. Army Engineer District, Alaska (USAED) dated May 2000 contains the most current information about these sites. In general, most of the sites in this decision document were identified as areas of concern due to the presence of debris, underground storage tanks (USTs), or drums

that were removed during IRA field activities. The principal contaminants of concern at these sites were gasoline- and diesel-range petroleum hydrocarbons. Analytical results indicated that either 1) no sources of contamination were found, or 2) no contaminants were identified at concentrations exceeding Alaska Department of Environmental Conservation (ADEC) Method Two cleanup levels in 18 AAC 75.341, and no ground water contamination was identified.

Data collected during investigation and cleanup activities were evaluated during the 5-year effort and site-specific findings are presented in Decision Document No. 1, Part II (attached).

Authority for the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) is derived from the following laws: the Comprehensive Environmental Restoration, Compensation and Liability Act (CERCLA) of 1980, Public Law (PL) 96-510, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; PL 99-499 (codified as 42 United States Code 9601-9675); and Environmental Restoration Program, 10 USC 2701-2707.

DESCRIPTION OF SELECTED REMEDY AND IMPLEMENTATION

The closure remedy was selected because these sites do not have military-related contaminants or contaminant sources, or do not present a risk to human health or the environment.

The selected remedy for each site is no further Department of Defense (DOD) action and site closure.

DECLARATION

In accordance with the Defense Environmental Restoration Program for FUDS, the USAED has completed all activities required for the selected remedy at the thirteen sites addressed in this decision document.

This declaration of decision supports the conclusion that all known sources of contamination have been removed to levels agreed on by the ADEC as being protective of human health and the environment. Therefore, no further DOD action at these closed sites is required.

This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposure routes that may cause a risk to human health or the environment.

Steven Perrenot

Date: 20 FEB 02

Steven T. Perrenot
Colonel, Corps of Engineers
District Engineer

REVIEW AND CONCURRENCE
State of Alaska, Department of Environmental Conservation

The Alaska Department of Environmental Conservation (ADEC) concurs that prior releases of oil and other hazardous substances related to military activities at these sites have been adequately characterized and cleaned up in accordance with 18 AAC 75, Article Three. ADECC concurs that no further investigation or cleanup are necessary and that these sites are considered "closed." This decision may be reviewed and modified in the future if new information becomes available indicating the presence of previously undiscovered contamination or unacceptable risk to human health, safety, and welfare or the environment.

Date: Feb 20 2002

Jennifer Roberts
Department of Defense Oversight Section Manager
Contaminated Sites Program

DECLARATION OF DECISION
CLOSED SITES
AMAKNAK AND UNALASKA ISLANDS

Site Name and Locations: Closed Sites, Amaknak and Unalaska Islands

The following closed sites are located in and around the City of Unalaska and the community of Dutch Harbor on Amaknak and Unalaska Islands.

- UST 1765
- UST 2875
- UST 3160
- UST 3162
- UST 3265
- UST 3360
- UST 3660
- Unalaska Valley Gas Station
- Upper Pyramid Valley UST 5286
- Upper Pyramid Valley Drums
- Margaret Bay Area Suspected Dry Well Outfalls
- Margaret Bay Stockpiles
- East Point Loop Road Pumphouse

The Amaknak and Unalaska Islands are located in southwestern Alaska, in the Fox Islands Group of the Aleutian Islands chain. The 13 closed sites comprise a portion of the formerly used defense sites (FUDS) that were investigated during 1996 to 2000 on Amaknak and Unalaska Islands.

Statement of Basis: This decision is based on the results of site investigations (SIs), remedial investigations (RIs), and interim removal actions (IRAs) conducted during 1996, 1997, 1998, 1999, and 2000. The accompanying Decision Document No. 1, Part II, summarizes these activities, and they are detailed in the individual investigation reports that are referenced in this document. The Comprehensive Remedial Investigation Report prepared by U.S. Army Engineer District, Alaska (USAED) dated May 2000 contains the most current information about these sites.

In general, most of the sites in this decision document were identified as areas of concern due to the presence of debris, underground storage tanks (USTs), or drums that were removed during IRA field activities. The principal contaminants of concern at these sites were gasoline- and diesel-range petroleum hydrocarbons. Analytical results indicated that

either 1) no sources of contamination were found, or 2) no contaminants were identified at concentrations exceeding Alaska Department of Environmental Conservation (ADEC) Method Two cleanup levels in 18 AAC 75.341, and no groundwater contamination was identified.

Data collected during investigation and cleanup activities were evaluated during the 5-year effort and site-specific findings are presented in Decision Document No. 1, Part II (attached).

Authority for the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) is derived from the following laws: the Comprehensive Environmental Restoration, Compensation and Liability Act (CERCLA) of 1980, Public Law (PL) 96-510, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; PL 99-499 (codified as 42 United States Code 9601-9675); and Environmental Restoration Program, 10 USC 2701-2707.

DESCRIPTION OF SELECTED REMEDY AND IMPLEMENTATION

The closure remedy was selected because these sites do not have military-related contaminants or contaminant sources, or do not present a risk to human health or the environment.

The selected remedy for each site is no further Department of Defense (DOD) action and site closure.

DECLARATION

In accordance with the Defense Environmental Restoration Program for FUDS, the USAED has completed all activities required for the selected remedy at the thirteen sites addressed in this decision document.

This declaration of decision supports the conclusion that all known sources of contamination have been removed to levels agreed on by the ADEC as being protective of human health and the environment. Therefore, no further DOD action at these closed sites is required.

This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposure routes that may cause a risk to human health or the environment.

_____ Date: _____

Colonel, Corps. of Engineers
District Engineer

REVIEW AND CONCURRENCE

State of Alaska, Department of Environmental Conservation

The Alaska Department of Environmental Conservation (ADEC) concurs that prior releases of oil and other hazardous substances related to military activities at these sites have been adequately characterized and cleaned up in accordance with 18 AAC 75, Article Three. ADEC concurs that no further investigation or cleanup are necessary and that these sites are considered "closed." This decision may be reviewed and modified in the future if new information becomes available indicating the presence of previously undiscovered contamination or unacceptable risk to human health, safety, and welfare or the environment.

_____ Date: _____

Jennifer Roberts
Department of Defense Oversight Section Manager
Contaminated Sites Program

TOTAL ENVIRONMENTAL RESTORATION CONTRACT

PART II

DECLARATION OF DECISION NO. 1

CLOSED SITES

AMAKNAK AND UNALASKA ISLANDS, ALASKA

FINAL JANUARY 2002

Alaska District

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ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AOC	Areas of Concern
AST	aboveground storage tank
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Restoration, Compensation and Liability Act
COPC	compound of potential concern
DOD	Department of Defense
DQO	data quality objective
DRO	diesel-range organics
FSP	field sampling plan
FUDS	formerly used defense sites
IRA	interim removal action
Jacobs	Jacobs Engineering Group Inc.
mg/kg	milligrams per kilogram
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PL	Public Law
POL	petroleum, oil, and lubricants
QAPP	quality assurance project plan
RI	remedial investigation
RRO	residual-range organics
SI	site investigation
SVOC	semivolatile organic compound
USAED	U.S. Army Engineer District, Alaska
USC	United States Code
UST	underground storage tank
VOC	volatile organic compound
WWII	World War II

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1.0 INTRODUCTION

This decision document presents in detail the rationale for recommending site closure for 13 formerly used defense sites (FUDS) on Amaknak and Unalaska Islands, Alaska. Specifically, this report presents the field approaches and results of remedial investigations and removals performed at these sites in 1996, 1997, 1998, 1999, and 2000. Field activities included site reconnaissance, site investigations (SIs), remedial investigations (RIs), and interim removal actions (IRAs). The project activities were conducted in accordance with the 1996 Work Plan (USAED 1996) and subsequent 1997 and 1998 addenda (USAED 1997, 1998a); 1999 modifications (USAED 1999e); and Islandwide addendum (USAED 2000e).

Unalaska and Amaknak Islands are located in southwestern Alaska, in the Fox Islands Group of the Aleutian Islands chain, approximately 850 miles southwest of Anchorage, Alaska, and 1,300 miles northwest of Seattle, Washington.

During World War II (WWII), several Army posts and a Naval Operating Base were established in the Dutch Harbor/Unalaska area. Approximately 65,000 military personnel were living on and around Amaknak and Unalaska Islands at one time. The majority of the larger facilities were built around Margaret Bay as part of Fort Mears-Army Garrison 1. Japanese war planes bombed facilities on Amaknak Island in 1942, resulting in the construction of more defensive positions and movement of other facilities to better protected locations. Approximately 10,000 new troops occupied the Generals Hill and Pyramid Valley areas of Unalaska Island after the bombings.

Extensive preparations for the war effort required large volumes of fuels. Other potentially hazardous materials, such as polychlorinated biphenyls (PCBs), asbestos, and various metals, were used in construction, power distribution, and other activities typical of remote military operations. The 1983 Defense Appropriations Act initiated Department of Defense (DOD) cleanup activities at FUDS. The U.S. Army Engineer District, Alaska (USAED), the executing agent for the DOD, was assigned responsibility to clean up FUDS. This document does not address abandoned WWII buildings and debris.

2.0 ENVIRONMENTAL INVESTIGATIONS

The field activities conducted between 1996 and 2000 included non-intrusive site reconnaissance activities at each of the sites. SI activities were designed to determine the presence and estimate the extent of contamination at specific areas identified during site reconnaissance. RI activities involved drilling soil borings, installing monitoring wells or well points, and collecting environmental samples. Test pits were also excavated at select locations to visually and analytically determine the extent of contamination. The IRA program consisted of the removal of 93 underground storage tanks (USTs) and associated piping, one aboveground storage tank (AST), and one fuel distribution pipeline; characterization and removal of approximately 230 drums; disposal of contaminated liquids and sludge; soil removal and treatment; and screening, sampling, and analysis of environmental media. Background sampling was also conducted for soil, groundwater, surface water, and sediment. Additional site-specific information from the 1996, 1997, 1998, 1999, and 2000 investigations is contained in the Final 1996 Interim Removal Action/Investigation Report (USAED 1998b), Final 1997 Interim Removal Actions; Site Investigation; Remedial Investigation Report (USAED 1999a), Final 1998 SI/RI/IRA Report (USAED 1999c); 1998 Pre-WWII Tank Farm Interim Removal Action Report, (USAED 1999e); 2000 Comprehensive Remedial Investigation Report (USAED 2000b); the Islandwide Work Plan Addendum (USAED 2000a), and the 2000 Island Wide SI/IRA/RI Final Report (USAED 2001) respectively. Table 1 identifies the activities that occurred at the 13 sites comprising this decision document.

The overall objective of the FUDS program is to minimize ongoing sources of environmental impacts and reduce associated risks to human health and the environment resulting from past military use of properties. The FUDS Program Management Plan (USAED 1999d) presents a proposed mechanism for achieving these objectives in a timely and cost-effective manner.

Project-wide objectives for FUDS sites on Amaknak and Unalaska Islands were as follows:

- Locate and investigate areas of potential concern using site reconnaissance and SI techniques.
- Remove primary contaminant sources, including the contents of petroleum storage tanks and related pipelines, electrical transformers, steel drums, and other WWII-era containers, and dispose of them appropriately.

Table 1
Summary of Field Activities
Amaknak and Unalaska Islands, Alaska

Year	Site Name	Field Activity			Summary of Activities
		SI	RI	IRA	
1996 1997 1998	Background Sampling		X		• RI: Collected background soil, groundwater, surface water, and sediment samples for determination of background metals. Soil samples were also collected to provide island-specific geotechnical information.
1997 1998	Lower Unalaska Valley UST 1765			X	• IRA: Removed two USTs; disposed of UST contents; excavated, removed, and treated POL-impacted soils; conducted field screening; collected analytical soil samples; and backfilled the excavation.
1997	Upper Broadway UST 2875			X	• IRA: Removed one UST; excavated, removed, and treated POL-impacted soils; conducted field screening; collected analytical soil samples; and backfilled the excavation.
1997	Lower Unalaska Valley–Ski Bowl USTs 3160, 3162, 3265, and 3360			X	• IRA: Removed seven USTs; disposed of UST contents found in four USTs; excavated, removed, and treated POL-impacted soils from one location; conducted field screening; collected 17 analytical soil samples; and backfilled the excavation.
1996	Upper Unalaska Valley UST 3660	X		X	• SI: Installed exploratory test pits to determine extent of POL impacts. • IRA: Removed 1 UST; disposed of UST contents; excavated, removed, and treated POL-impacted soils; conducted field screening; collected analytical soil samples; and backfilled the excavation.
1997	Unalaska Valley Gas Station	X			• Conducted site reconnaissance and interviews; excavated two exploratory test pits to determine extent of POL impacts; and collected one analytical soil sample.
1997	Upper Pyramid Valley UST 5286			X	• IRA: Removed one UST; disposed of UST contents; excavated, removed, and treated POL-impacted soils; conducted field screening; collected analytical soil samples; and backfilled the excavation.
1998	Upper Pyramid Valley Drums	X		X	• SI: Conducted site reconnaissance, collected one analytical soil sample, estimated the number and contents of drums encountered. • IRA: Removed the 14 empty 55-gallon drums.

Table 1
Summary of Field Activities
Amaknak and Unalaska Islands, Alaska
(continued)

		Field Activity			
Year	**Site Name**	**SI**	**RI**	**IRA**	**Summary of Activities**
1996 1997	Margaret Bay Area – Suspected Dry Well Outfalls and Soil Stockpiles	X		X	• SI: Conducted site reconnaissance for dry well outfalls in bay. • IRA: Removed two soil stockpiles; treated POL-impacted soils; conducted field screening; and collected analytical soil samples .
1998	Eastpoint Loop Road Pumphouse	X			• SI: Conducted site reconnaissance. Post-WWII piping identified, no UST observed.

Notes:

AST = above ground storage tank
IRA = interim removal action
POL = petroleum, oil, and lubricants
RI = remedial investigation
SI = site investigation
UST = underground storage tank
WWII = World War II

- Remove secondary contaminant sources, such as impacted soil and sediments, and remediate or dispose of them appropriately.
- Document the concentration of any contaminants, remaining in soil at each of the sites by collecting and analyzing soil samples.
- Evaluate groundwater quality where visibly impacted soils could not be completely removed and/or where groundwater was encountered, or where impacts were extensive and/or shallow groundwater was observed.
- Further evaluate environmental impacts at sites identified through the previous investigations.
- Collect background samples from representative media to establish statistically defensible background values.

The specific objectives of the USAED investigations on Amaknak and Unalaska Islands were to accomplish the following:

- Identify and confirm unknown source areas.
- Delineate known source areas.
- Perform IRAs and remedial actions to mitigate or clean up contamination.

Field activities over the five-year period can be segregated into three major types: SIs, RIs, and IRAs. SI activities were performed to evaluate the presence or absence of environmental impacts associated with a site. RI activities were performed to further characterize areas (the nature and extent of contamination) once impacts were identified during SIs. For IRA activities, primary and secondary contaminant sources such as USTs, pipelines, and associated petroleum, oil, and lubricants (POL)-impacted soil were removed and disposed of. Many of the activities and procedures performed during the 1996 through 2000 field activities were presented in work plans and work plan addenda before completion of each year's field activities.

Initial site reconnaissance was performed at each area to allow field crews to identify existing site conditions and determine the most logical order for fieldwork associated with subsequent SI, RI, or IRA activities. Site reconnaissance at potential UST and pipeline areas included SI work using magnetometers and other non-intrusive means to detect ferrous metals in the subsurface. SI activities also focused on determining the presence and estimating the extent of contamination at selected areas in support of IRA activities.

RI activities typically involved advancing soil borings and installing monitoring wells. In 1998, these types of RI activities were undertaken at eight areas (RI drilling program). Data compiled from soil and groundwater samples collected during the RI were used to determine if an area should be recommended for IRA or site closure.

The scope of IRA activities included UST and associated piping removal; drum characterization and removal; disposal of contaminated liquids and sludge; soil removal and treatment; screening; and sampling and analysis.

Data were tabulated and compared to Alaska Department of Environmental Conservation (ADEC) Method Two soil and Table C groundwater cleanup levels and surface water and sediment quality standards, where available. Section 4.0 describes how site data were compared to cleanup levels. Post-removal samples indicated that contamination had been successfully removed from these sites, thus they were recommended for closure in Proposed Plan No. 1.

As a result of the above-described evaluations, this Decision Document is comprised of 13 individual sites that have been determined to meet the requirements for site closure. Figure 1 presents the general geographical locations of all closed sites, and includes the outlying Unalaska Island closed sites (Pyramid Valley). Lower and Upper Unalaska Valley closed sites are shown in Figure 2 and Amaknak Island closed sites are presented in Figure 3. It should be noted that other sites of concern are still being evaluated for further action under the FUDS programs on Amaknak and Unalaska Islands.

BROAD BAY

MAKUSHIN VALLEY

UNALASKA BAY

HOG ISLAND

AMAKNAK ISLAND

DUTCH HARBOR

MORRIS COVE

MANCIL LAKE

SUMMER BAY

HUMPY COVE

HUMPY COVE (HALFWAY CREEK)
CRI 6.37

AMAKNAK ISLAND
CLOSED SITES

DEVILFISH POINT

ILIULIUK BAY

SUMMER BAY LAKE

NATEEEKIN BAY

SOUTH CHANNEL ILIULIUK BAY

CITY OF UNALASKA

UNALASKA LAKE

UNALASKA VALLEY
CLOSED SITES

CAPTAINS BAY

ILIULIUK RIVER

PYRAMID PEAK
(ELEVATION 2166 FT.)

UPPER PYRAMID
VALLEY DRUMS
CRI 6.45

UPPER PYRAMID
VALLEY UST
5286 CRI 6.23

UNALASKA ISLAND

NORTH

0 2000 4000 8000
SCALE IN FEET

ALASKA

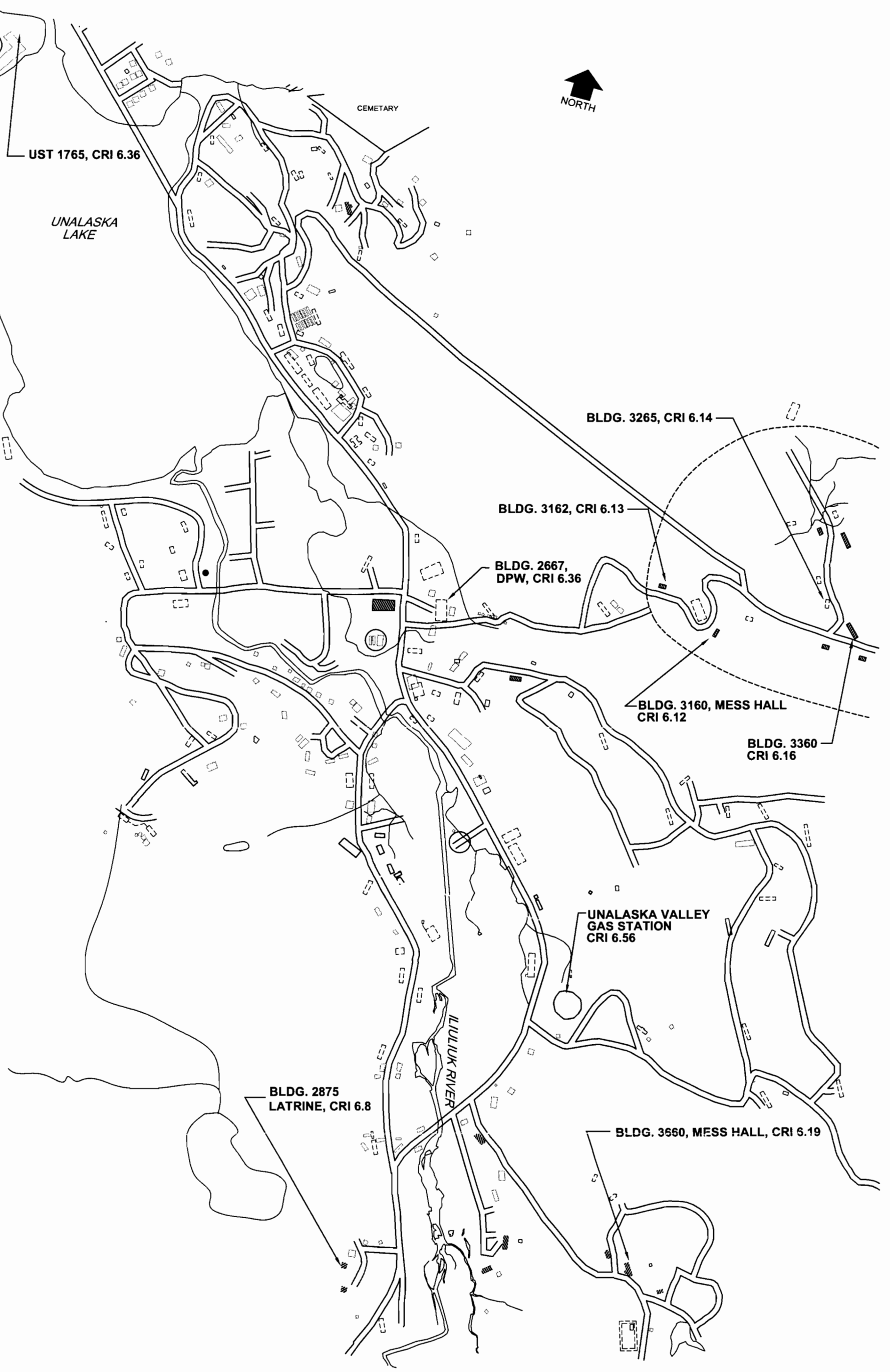
AREA OF DETAIL

NOTE:
OTHER SITES OR AREAS OF CONCERN ON AMAKNAK AND UNALASKA ISLANDS ARE STILL BEING EVALUATED FOR FURTHER ACTION UNDER THE FUDS PROGRAM.

GENERAL SITE LOCATIONS
AMAKNAK & UNALASKA ISLANDS
CLOSED SITES

AMAKNAK ISLAND, ALASKA

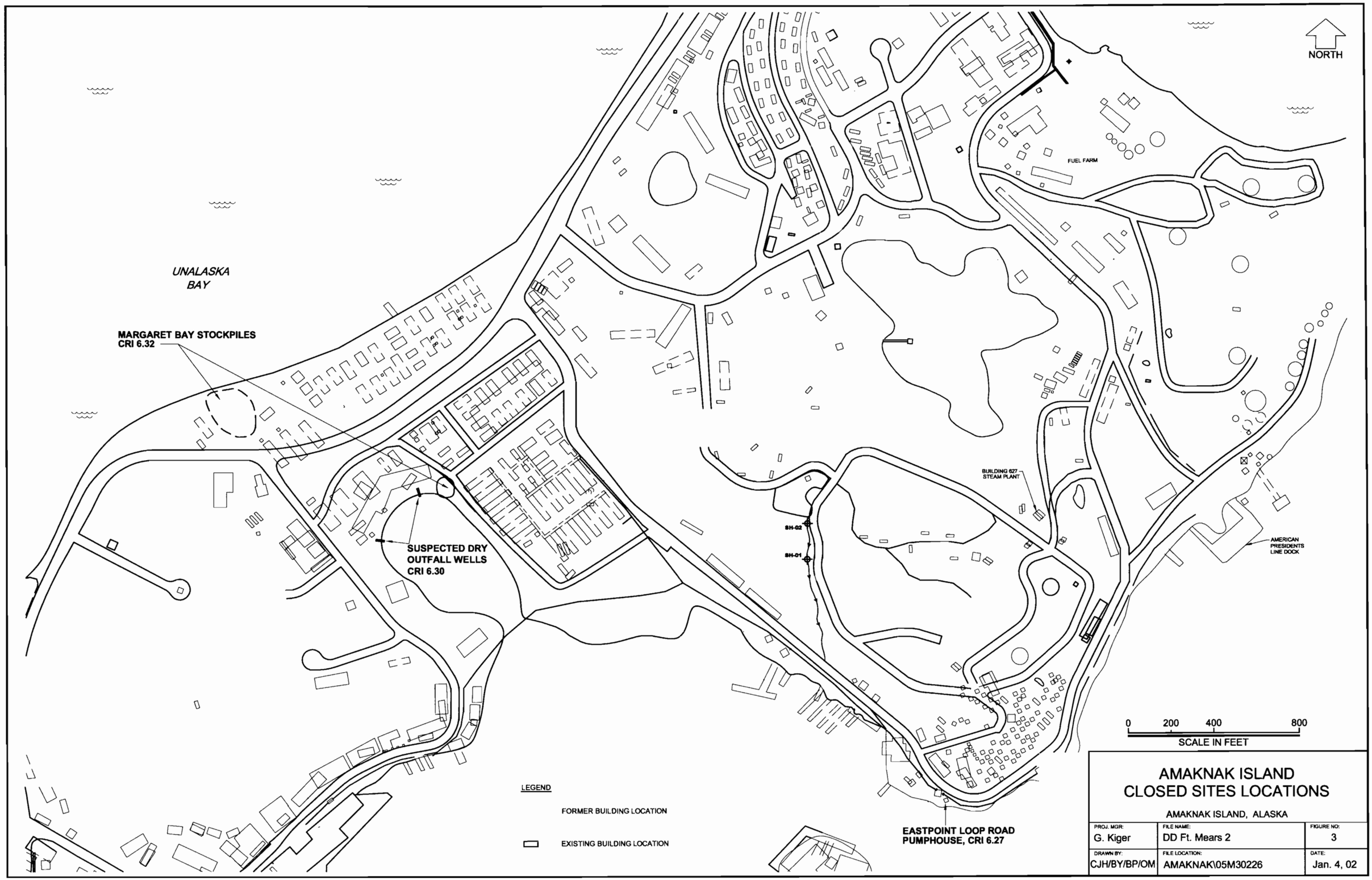
PROJ. MGR:	FILE NAME:	FIGURE NO:
G. Kiger	DD Base Map 2	1
DRAWN BY:	FILE LOCATION:	DATE:
CJH/BY/BP/OM	AMAKNAK\05M30226	Jan. 4, 02



UNALASKA VALLEY CLOSED / SITE LOCATIONS

UNALASKA ISLAND, ALASKA

PROJECT MANAGER: G. Kiger	FILE NAME: DD UV	DATE: Dec. 3, 01
	LAYOUT TAB: Closed Sites	FIGURE NO.: 2
DRAWN BY: JE	FILE LOCATION: Amaknak / 05M30226	



AMAKNAK ISLAND CLOSED SITES LOCATIONS

AMAKNAK ISLAND, ALASKA

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G. Kiger	DD Ft. Mears 2	3
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CJH/BY/BP/OM	AMAKNAK\05M30226	Jan. 4, 02

3.0 PROJECT DATA QUALITY OBJECTIVES

Project data quality objectives (DQO) are presented in this section. The objectives of data collection on Amaknak and Unalaska Islands were to:

- Identify and evaluate locations where visual, olfactory, and other indications of impacts from historic FUDS activities are found.
- Make informed decisions based on field screening and laboratory data to determine what materials should be removed at IRA sites in order to meet cleanup goals.
- Document the levels of contaminants remaining and/or achievement of cleanup goals following IRA activities, with defensible analytical laboratory results.
- Establish compound of potential concern (COPC) concentrations existing at SI and background locations and in potential waste materials with representative analytical samples.
- Confirm or collect defensible chemical information to support decision-making at RI locations.
- Collect data necessary to support future risk assessment at locations where regulatory cleanup criteria are not met or do not exist.
- Evaluate fate and transport pathways and potential receptors.
- Characterize materials for treatment, recycling, disposal, and transportation.

The details for completing each procedure are described individually in the site-specific work plans and addenda, field sampling plans (FSPs) and FSP addenda, and quality assurance project plans (QAPP) and QAPP addenda (USAED 1996, 1997, 1998a, 1999e, and 2000a).

4.0 DETERMINATION OF CLEANUP LEVELS AND SUMMARY OF RISK

Soil sample results from each of these sites were compared with cleanup levels established by ADEC. These cleanup levels are based on protecting groundwater from being impacted by contaminants that could leach from the soil and preventing risk to people that may come in contact with the contaminants in the soil. The exposure pathways by which people may come in contact with contaminants in soil include accidental ingestion, inhalation of vapors, and skin contact.

The cleanup levels are found in sections of Alaska Regulations in 18 Alaska Administrative Code (AAC) 75, Article 3, entitled Oil and Hazardous Substances Pollution Control Regulations, Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances. These regulations address the selection or development of cleanup levels for contaminated soil and groundwater that are considered protective of human health, safety, and welfare, and the environment.

Four different methods of establishing soil cleanup levels are defined in 18 AAC 75.341. Methods One and Two consist of defined cleanup levels that are referenced in tables contained in that regulation. Method Three involves calculating site-specific cleanup levels using soil data from the site or using an industrial land use assumption (along with any necessary institutional controls to limit future land use). Method Four consists of conducting a site-specific risk assessment.

The most stringent Method Two soil cleanup levels were used for the sites addressed in this document. The primary contaminant of concern at these sites was diesel-range organics (DRO), which has a migration to groundwater cleanup level of 230 milligrams per kilogram (mg/kg) of soil. This cleanup level is based on an assumption that the land may be used for residential purposes and that groundwater beneath the sites may be used as a drinking water source. Tables of site-specific analytical data are presented in Appendix A.

Samples collected from soil remaining at the sites addressed in this document did not contain contaminants at concentrations above the migration to groundwater cleanup levels.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted for appropriate sites. Separate evaluations were done for carcinogenic (cancer-producing) compounds and non-cancer causing compounds.

The maximum concentration of each carcinogenic compound was used to calculate the risk from exposure through each exposure pathway. The risk from each pathway was then summed to calculate the cumulative carcinogenic risk. The result was compared to the regulation-defined risk level (1×10^{-5} or 1 in 100,000).

The maximum concentration of each non-carcinogenic compound was used to calculate the hazard quotient. The hazard quotients were summed for each pathway to develop a hazard index. The hazard index for each pathway was compared with the acceptable hazard index defined in the regulation, which is 1.0.

If the cumulative carcinogenic risk was less than one in one hundred thousand (i.e., 1×10^{-5}), and the hazard index was less than 1.0 for each pathway, then it was concluded that the cumulative cleanup standards for the site had been met. A review of the results from investigations and work conducted at each of these sites indicates that the Method Two soil cleanup levels and the cumulative risk levels have been achieved.

Based on the results of the evaluation, these 13 sites are proposed for closure. Risk evaluation summaries for these sites are described below.

5.0 SITE-SPECIFIC SUMMARIES

This section includes site-specific summaries of field investigatory and remedial activities performed at the closed sites. The section numbers referenced in parentheses correspond with section numbers from the Comprehensive RI Report (USAED 2000a). The sections from the comprehensive RI Report are presented in their entirety in Appendix A. The sections also contain the following site-specific information to better define the location of each site:

- GPS coordinates (Latitude and Longitude)
- USGS coordinates (from USGS Unalaska [C-2] Quadrangle Topographic Map, 1990 Edition)
- Legal descriptions from City of Unalaska, Alaska Official Zoning, Streets and Highway Map (where available)

5.1 UNALASKA VALLEY USTS

The locations of the Unalaska Valley USTs can be found on Unalaska Island in Figure 2.

5.1.1 UST 1765 (Section 6.36)

GPS Coordinates: N 53° 52' 23.2", W 166° 31' 49.1"
USGS Coordinates: SE ¼ of SW ¼ of NW ¼ of Section 11, T73S R118W
Property Description: Island Elder Subdivision, P-98-01 & P-95-08

A 300-gallon UST was emptied and removed, and approximately 22 cubic yards of petroleum-contaminated soil were excavated and thermally treated. Confirmation samples collected from soil at the limits of the excavation did not contain contaminants above Method Two soil cleanup levels for petroleum. No further investigation or cleanup is necessary. The site is considered closed.

5.1.2 UST 2875 (Section 6.8)

GPS Coordinates: N 53° 51' 04.9", W 166° 30' 18.0"
USGS Coordinates: SE ¼ of SE ¼ of SE ¼ of Section 14, T73S R118W
Property Description: Salmonberry Subdivision, P-2000-10

A 300-gallon UST was emptied and removed and approximately 6 cubic yards of petroleum-contaminated soil were excavated and thermally treated. Confirmation samples collected from soil at the limits of the excavation did not contain contaminants above Method Two soil cleanup levels for petroleum. No further investigation or cleanup is necessary. The site is considered closed.

5.1.3 UST 3160 (Section 6.12)

GPS Coordinates: N 53° 51' 55.9", W 166° 30' 02.6"
USGS Coordinates: SW ¼ of SE ¼ of SW ¼ of Section 12, T73S R118W
Property Description: Not Available

A 300-gallon UST was removed from the site during the IRA. No soils were excavated because results of field screening did not indicate that any releases had occurred at the site. Two soil samples collected from UST 3160 were subjected to the risk-based screening process. Based on the results of this screening, no maximum detected concentrations of DRO, RRO, or BTEX constituents exceeded the most stringent Method Two cleanup criteria for soils. No further investigation or cleanup is necessary. The site is considered closed.

5.1.4 UST 3162 (Section 6.13)

GPS Coordinates: N 53° 51' 58.0", W 166° 30' 13.0"
USGS Coordinates: SW ¼ of SE ¼ of SW ¼ of Section 12, T73S R118W
Property Description: Not Available

A 300-gallon UST was removed during IRA activities. No soil was removed because field screening results did not indicate that soils were impacted by past POL releases. Two soil samples collected from UST 3162 were subjected to the risk-based screening process. Based on the results of this screening, no maximum detected concentrations of DRO, RRO, or BTEX constituents exceeded the most stringent Method Two cleanup criteria for soils. No further investigation or cleanup is necessary. The site is considered closed.

5.1.5 UST 3265 (Section 6.14)

GPS Coordinates: N 53° 52' 04.8", W 166° 29' 54.4"
USGS Coordinates: SE ¼ of SE ¼ of SW ¼ of Section 12, T73S R118W
Property Description: Not Available

A 300-gallon UST was removed from the Building 3265 site during IRA activities. Field screening did not indicate the presence of contaminated soils. Therefore, no soil was excavated. The two soil samples collected from the UST 3265 excavation were from biogenic sources and were not subjected to the risk-based screening process. There was no POL-contaminated soil at the UST 3265 excavation. No further investigation or cleanup is necessary. The site is considered closed.

5.1.6 UST 3360 (Section 6.16)

GPS Coordinates: N 53° 51' 11.3", W 166° 29' 46.8"
USGS Coordinates: SE ¼ of SE ¼ of SW ¼ of Section 12, T73S R118W
Property Description: Not Available

A 300-gallon UST was removed from the site during IRA activities. Field screening did not indicate the presence of contaminated soils. Therefore, no soil was excavated. Two soil samples were collected from UST 3360 and subjected to the risk-based screening process. Based on the results of this screening, no maximum detected concentrations of DRO or RRO

exceeded the most stringent Method Two cleanup level for contaminants in soils assumed to migrate to groundwater used as drinking water. BTEX constituents were not detected in any sample. No further investigation or cleanup is necessary. The site is considered closed.

5.1.7 UST 3660 (Section 6.19)

GPS Coordinates: N 53° 51' 11.2", W 166° 29' 46.8"
USGS Coordinates: SW ¼ of SE ¼ of SW ¼ of Section 13, T73S R118W
Property Description: Not Available

A 300-gallon UST and 248 cubic yards of contaminated soils were removed during IRA activities. Based on the results of the screening, no maximum detected concentrations of DRO, RRO, or polynuclear aromatic hydrocarbons (PAHs) exceeded the most stringent Method One or Method Two cleanup levels for soils. BTEX constituents were not detected in any of the samples. It is apparent that POL-contaminated soil was successfully removed during IRA activities. No further investigation or cleanup is necessary. The site is considered closed.

5.1.8 Unalaska Valley Gas Station (Section 6.56)

GPS Coordinates: N 53° 51' 29.6", W 166° 30' 08.4"
USGS Coordinates: NW ¼ of NE ¼ of SW ¼ of Section 13, T73S R118W
Property Description: Not Available

Two test pits were excavated at the Unalaska Valley Gas Station site. The test pits were located slightly downgradient of where four former USTs were thought to have been located. Based on field screening, there were no indications of contamination in either of the test pits. The four USTs were removed in 1984. No gasoline-range organics (GRO), BTEX or PAH compounds were detected. The site is considered closed.

5.2 UPPER PYRAMID VALLEY DRUMS AND UST

The locations of the Upper Pyramid Valley drums and UST can be found on Unalaska Island in Figure 1.

5.2.1 Upper Pyramid Valley UST 5286 (Section 6.23)

GPS Coordinates: N 53° 50' 45.1", W 166° 33' 32.3"
USGS Coordinates: SE ¼ of NE ¼ of NE ¼ of Section 21, T73S R118W
Property Description: Not Available

A 5,600-gallon UST and approximately 225 cubic yards of soil were removed during IRA activities. DRO, RRO, GRO, and BTEX concentrations were not detected in any of the confirmatory samples collected from the UST 5286 excavation or test pit. No further investigation or cleanup is necessary. The site is considered closed.

5.2.2 Upper Pyramid Valley Drums (Section 6.45)

GPS Coordinates: N 53° 50' 31.8", W 166° 33' 01.6"
USGS Coordinates: NE ¼ of NE ¼ of NE ¼ of Section 21, T73S R118W
Property Description: Not Available

Fourteen drums were removed during IRA activities. No visual, olfactory or photoionization detector (PID) evidence of impact were noted during reconnaissance at the site. One soil sample was collected before removal of the drums. GRO, volatile organic compounds (VOCs) and PCBs were not detected in the collected sample. DRO and RRO were detected at concentrations below the most stringent Method Two cleanup levels for soils. Total chromium and lead were detected at concentrations less than their respective background value and the most stringent Method Two cleanup level for soils. No further investigation or cleanup is necessary. The site is considered closed.

5.3 AMAKNAK ISLAND SITES

Amaknak Island sites are shown on Figure 3.

5.3.1 Margaret Bay Area Suspected Dry Well Outfalls (Section 6.30)

GPS Coordinates: N 53° 53' 03.7", W 166° 32' 56.8"
N 53° 53' 03.7", W 166° 32' 50.6"
USGS Coordinates: NE ¼ of NE ¼ of SW ¼ of Section 3, T73S R118W (for both outfalls)
Property Description: Margaret Bay Subdivision, P-92-03 (for both outfalls)

The 1997 investigation could not locate the two Dry Well Outfalls. Only a single 2-inch diameter pipe was observed extending 10 feet into Margaret Bay. However, no evidence of the pipe was found above the water level. Marine life around the margins of Margaret Bay appears to be diverse and healthy. Two hand-excavated test pits along the Margaret Bay shoreline revealed black organic sediment within the rocks and cobbles. No petroleum odor or sheen was noted in the test pits or the sediments. The black organic sediments are assumed to have biogenic origins. No further investigation or cleanup is necessary. The site is considered closed.

5.3.2 Margaret Bay Stockpiles (Section 6.32)

GPS Coordinates: N 53° 53' 06.7", W 166° 32' 50.2"
N 53° 53' 09.4", W 166° 33' 12.1"
USGS Coordinates: NE ¼ of NE ¼ of SW ¼ of Section 3, T73S R118W
NW ¼ of NE ¼ of SW ¼ of Section 3, T73S R118W
Property Description: Margaret Bay Subdivision, P-92-03 (for both stockpiles)

Activities were related to the removal, transportation, and treatment of pre-existing soils from two stockpiles within the Margaret Bay area. Approximately 1,000 cubic yards of soil were excavated, transported, and thermally treated from the first stockpile. The second stockpile consisted of approximately 200 cubic yards of soil, which was also excavated, transported, and thermally treated. After thermal treatment, the stockpiled soil was sampled and met the applicable cleanup levels. Surface soil samples were collected after the stockpiles were removed and analytical results evaluated. No DRO or RRO exceeded the Method Two cleanup criteria for soils. Neither VOCs nor semivolatile organic compounds (SVOCs) were detected. No other constituents were detected. No further investigation or cleanup is necessary. The site is considered closed.

5.3.2 Eastpoint Loop Road Pumphouse (Section 6.27)

GPS Coordinates: N 53° 52' 51.6", W 166° 32' 10.5"
USGS Coordinates: NW ¼ of SE ¼ of SE ¼ of Section 3, T73S R118W
Property Description: Eastpoint Subdivision, P-81-7

The pipelines identified during site reconnaissance were determined to be part of fuel lines installed after WWII, possibly related to the Delta-Western Bulk Fuel Facility or the former fish processing facility. Therefore, these pipelines are not FUDS-related. No USTS were identified or observed. No further investigation or cleanup is necessary. The site is considered closed.

6.0 SITE-SPECIFIC ACTIVITIES

Details on the activities at each site are presented in text taken from the Comprehensive RI and provided as Appendix A. Each site in Appendix A is organized in the following manner. A general description of the site is presented and includes the location of the site and the activities conducted. Previous investigations, where applicable, are summarized. An analytical data evaluation is presented by medium and includes the number of samples, chemical analyses performed, and the analytical results. Figures and tables presenting this information are also included. Finally, recommendations and conclusions for each site are presented.

7.0 CONCLUSIONS AND RECOMMENDATIONS

A summary of conclusions and recommendations for each site, based on all data collected during the five years of fieldwork, is presented as Table 2. The section numbers listed on Table 2 correspond with section numbers from the Comprehensive Remedial Investigation Report (USAED 2000a). A thorough, site-specific discussion of findings, conclusions and recommendations for no further defense action and site closure is found in Appendix A of this report.

Based on the 1996, 1997, 1998, 1999, and 2000 activities conducted in and around the City of Unalaska and the community of Dutch Harbor, FUDS have been identified and addressed through various environmental investigation efforts. This decision document encompasses the results of investigatory/remedial activities for 13 of these sites. Field activities included SIs, RIs, and IRAs. Analytical data from all years were tabulated and compared to ADEC Method Two soil cleanup levels.

Based on the results of the evaluations, conclusions, and recommendations, these thirteen sites are considered closed.

Table 2
Summary of Conclusions and Recommendations
Amaknak and Unalaska Islands, Alaska

Section	Site Name	Year	IRA Type	Size/ Quantity	Media Removed	Media Sampled/Quantity	COPCs	Maximum Concentration	Status	Comments
Unalaska Valley USTs										
6.36	UST 1765	1998	UST	300 gal. (1)	UST water – 40 gal. Impacted soil – 22 cy	Soil (2)	None		Closed	
6.8	UST 2875	1997	UST	300 gal. (1)	UST water - 15 gal. Impacted soil - 6 cy	Soil (2)	None		Closed	
6.12	UST 3160	1997	UST	300 gal. (1)	None	Soil (2)	None		Closed	
6.13	UST 3162	1997	UST	300 gal. (1)	None	Soil (2)	None		Closed	
6.14	UST 3265	1997	UST	300 gal. (1)	UST water - 310 gal.	Soil (3)	DRO	3,600 mg/kg	Closed	DRO determined to be from a naturally-occurring source.
6.16	UST 3360	1997	UST	300 gal. (1)	UST water - 50 gal.	Soil (2)	None		Closed	
6.19	UST 3660	1997	UST	300 gal. (1)	UST water - 300 gal.	Soil (7)	None		Closed	
					Impacted soil - 248 cy					
6.56	Unalaska Valley Gas Station	1997	UST	4 tanks previously removed (1984)		Soil (1)	None		Closed	

Table 2
Summary of Conclusions and Recommendations
Amaknak and Unalaska Islands, Alaska
(continued)

Section	Site Name	Year	IRA Type	Size/ Quantity	Media Removed	Media Sampled/Quantity	COPCs	Maximum Concentration	Status	Comments
Upper Pyramid Valley Drums and UST										
6.23	Upper Pyramid Valley UST 5286	1997	UST	5,600 gal. (1)	UST water - 5,000 gal. Weathered gas - 100 gal. Impacted soil - 225 cy	Soil (7)	None		Closed	
6.45	Upper Pyramid Valley Drums	1998	Drum	55-gal. (14)		Soil (1)	None		Closed	
Amaknak Island Sites										
6.30	Margaret Bay Suspected Dry Well Outfalls	1997	None			None			Closed	Dry wells assumed to have been removed.
6.32	Margaret Bay Stockpiles	1996	stkpl (2)	1,000 cy (1) 200 cy (1)	Stockpile soil - 1,200 cy Liner material - 17 cy	Soil (8)	None		Closed	
6.27	Eastpoint Loop Road Pumphouse	1998	None			None			Closed	No USTs identified. Pipeline determined not to be FUDS-related.

Notes:

AOPC = area of potential concern
COPC = compound of potential concern
cy = cubic yard
DRO = diesel-range organics
FUDS = formerly used defense sites
gal. = gallon
IRA = interim removal action
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
RI = remedial investigation
SI = site investigation
Stkpl. = stockpile
UCL = upper confidence level
UST = underground storage tank
% = percent

8.0 REFERENCES

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USAED. 2000b (July). *2000 Islandwide Work Plan Addendum, Amaknak/Unalaska Islands, Alaska. Final.* Prepared by Jacobs Engineering Group Inc.

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USAED. 1999e (March). *1997 Interim Removal Actions Site Investigation, Remedial Investigation Report, Amaknak and Unalaska Islands, Alaska.* Final. Prepared by Jacobs Engineering Group Inc.

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USAED. 1997. (June). *1997 Work Plan Addendum, Amaknak and Unalaska Islands, Alaska.* Prepared by Jacobs Engineering Group Inc.

USAED. 1996. (August). *1996 Field Effort Work Plan, Margaret Bay and Generals Hill UST Remedial Action, Pre-WWII Tanks Farm Remedial Investigation, Amaknak and Unalaska Islands, Alaska.* Final. Prepared by Jacobs Engineering Group Inc.

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APPENDIX A

Site-Specific Sections From the 2000 Comprehensive Remedial Investigation Report

DECISION DOCUMENT NO. 1

CLOSED SITES LIST
AMAKNAK and UNALASKA ISLANDS

Comprehensive Remedial Investigation Report Section Number	Site Name	Area Name (Figure Reference)
6.8	UST 2875	Upper Broadway UST 2875 (Figure 2)
6.12	UST 3160	Lower Unalaska Valley – Ski Bowl (Figure 2).
6.13	UST 3162	Lower Unalaska Valley – Ski Bowl (Figure 2).
6.14	UST 3265	Lower Unalaska Valley – Ski Bowl (Figure 2).
6.16	UST 3360	Lower Unalaska Valley – Ski Bowl (Figure 2).
6.19	UST 3660	Upper Unalaska Valley (Figure 2)
6.23	UST 5286	Upper Pyramid Valley (Figure 1).
6.27	Eastpoint Loop Road Pumphouse	Amaknak Island (Figure 3).
6.30	Dry Well Outfalls	Amaknak Island (Figure 3).
6.32	Margaret Bay Stockpiles	Amaknak Island (Figure 3).
6.36	Lower Unalaska Valley UST 1765	Lower Unalaska Valley (Figure 2).
6.45	Upper Pyramid Valley Drums	Upper Pyramid Valley (Figure 1)
6.56	Unalaska Valley Gas Station	Unalaska Valley (Figure 2).

6.8 UST 2875

Building 2875 is the ruins of an old latrine located just north of UV-2860 on Hawley Lane on Unalaska Island (Figure 3-4). A single-wall 300-gallon UST containing approximately 15 gallons of water was encountered on the southeast side of the building (Figure 6-15). The steel vessel had moderate to heavy corrosion, but no perforations were noted. Typical threaded product, return, and vent piping were present below ground surface. The UST and approximately 6 cy of POL-stained soil were removed from the fill pipe area of the tank on 3 September 1997. Two soil samples were collected to characterize residual contamination remaining beneath the former UST. Soil to backfill the excavation was located onsite. The UST 2875 was initially presented in the 1997 IRA/SI/RI Report (USAED 1999e).

6.8.1 Analytical Data Evaluation

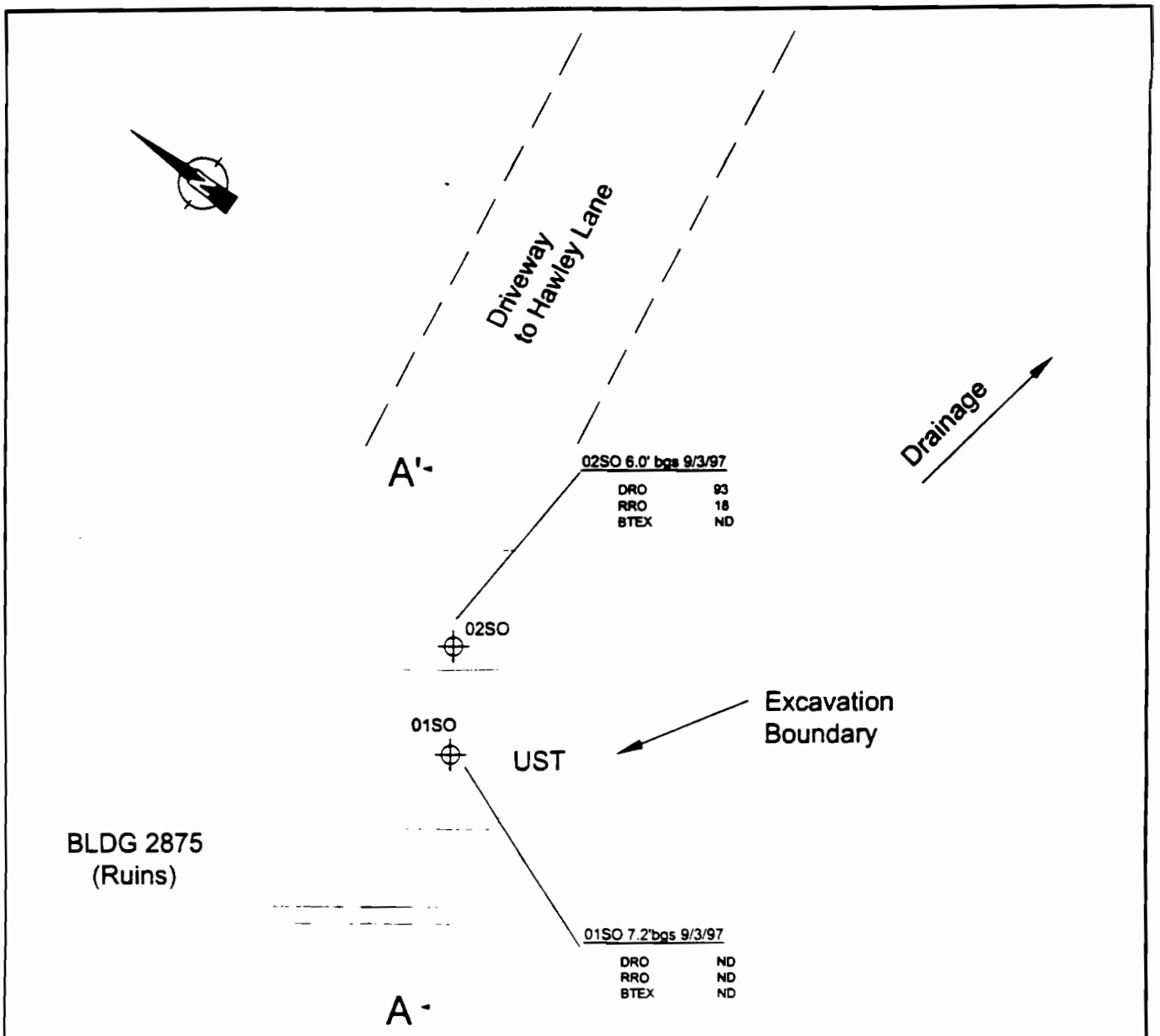
Two sample locations were selected to characterize the site after removal of approximately 6 cy of soil (Figure 6-15 and 6-16). Both samples were submitted for DRO, RRO, and BTEX analyses. No samples were submitted for PAH analyses.

RRO was detected in one of the two soil samples with a concentration of 18 mg/kg (Table 6-17). BTEX constituents were not detected in either sample.

DRO was detected in one (2875-02SO) of the two soil samples with a concentration of 93 mg/kg. This sample was collected from soil at the bottom of the excavation at the northeast end of the former UST location.

6.8.2 Risk-Based Screening Results

Soil samples collected from the UST 2875 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate/Heavy
Maximum Excavation Depth:	7.2 Feet bgs
Impacted Soil Excavated (1997):	6 yd^3

0 2.5 5 10

SCALE IN FEET

LEGEND

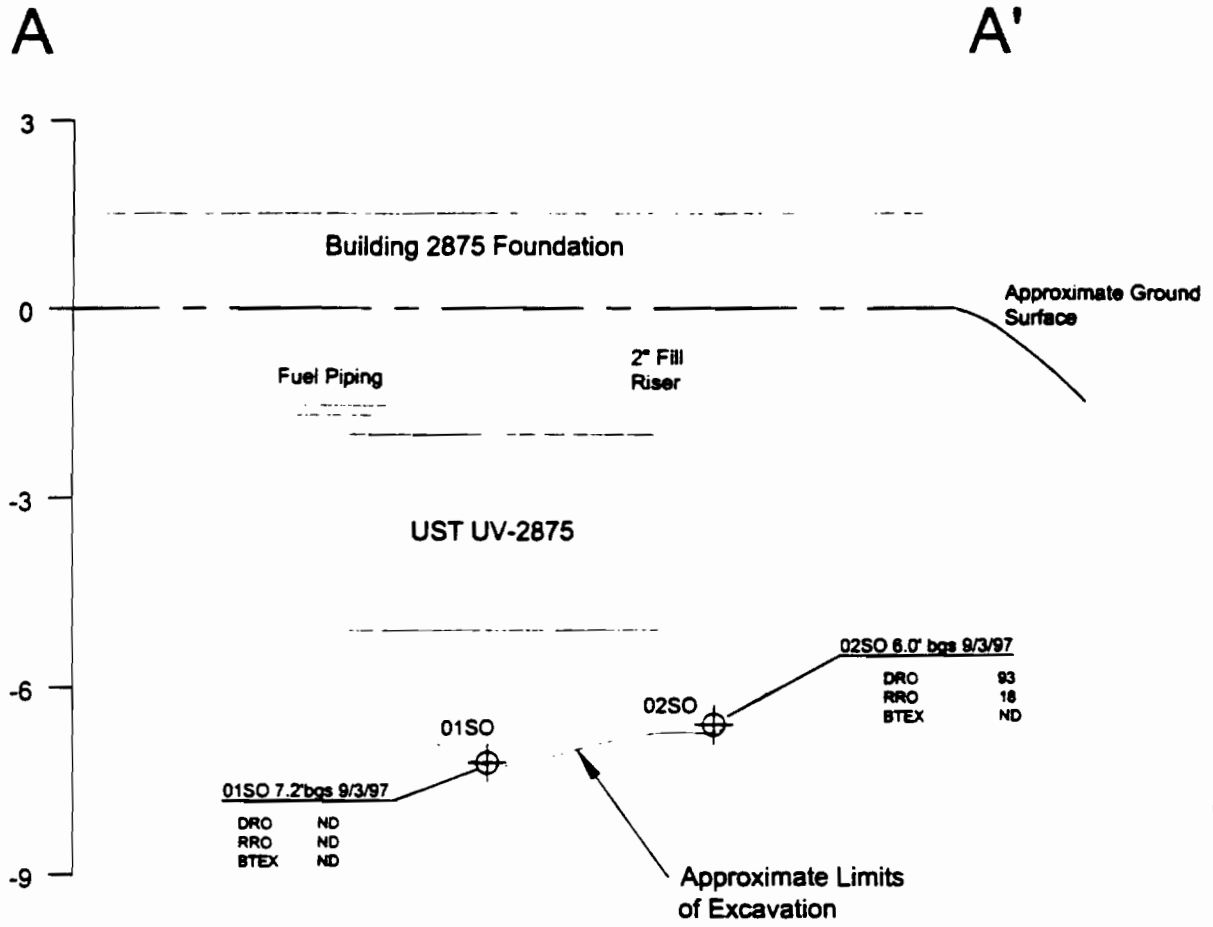
Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
Approximate Location Analytical Sample 97AMA-2875-01SO.

UST UV-2875
UPPER BROADWAY, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV2875	1	6-15
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate/Heavy
Maximum Excavation Depth:	7.2 Feet bgs
Impacted Soil Excavated (1997):	6 yd^3

SCALE

Horizontal 1"=3'
Vertical 1"=3'

LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed
01SO
Approximate Location Analytical Sample 97AMA-2875-01SO.

UST UV-2875
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ MGR.	ACAD FILE NAME:	VIEW	FIGURE NO.:
L PHYFE	Xsec2875	1	6-16
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99

6.8.2.1 Soils

Two soil samples collected from UST 2875 were subjected to the risk-based screening process. Sample depths for collected soils ranged between 6.0 and 7.2 feet bgs. Soil samples were collected from the bottom of the excavation after tank removal.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 2875 is located in an area zoned as a holding zone, but areas zoned as residential are located adjacent to Building 2875. Therefore, the site was evaluated under a residential land use scenario.

Table 6-18 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of this screening, no detected concentrations of RRO exceed the most stringent ADEC Method 2 cleanup criteria for soils. BTEX constituents were not detected in either sample.

DRO was detected in one sample (2875-02SO) at a concentration that does not exceed the most stringent ADEC Method 2 DRO value (230 mg/kg) that is protective of contaminants migrating from soil to groundwater (Table 6-18). RRO was detected in one sample (2875-02SO) at a concentration that does not exceed the most stringent ADEC Method 2 RRO value (8,300 mg/kg) that is protective of contaminants migrating from soil to groundwater (Table 6-18). Therefore it can be concluded that detected compounds are not migrating from soils to groundwater at levels of concern.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO and RRO was 0.01 for the ingestion pathway, 0.008 for the inhalation pathway, and 0.41 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.8.3 Conclusions and Recommendations

A 300-gallon UST and approximately 6 cy of POL-impacted soils were removed during IRA activities at this site. Two soil samples collected from UST 2875 were subjected to the risk-based screening process assuming a residential scenario. Sample depths for collected soils ranged between 6.0 and 7.2 feet bgs. Samples were submitted for RRO, DRO, and BTEX analyses.

Based on the results of this screening, no maximum detected concentrations of DRO or RRO exceed the most stringent ADEC Method 2 cleanup criteria for soils (Table 6-18). BTEX constituents were not detected. Cumulative hazard indexes for various exposure pathways ranged from 0.008 to 0.41, each less than the limitation of 1.0. NFA at this site is recommended.

Table 6-17
Analytical Data Summary, Soil
UST 2875
Amaknak and Unalaska Islands, Alaska

Sample Location:	2875-01	2875-02
Sample Identification Number:	97AMA-2875-01SO	97AMA-2875-02SO
Date Sampled:	9/3/97	9/3/97
Sample Depth (feet):	7.2	6
TEST GROUP: AROMATICS - UNITS: MG/KG		
Benzene	ND[0.0238:::D]	ND[0.0164]
Toluene	ND[0.0238]	ND[0.0164]
Ethylbenzene	ND[0.0238]	ND[0.0164]
Xylenes	ND[0.0714]	ND[0.0492]
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	ND[9.5]	93
Residual Range Organics	ND[24]	18

Table 6-17
Analytical Data Summary, Soil
UST 2875
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.

Table 6-18
Compounds of Potential Concern, Soil
UST 2875
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	2	0			0 0101	0 0238	2 00E-02	D	none	0
Toluene	2	0			0 0101	0 0238	4 80E+00	D	none	0
Ethylbenzene	2	0			0 0101	0 0238	5 00E+00	D	none	0
Xylenes	2	0			0 0302	0 0714	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	1	93	93	48 875	9 5	2 30E+02	D	none	0
Residual Range Organics	2	1	18	18	15	24	8 30E+03	D	none	0

Table 6-18
Compounds of Potential Concern, Soil
UST 2875
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

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6.12 UST 3160

UST UV-3160 was located at a former mess hall located below Ptarmigan Road in the lower Ski Bowl area on Unalaska Island (Figure 3-3). The UST-3160 was a 300-gallon, single-wall steel tank that was buried just below ground surface on the eastern side of the remaining building foundation (Figure 6-23). During the 1997 investigation, four threaded steel fuel lines were found to connect the tank to the foundation. Only a trace of water was found in the light-to-moderately corroded UST when it was removed from the ground on 24 September 1997.

Field screening revealed no POL-impacted soil in the 25 ft^2 excavation area. Two analytical soil samples were collected to characterize the UST site. The excavation was backfilled by recontouring the surrounding land. No soil was removed from the site.

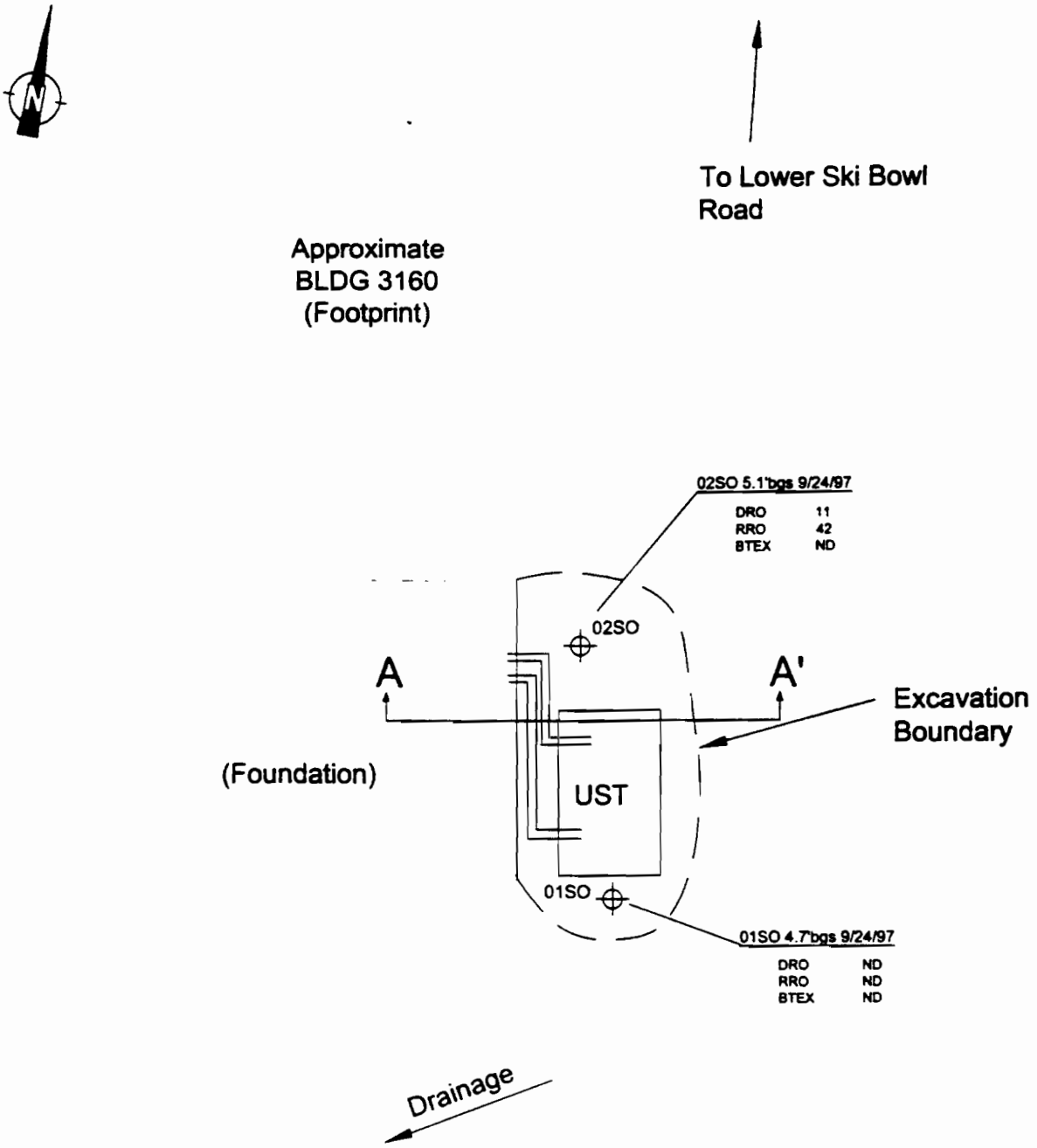
6.12.1 Analytical Data Evaluation

Two samples (3160-01SO and 3160-02SO) were collected from the bottom of the excavation to characterize the soil remaining after the removal of UST UV-3160 (Figures 6-23 and 6-24). Samples were collected from 4.5 and 5.1 feet bgs and submitted for DRO, RRO, and BTEX analyses.

RRO was detected in one sample (3160-02SO) at a concentration of 42 mg/kg (Table 6-26). BTEX constituents were not detected in either sample. DRO was detected in one of two samples (3160-02SO) at a concentration of 11 mg/kg.

6.12.2 Risk-Based Screening Results

Soil samples collected from the UST 3160 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	5.1 Feet bgs
Impacted Soil Excavated (1997):	0 yd^3

0 2.5 5 10

SCALE IN FEET

LEGEND

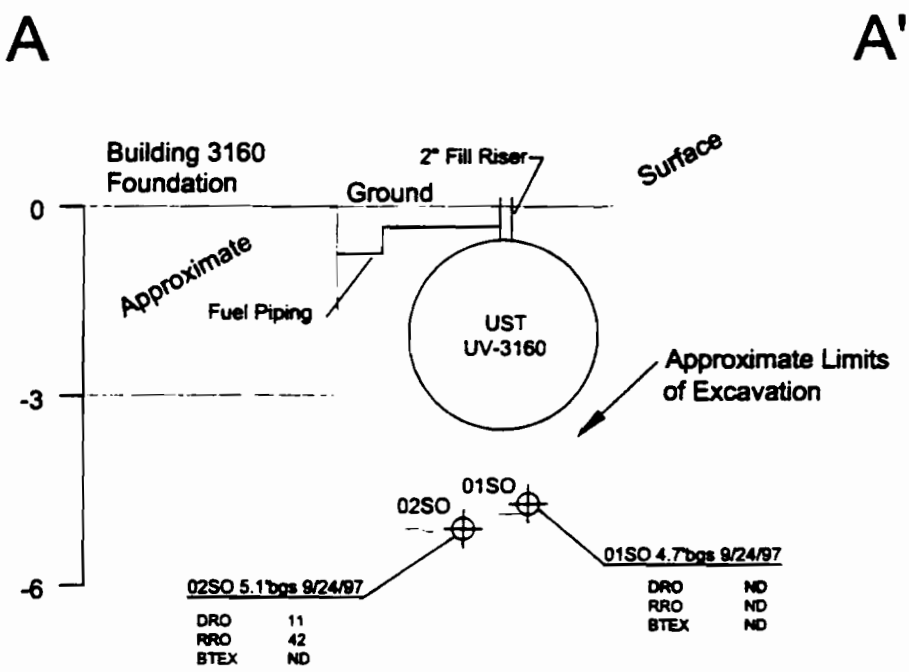
Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
Approximate Location Analytical Sample 97AMA-3160-01SO.

UST UV-3160
LOWER SKI BOWL, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV3160	1	6-23
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	5.1 Feet bgs
Impacted Soil Excavated (1997):	0 yd³

SCALE

Horizontal 1"=3'
Vertical 1"=3'

LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
Approximate Location Analytical Sample 97AMA-3160-01SO.

UST UV-3160
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	Xsec3160	1	6-24
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99

6.12.2.1 Soils

Two soil samples collected from UST 3160 were subjected to the risk-based screening process. Sample depths for collected soils were 4.5 and 5.1 feet bgs. Soil samples were collected from the bottom of the excavation after tank removal.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 3160 is located in an area zoned as a holding zone. However, because Building 3160 is in an area that may be used as residential in the future, the site was evaluated under a residential land use scenario.

Table 6-27 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of this screening, no maximum detected concentrations of RRO, DRO or BTEX constituents exceed the most stringent ADEC Method 2 cleanup criteria for soils.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO and RRO was 0.006 for the ingestion pathway, 0.003 for the inhalation pathway, and 0.05 for the migration to groundwater pathway. Each of these values is less than the limit of 1.0.

6.12.3 Conclusions and Recommendations

A 300-gallon UST was removed from the site during the IRA. No soils were excavated because results of field screening did not indicate that any releases had occurred at the site. Two soil samples collected from UST 3160 were subjected to the risk-based screening process. Sample depths for collected soils were 4.5 and 5.1 feet bgs. Samples were submitted for DRO, RRO, and BTEX analyses.

Based on the results of this screening, no maximum detected concentrations of RRO, DRO or BTEX constituents exceed the most stringent ADEC Method 2 cleanup criteria for soils (Table 6-27).

NFA at this site is proposed because BTEX constituents were not detected in samples from the excavation, detected concentrations of RRO and DRO did not exceed the most stringent ADEC Method 2 cleanup levels, and the cumulative hazard index was less than 1.0 for each exposure pathway.

Table 6-26
Analytical Data Summary, Soil
UST 3160
Amaknak and Unalaska Islands, Alaska

Sample Location:	3160-01	3160-02
Sample Identification Number:	97AMA-3160-01SO	97AMA-3160-02SO
Date Sampled:	9/24/97	9/24/97
Sample Depth (feet):	4.5-4.7	4.8-5.1
TEST GROUP: AROMATICS - UNITS: MG/KG		
Benzene	ND[0.0189]	ND[0.0196]
Toluene	ND[0.0189]	ND[0.0196]
Ethylbenzene	ND[0.0189]	ND[0.0196]
Xylenes	ND[0.0566]	ND[0.0588]
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	ND[7.5]	11
Residual Range Organics	ND[19]	42

Table 6-26
Analytical Data Summary, Soil
UST 3160
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.

Table 6-27
Compounds of Potential Concern, Soil
UST 3160
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	2	0			0 0096	0 0196	2 00E-02	D	none	0
Toluene	2	0			0 0096	0 0196	4 80E+00	D	none	0
Ethylbenzene	2	0			0 0096	0 0196	5 00E+00	D	none	0
Xylenes	2	0			0 0289	0 0588	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	1	11	11	7 375	7 5	2 30E+02	D	none	0
Residual Range Organics	2	1	42	42	25.75	19	8 30E+03	D	none	0

Table 6-27
Compounds of Potential Concern, Soil
UST 3160
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

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6.13 UST 3162

Building 3162 was a command bunker located below Ptarmigan Road, and northwest of UST-3160 on Unalaska Island (Figure 3-3). The structure of Building 3162 remains intact and a remote vent riser on the roof revealed the presence of an UST. The UST-3162 was an empty, heavily corroded 300-gallon steel tank located on the southeast side of an offset utility room (Figures 6-25 and 6-26). Two sets of product and return lines connected the deeply buried UST to the utility room. An additional pair of steel lines was encountered running southeast from the corner of the utility room. It was not clear if these lines were electrical conduits or fuel piping. Additional excavation was performed to determine if the lines connected to a second UST. A second UST was not found in the area.

Soil screening did not indicate the presence of POL contamination at UST-3162. Removal of the tank on 24 September 1997 resulted in a 250 ft^2 excavation. No soil was removed from the site. The investigation at UST-3162 was initially presented in the 1997 IRA/SI/RI Report (USAED 1999e).

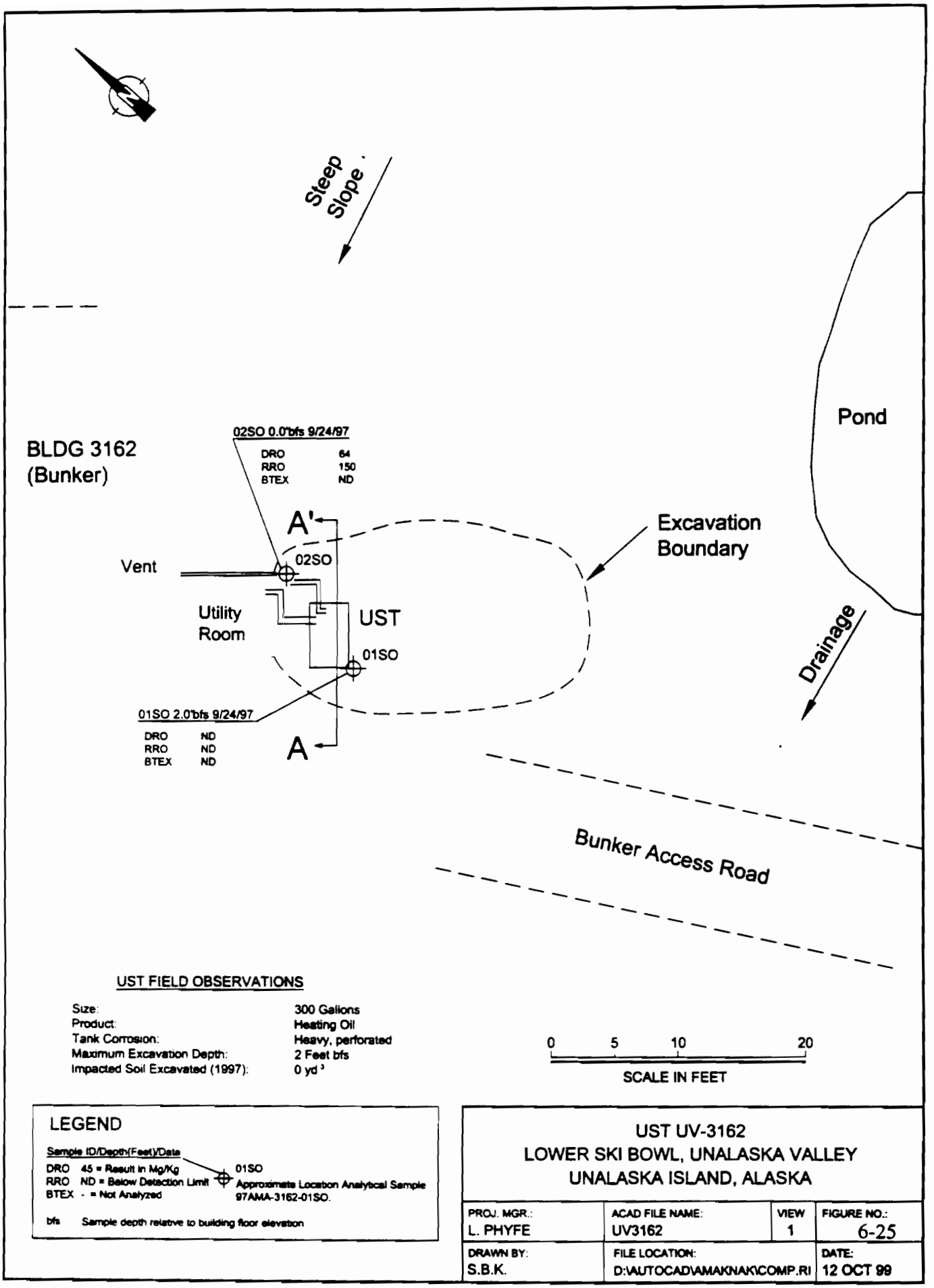
6.13.1 Analytical Data Evaluation

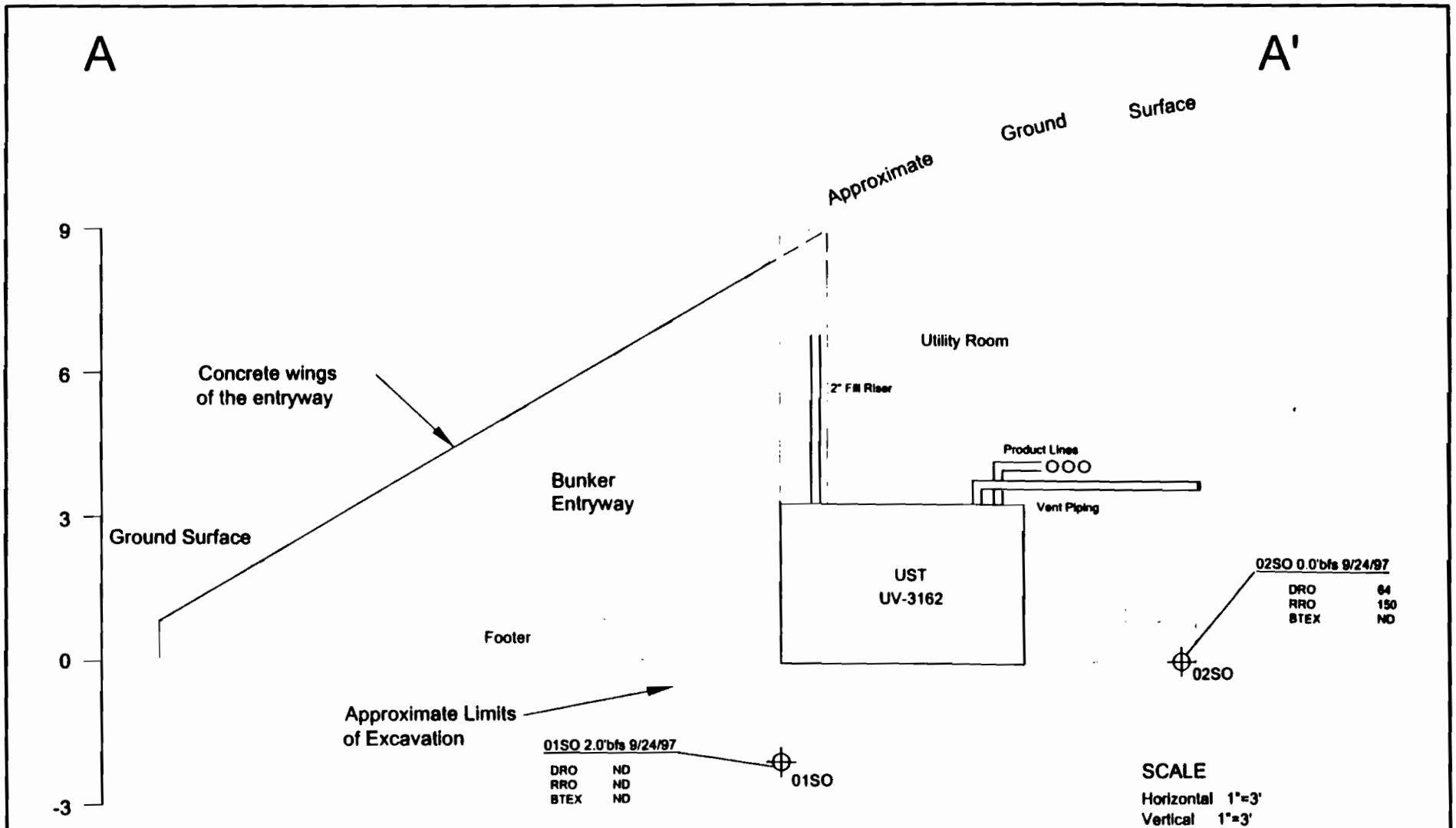
Two soil samples (3162-01SO and 3162-02SO) were collected from the excavation to characterize the soil remaining after the removal of UST-3162 (Figures 6-25 and 6-26). As presented on Figure 6-26, samples were collected approximately 0.0 and 2.0 feet below the bottom of the removed UST (3162-01SO) and at the base of the bunker footer (3162-02SO). Both samples were submitted for DRO, RRO, and BTEX analyses.

RRO was detected in one of two samples (3162-02SO) at a concentration of 150 mg/kg (Table 6-28). DRO was only detected in one of two samples (3162-02SO) at a concentration of 64 mg/kg. BTEX constituents were not detected in either soil sample.

6.13.2 Risk-Based Screening Results

Two soil samples collected from the UST 3162 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared


Steep Slope
Pond
BLDG 3162
(Bunker)
02SO 0.0'bfs 9/24/97
DRO 64
RRO 150
BTEX ND
A'
Vent
02SO
Excavation Boundary
Utility Room
UST
01SO
Drainage
01SO 2.0'bfs 9/24/97
DRO ND
RRO ND
BTEX ND
A
Bunker Access Road
UST FIELD OBSERVATIONS
Size: 300 Gallons
Product: Heating Oil
Tank Corrosion: Heavy, perforated
Maximum Excavation Depth: 2 Feet bfs
Impacted Soil Excavated (1997): 0 yd³
0 5 10 20
SCALE IN FEET
LEGEND
Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed
01SO
Approximate Location Analytical Sample 97AMA-3162-01SO.
bfs Sample depth relative to building floor elevation
UST UV-3162
LOWER SKI BOWL, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA
PROJ. MGR.: L. PHYFE
ACAD FILE NAME: UV3162
VIEW 1
FIGURE NO.: 6-25
DRAWN BY: S.B.K.
FILE LOCATION: D:\AUTOCAD\AMAKNAK\COMP.RI
DATE: 12 OCT 99



LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
Approximate Location Analytical Sample 97AMA-3162-01SO.

bfs Sample depth relative to building floor elevation

UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Heavy, perforated
Maximum Excavation Depth:	2 Feet bfs
Impacted Soil Excavated (1997):	0 yd^3

UST UV-3162
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.: L. PHYFE	ACAD FILE NAME: Xsec3162	VIEW 1	FIGURE NO 6-26
DRAWN BY: S.B.K.	FILE LOCATION: D:\AUTOCAD\AMAKNAK\COMP.RI		DATE 12 OCT 99

to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.

6.13.2.1 Soils

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 3162 is located in an area zoned as a holding zone. However, because Building 3162 is located in an area with the potential for residential use, the site was evaluated under a residential land use scenario.

Table 6-29 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of this screening, no maximum detected concentrations of DRO, RRO or BTEX constituents exceed the most stringent ADEC Method 2 cleanup criteria for soils.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO and RRO was 0.03 for the ingestion pathway, 0.01 for the inhalation pathway, and 0.29 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.13.3 Conclusions and Recommendations

A 300-gallon UST was removed during IRA activities. No soil was removed because field screening results did not indicate that soils was impacted by past POL releases. Two soil samples collected from UST 3162 were subjected to the risk-based screening process. Sample depths for collected soils ranged to a maximum of 2.0 feet below the bottom of the excavated tank (relative to the building floor elevation as opposed to ground surface). Samples were submitted for RRO, DRO, and BTEX analyses.

Based on the results of the risk-based screening, no maximum detected concentrations of DRO, RRO or BTEX constituents exceed the most stringent ADEC Method 2 cleanup criteria for soils (Table 6-29). Cumulative hazard indexes for each exposure pathways was less than the limitation of 1.0. Based on these results, NFA at this site is recommended.

Table 6-28
Analytical Data Summary, Soil
UST 3162
Amaknak and Unalaska Islands, Alaska

Sample Location:	3162-01	3162-02
Sample Identification Number:	97AMA-3162-01SO	97AMA-3162-02SO
Date Sampled:	9/24/97	9/24/97
Sample Depth (feet):	1.8-2.0	0
TEST GROUP: AROMATICS - UNITS: MG/KG		
Benzene	ND[0.02:::D]	ND[0.0137]
Toluene	ND[0.02]	ND[0.0137]
Ethylbenzene	ND[0.02]	ND[0.0137]
Xylenes	ND[0.06]	ND[0.0411]
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	ND[8]	64
Residual Range Organics	ND[20]	150

Table 6-28
Analytical Data Summary, Soil
UST 3162
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.

Table 6-29
Compounds of Potential Concern, Soil
UST 3162
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	2	0			0 0084	0 02	2 00E-02	D	none	0
Toluene	2	0			0 0084	0 02	4 80E+00	D	none	0
Ethylbenzene	2	0			0 0084	0 02	5 00E+00	D	none	0
Xylenes	2	0			0 0253	0 06	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	1	64	64	34	8	2 30E+02	D	none	0
Residual Range Organics	2	1	150	150	80	20	8 30E+03	D	none	0

Table 6-29
Compounds of Potential Concern, Soil
UST 3162
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

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6.14 UST 3265

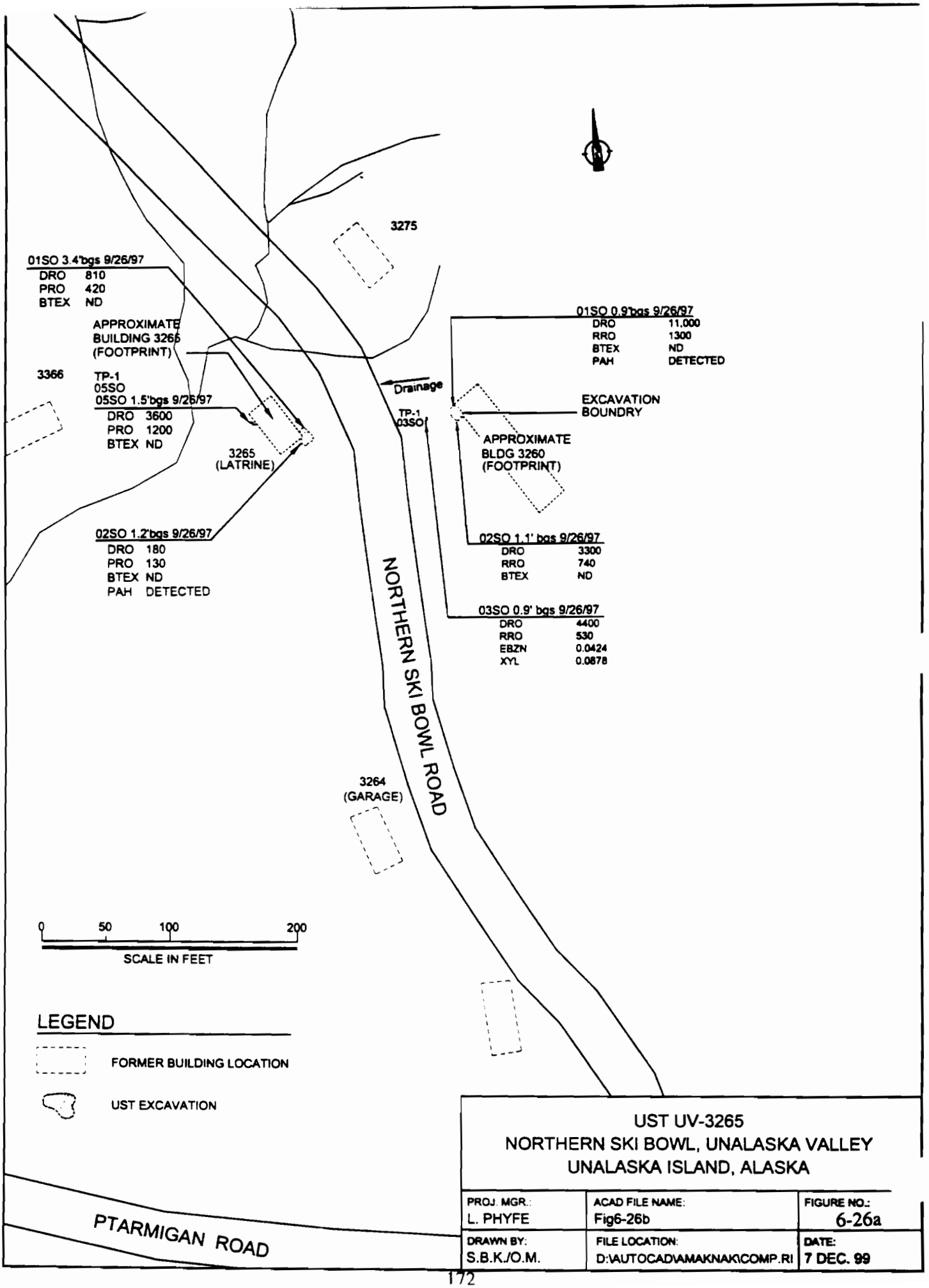
UST 3265 is located across the road from UST-3260 in the northern Ski Bowl area of Unalaska Island (Figures 3-5 and 6-26a). It is located immediately downgradient of UST-3260. Only a flat, gravelly pad remains at the former latrine location. The 300-gallon single-wall tank was set in a silt/peat soil, was heavily corroded, and was full of water. Approximately 310 gallons of water with traces of oil were pumped from UST-3265 shortly before it was pulled from the ground on 25 September 1997. The UST excavation was approximately 60 square feet (Figures 6-27 and 6-28). Because field screening did not indicate historic releases at the site, onsite soil was used for backfill. No POL-impacted soils were excavated from the site during UST removal. The tank was transported to the decontamination pad and cleaned with other tanks from the Ski Bowl area.

Two soil samples were collected to characterize the levels of potential POL contamination remaining in the UST excavation. A test pit was also advanced 37 feet northwest (downgradient) of UST-3265 at the interface between the building pad and the lower wetlands (Figure 6-27). Field screening did not indicate the presence of POL impacts in the test pit, which conflicted with later analytical results. One soil sample was collected from the test pit.

6.14.1 Analytical Data Evaluation

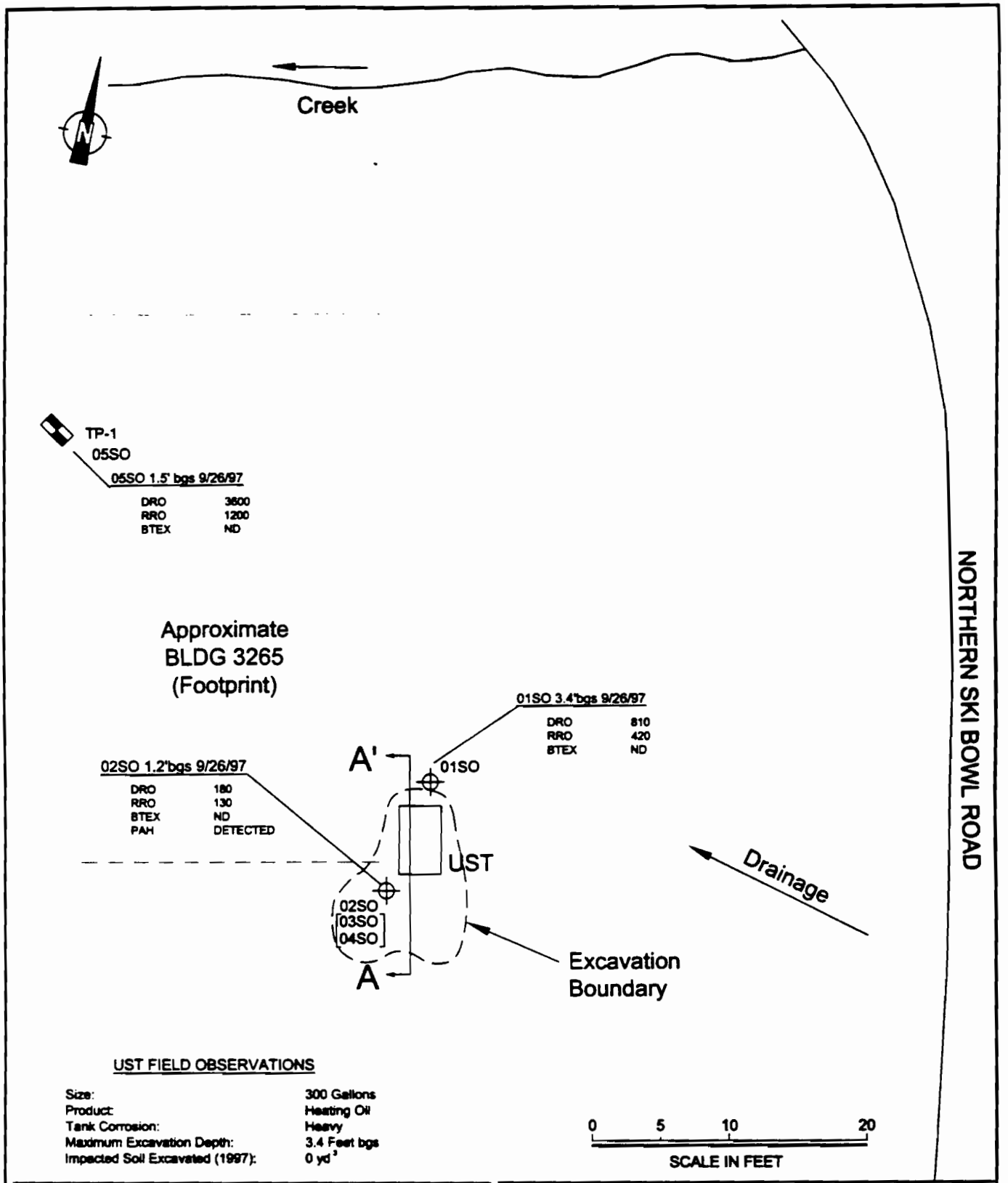
A total of three soil samples were collected to characterize UST-3265. Two soil samples (3265-01SO and 3265-02SO) were collected to characterize the UST excavation (Figure 6-27). A third soil sample (3265-05SO) was collected from the test pit downgradient of the site. All samples were collected from 1.1 to 3.4 feet bgs. All three samples were submitted for DRO, RRO, and BTEX analyses. Sample 3265-02SO was also submitted for PAH analyses.

RRO was detected in all of the soil samples with concentrations ranging between 130 mg/kg and 1,200 mg/kg (Table 6-30). BTEX constituents were not detected in any of the soil samples. Six different PAHs were detected in sample 3265-02SO but all were at low concentrations.



UST UV-3265
NORTHERN SKI BOWL, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	FIGURE NO.:
L. PHYFE	Fig6-26b	6-26a
DRAWN BY:	FILE LOCATION:	DATE:
S.B.K./O.M.	D:\AUTOCAD\AMAKNAK\COMP.RI	7 DEC. 99



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Heavy
Maximum Excavation Depth:	3.4 Feet bgs
Impacted Soil Excavated (1997):	0 yd³

0 5 10 20

SCALE IN FEET

LEGEND

Sample ID/Depth(Feet)/Date

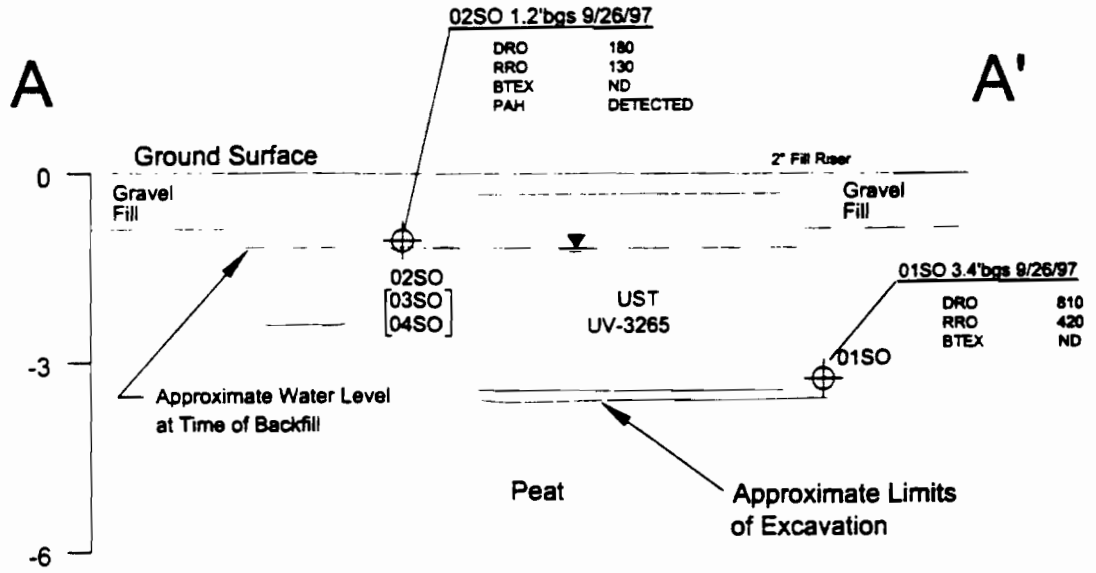
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

02SO
03SO
04SO
Approximate Location Analytical Sample 97AMA-3265-02SO with QC [03SO] and QA [04SO] replicates.

TP1 Approximate location of 1997 Test Pit

UST UV-3265
NORTHERN SKI BOWL, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV3265	1	6-27
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Heavy
Maximum Excavation Depth:	3.4 Feet bgs
Impacted Soil Excavated (1997):	0 yd^3

SCALE

Horizontal 1"=3'
Vertical 1"=3'

LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

02SO
[03SO]
[04SO]

Approximate Location Analytical Sample 97AMA-3265-02SO with QC [03SO] and QA [04SO] replicates.

UST UV-3265
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	Xsec3265	1	6-28
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99

DRO was also detected in all of the soil samples with concentrations ranging between 180 mg/kg and 3,600 mg/kg (Table 6-30). The test pit sample (3265-05SO) contained the maximum detected concentration of DRO. The highest concentration of DRO detected in samples from the UST excavation was 810 mg/kg (3265-01SO). This sample was collected from the bottom of the northern end of the excavation (Figure 6-28). The second sample collected from the excavation has a DRO concentration of 180 mg/kg. Laboratory chromatograms from both samples collected within the excavation area were evaluated and the DRO concentrations were attributed to biogenic origins. Copies of these chromatograms and the chromatograms from other soil samples from this site are in Appendix E. Because only biogenic (naturally occurring) DRO was found at the UST-3265 excavation, it is apparent that the POL contents of this tank did not leak and contaminate the soil surrounding it. However, the test pit sample collected downgradient of the site did contain a DRO concentration associated with a fuel release. After examining other leaking USTs in this area, it became apparent that the DRO in TP-1 (3265-05SO) at this site is most likely migrating from UST-3260, which is located just upgradient of this site. Therefore, the contamination found in TP-1 (3265-05SO) at this site has been included in the risk screening for UST-3260 (see Figure 6-26a). Analytical data for TP-1 are presented in Table 6-32 as part of Section 6-15.

Because the DRO detected at this site was biogenic, a cumulative risk evaluation is not required.

6.14.2 Risk-Based Screening Results

Table 6-31 presents the results of the risk-based screening using the maximum concentration for each detected compound. However, the two soil samples collected from the UST 3265 excavation were not subjected to the risk-based screening process because the DRO found was from naturally occurring sources and not from POL contamination.

6.14.3 Conclusions and Recommendations

A 300-gallon UST was removed from the Building 3265 site during IRA activities. Field screening did not indicate the presence of contaminated soils. Therefore, no soil was excavated. The two soil samples collected from the UST 3265 excavation were from biogenic sources and were not subjected to the risk-based screening process.

The POL contamination found in the test pit at this site is most likely migrating from UST-3260, located immediately upgradient. This test pit is addressed in Section 6-15 of this report.

There is no POL-contaminated soil at the UST 3265 excavation. Therefore, NFA at this site is recommended.

Table 6-30
Analytical Data Summary, Soil
UST 3265
Amaknak and Unalaska Islands, Alaska

Sample Location:	3265-01	3265-02
Sample Identification Number:	97AMA-3265-01SO	97AMA-3265-02SO
Date Sampled:	9/26/97	9/26/97
Sample Depth (feet):	3.1-3.4	0.9-1.2
TEST GROUP: AROMATICS - UNITS: MG/KG		
Benzene	ND[0.04:::D]	ND[0.0169]
Toluene	ND[0.04]	ND[0.0169]
Ethylbenzene	ND[0.04]	ND[0.0169]
Xylenes	ND[0.12]	ND[0.0508]
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	810:::DZ	180
Residual Range Organics	420	130
TEST GROUP: SEMI-VOA - UNITS: MG/KG		
Acenaphthene	NA	ND[0.0085]
Acenaphthylene	NA	ND[0.0085]
Anthracene	NA	ND[0.0085]
Benzo(a)anthracene	NA	ND[0.0085]
Benzo(a)pyrene	NA	0.017
Benzo(b)fluoranthene	NA	0.0053
Benzo(g,h,i)perylene	NA	ND[0.0085]
Benzo(k)fluoranthene	NA	0.0051
Chrysene	NA	ND[0.0085]
Dibenzo(a,h)anthracene	NA	ND[0.0085]
Fluorene	NA	0.0081
Fluoranthene	NA	ND[0.0085]
Indeno(1,2,3-cd)pyrene	NA	ND[0.0085]
2-Methylnaphthalene	NA	ND[0.0085]
Naphthalene	NA	0.0044
Phenanthrene	NA	0.0042:::Z
Pyrene	NA	ND[0.0085]

Table 6-30
Analytical Data Summary, Soil
UST 3265
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.
SEMI-VOA	Semivolatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-31
Compounds of Potential Concern, Soil
UST 3265
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	2	0			0.0142	0.04	2.00E-02	D	none	0
Toluene	2	0			0.0142	0.04	4.80E+00	D	none	0
Ethylbenzene	2	0			0.0142	0.04	5.00E+00	D	none	0
Xylenes	2	0			0.0427	0.12	6.90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	2	180	810 DZ	495	**	2.30E+02	D	none	1
Residual Range Organics	2	2	130	420	275	**	8.30E+03	D	none	0
TEST GROUP: SEMI-VOA - UNITS: MG/KG										
Acenaphthene	1	0			0.0043	0.0085	1.90E+02	D	none	0
Acenaphthylene	1	0			0.0043	0.0085	none		none	0
Anthracene	1	0			0.0043	0.0085	3.90E+03	D	none	0
Benzo(a)anthracene	1	0			0.0043	0.0085	5.50E+00	D	none	0
Benzo(a)pyrene	1	1	0.017	0.017	0.017	**	9.00E-01	D	none	0
Benzo(b)fluoranthene	1	1	0.0053	0.0053	0.0053	**	9.00E+00	D	none	0
Benzo(g,h,i)perylene	1	0			0.0043	0.0085	none		none	0
Benzo(k)fluoranthene	1	1	0.0051	0.0051	0.0051	**	9.30E+01	D	none	0
Chrysene	1	0			0.0043	0.0085	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	1	0			0.0043	0.0085	9.00E-01	D	none	0
Fluorene	1	1	0.0081	0.0081	0.0081	**	2.40E+02	D	none	0
Fluoranthene	1	0			0.0043	0.0085	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	1	0			0.0043	0.0085	9.00E+00	D	none	0
2-Methylnaphthalene	1	0			0.0043	0.0085	none		none	0
Naphthalene	1	1	0.0044	0.0044	0.0044	**	3.80E+01	D	none	0
Phenanthrene	1	1	0.0042 Z	0.0042 Z	0.0042	**	none		none	0
Pyrene	1	0			0.0043	0.0085	1.40E+03	D	none	0

Table 6-33
Compounds of Potential Concern, Soil
UST 3265
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SEMI-VOA	Semivolatile organic compounds
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

6.16 UST 3360

Building 3360 was a former mess hall in the main Ski Bowl valley of Unalaska Island (Figure 3-3). Only a flat gravel pad with some vegetation and small scraps remains at this site. The 300-gallon single-wall steel tank (UST-3360) was partially exposed at the ground surface, and was set in coarse rock at the edge of the building pad, suggesting that it had been moved in the past. UST-3360 was lifted from the ground with minimal excavation on 24 September 1997. The area of the excavation amounted to approximately 15 square feet. The moderately corroded tank contained approximately 50 gallons of water with no significant odor or visible sheen. Adequate backfill material existed onsite.

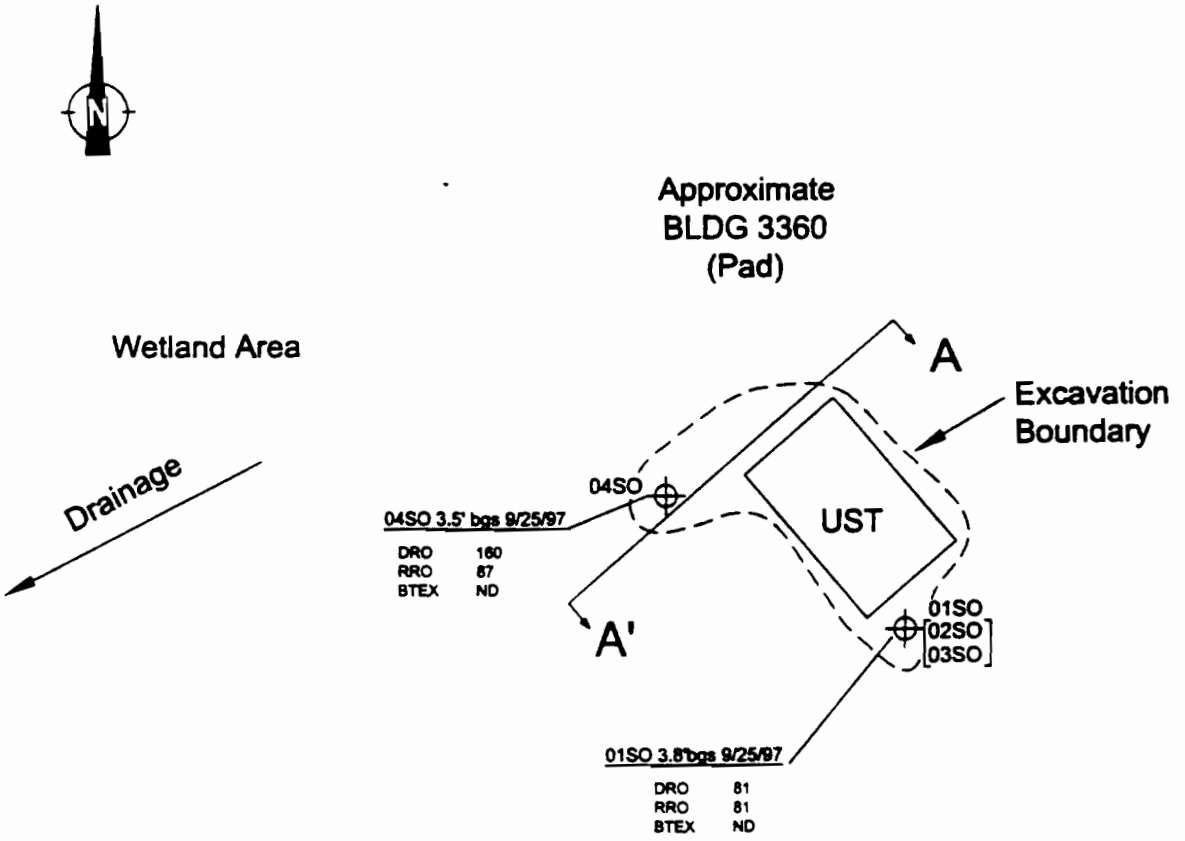
Field screening and visual observation did not indicate the presence of POL-impacted soil during the removal of UST-3360. Therefore, no POL-impacted soil was removed as part of the IRA. UST 3360 was initially presented in the 1997 IRA/SI/RI Report (USAED 1999e).

6.16.1 Analytical Data Evaluation

Two soil samples (3360-01SO and 3360-04SO) were collected to characterize the UST excavation (Figure 6-31). The samples were collected from between 2.0 and 3.8 feet bgs. The samples were submitted for DRO, RRO, and BTEX analyses.

RRO was detected in both soil samples with concentrations of 81 mg/kg (sample 3360-01SO) and 87 mg/kg (sample 3360-04SO) (Table 6-34). BTEX constituents were not detected in either soil sample.

DRO was also detected in both of the soil samples with concentrations of 81 mg/kg (sample 3360-01SO) and 160 mg/kg (sample 3360-04SO) (Table 6-34). Both samples were collected from the bottom of the excavation after removal of the UST (Figure 6-32).



PTARMIGAN ROAD

0 2.5 5 10

SCALE IN FEET

UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	3.8 Feet bgs
Impacted Soil Excavated (1997):	0 yd³

LEGEND

Sample ID/Depth(Feet)/Date

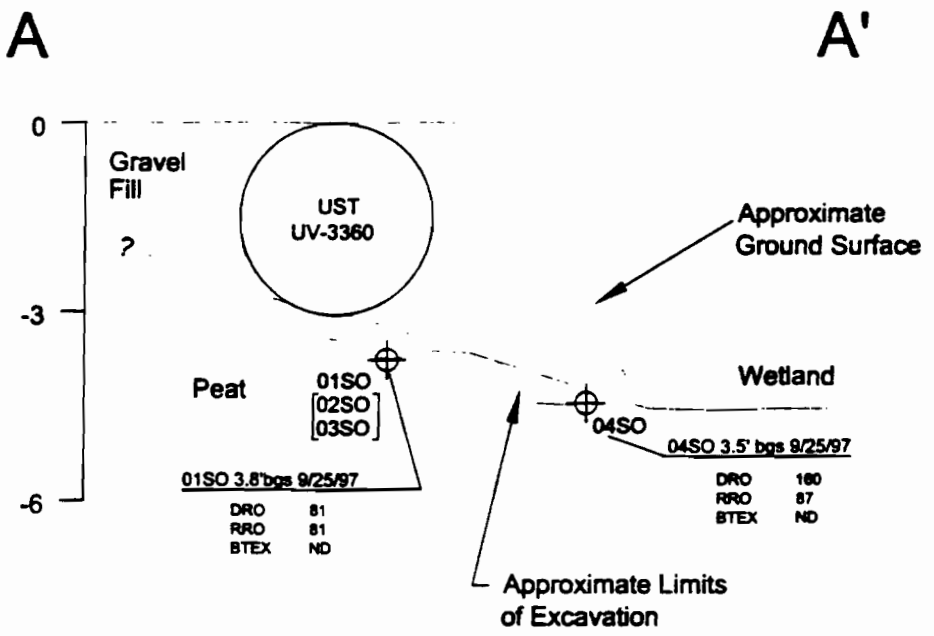
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
[02SO]
[03SO]

Approximate Location Analytical Sample 97AMA-3360-01SO with QC [02SO] and QA [03SO] replicates.

UST UV-3360
UPPER SKI BOWL, UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV3360	1	6-31
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	3.8 Feet bgs
Impacted Soil Excavated (1997):	0 yd³

SCALE

Horizontal 1"=3'
Vertical 1"=3'

LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

01SO
02SO
03SO

Approximate Location Analytical Sample 97AMA-3360-01SO with QC (02SO) and QA (03SO) replicates.

UST UV-3360
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	Xsec3360	1	6-32
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99

6.16.2 Risk-Based Screening Results

The soil samples collected from the UST 3360 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.

Two soil samples collected from the UST 3360 excavation were subjected to the risk-based screening process. Sample depths for collected soils were at 2.0 and 3.8 feet bgs.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 3360 is located in an area zoned as an open space. However, because the area in the vicinity of the site may be used as residential, the UST 3265 site was evaluated under a residential scenario.

Table 6-35 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of this screening, no maximum detected concentrations of RRO or DRO exceed the most stringent ADEC Method 2 cleanup level for contaminants in soil that may migrate to groundwater for groundwater used as drinking water. BTEX constituents were not detected any of the samples.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO and RRO was 0.03 for the ingestion pathway, 0.02 for the inhalation pathway, and 0.70 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.16.3 Conclusions and Recommendations

A 300-gallon UST was removed from the site during IRA activities. Field screening did not indicate the presence of contaminated soils. Therefore, no soil was excavated. Two soil samples were collected from UST 3360 and subjected to the risk-based screening process. Sample depths for collected soils ranged between 2.0 and 3.8 feet bgs. Samples were submitted for DRO, RRO, and BTEX analyses.

Based on the results of this screening, no maximum detected concentrations of RRO or DRO exceeded the most stringent ADEC Method 2 cleanup level for contaminants in soils assumed to migrate to groundwater used as drinking water (Table 6-35). BTEX constituents were not detected in any sample. Cumulative hazard indexes for each exposure pathway was less than the limitation of 1.0. NFA at this site is recommended.

Table 6-34
Analytical Data Summary, Soil
UST 3360
Amaknak and Unalaska Islands, Alaska

Sample Location:	**3360-01**	**3360-04**
Sample Identification Number:	**97AMA-3360-01SO**	**97AMA-3360-04SO**
Date Sampled:	**9/25/97**	**9/25/97**
Sample Depth (feet):	**3.5-3.8**	**2.0-3.5**
TEST GROUP: AROMATICS - UNITS: MG/KG		
Benzene	ND[0.02:::D]	ND[0.0167]
Toluene	ND[0.02]	ND[0.0167]
Ethylbenzene	ND[0.02]	ND[0.0167]
Xylenes	ND[0.06]	ND[0.05]
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	81	160
Residual Range Organics	81	87

Table 6-34
Analytical Data Summary, Soil
UST 3360
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.

Table 6-35
Compounds of Potential Concern, Soil
UST 3360
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	2	0			0 0092	0 02	2 00E-02	D	none	0
Toluene	2	0			0 0092	0 02	4 80E+00	D	none	0
Ethylbenzene	2	0			0 0092	0 02	5 00E+00	D	none	0
Xylenes	2	0			0 0275	0 06	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	2	81	160	120 5	**	2 30E+02	D	none	0
Residual Range Organics	2	2	81	87	84	**	8 30E+03	D	none	0

Table 6-35
Compounds of Potential Concern, Soil
UST 3360
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

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6.19 UST 3660

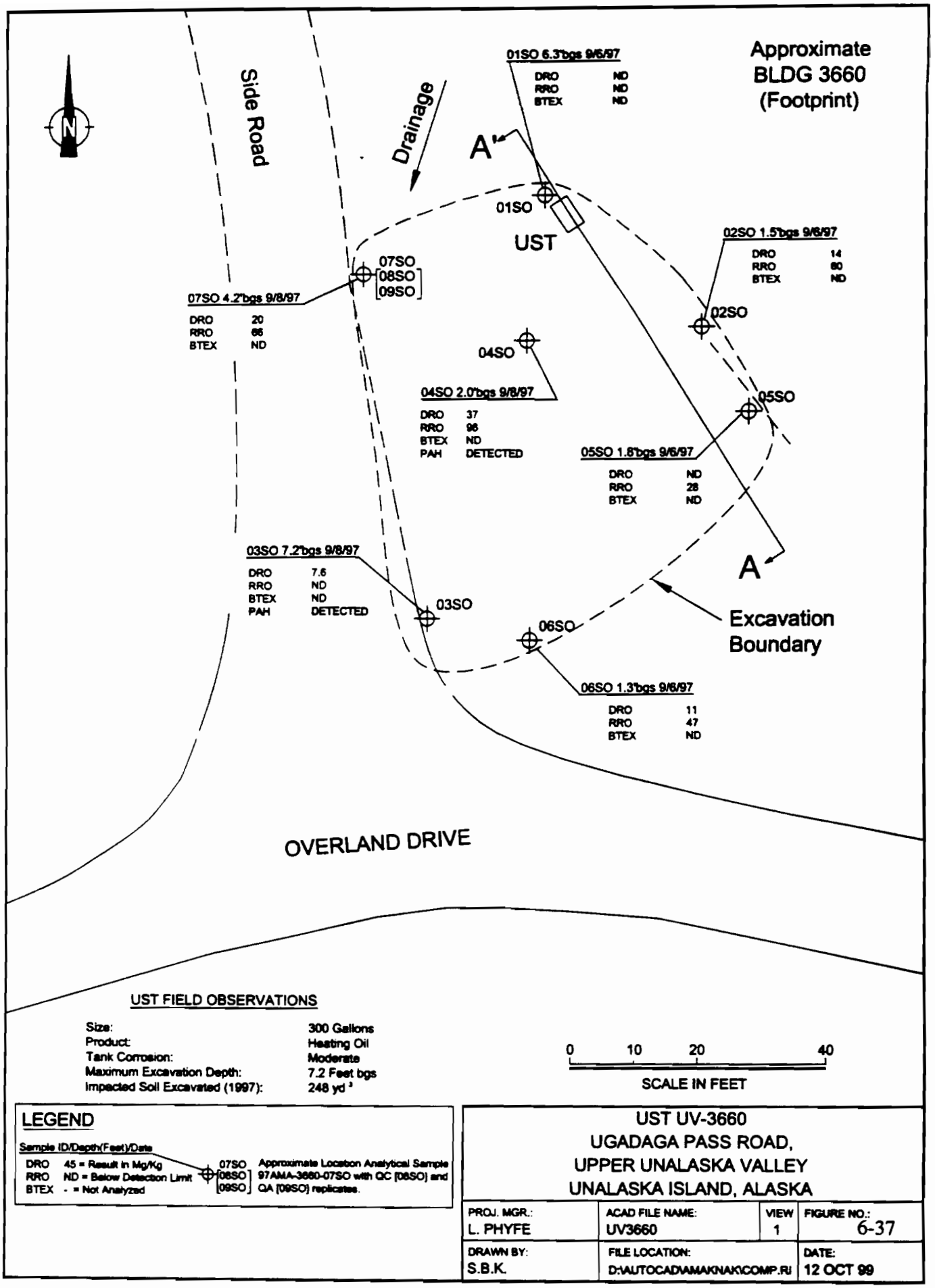
Building 3660 was a mess hall located on the north side of Overland Drive (also known as the Ugadaga Pass Road) on Unalaska Island (Figure 3-4). A ground pad is all that remains at the site and was partially revegetated. About 300 gallons of water were pumped from the moderately corroded, single-wall 300-gallon steel tank (UST-3660) prior to removal (Figures 6-37 and 6-38). Water filled the excavation as the tank was being uncovered on 6 September 1997. POL impacts were noted in the soil, so a trench was dug above the tank location to capture water flowing through the gravel building pad before it entered the excavation. Several exploratory test pits were excavated to determine the extent of POL contamination using field screening results (visual observation and PID readings). A shallow, low permeability layer of silt appeared to limit vertical migration of POLs. However, the horizontal extent of POL contamination was large. An approximately 1,600 ft^2 excavation resulted from the removal of POL-impacted soil (Figures 6-37 and 6-38).

Approximately 248 cubic yards of soil were excavated and removed from UST-3660 excavation area and transported to the TDU for treatment. The site was backfilled and regraded using excavated overburden and native soil from the Building 3660 site. The UST 3660 was initially discussed in the 1997 IRA/SI/RI Report (USAED 1999e).

6.19.1 Analytical Data Evaluation

Seven soil samples were collected to characterize the UST excavation. Sample depths ranged from 1.3 to 7.2 feet bgs. The soil samples were analyzed for DRO, RRO and BTEX. Two of the samples (3660-03SO and 3660-04SO) were also submitted for PAH analyses.

RRO was detected in five of the seven soil samples, with concentrations ranging between 28 mg/kg and 96 mg/kg (Table 6-40). The maximum concentration of RRO was detected in sample 3660-04SO. BTEX constituents were not detected in any of the seven soil samples. Several PAHs were detected in both analyzed samples (3660-03SO and 3660-04SO) at low concentrations (Table 6-40). DRO was detected in five of the seven soil samples, with concentrations ranging between 7.6 mg/kg and 37 mg/kg.



UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	7.2 Feet bgs
Impacted Soil Excavated (1997):	248 yd ^{3}

0 10 20 40

SCALE IN FEET

LEGEND

Sample ID/Depth(Feet)/Date

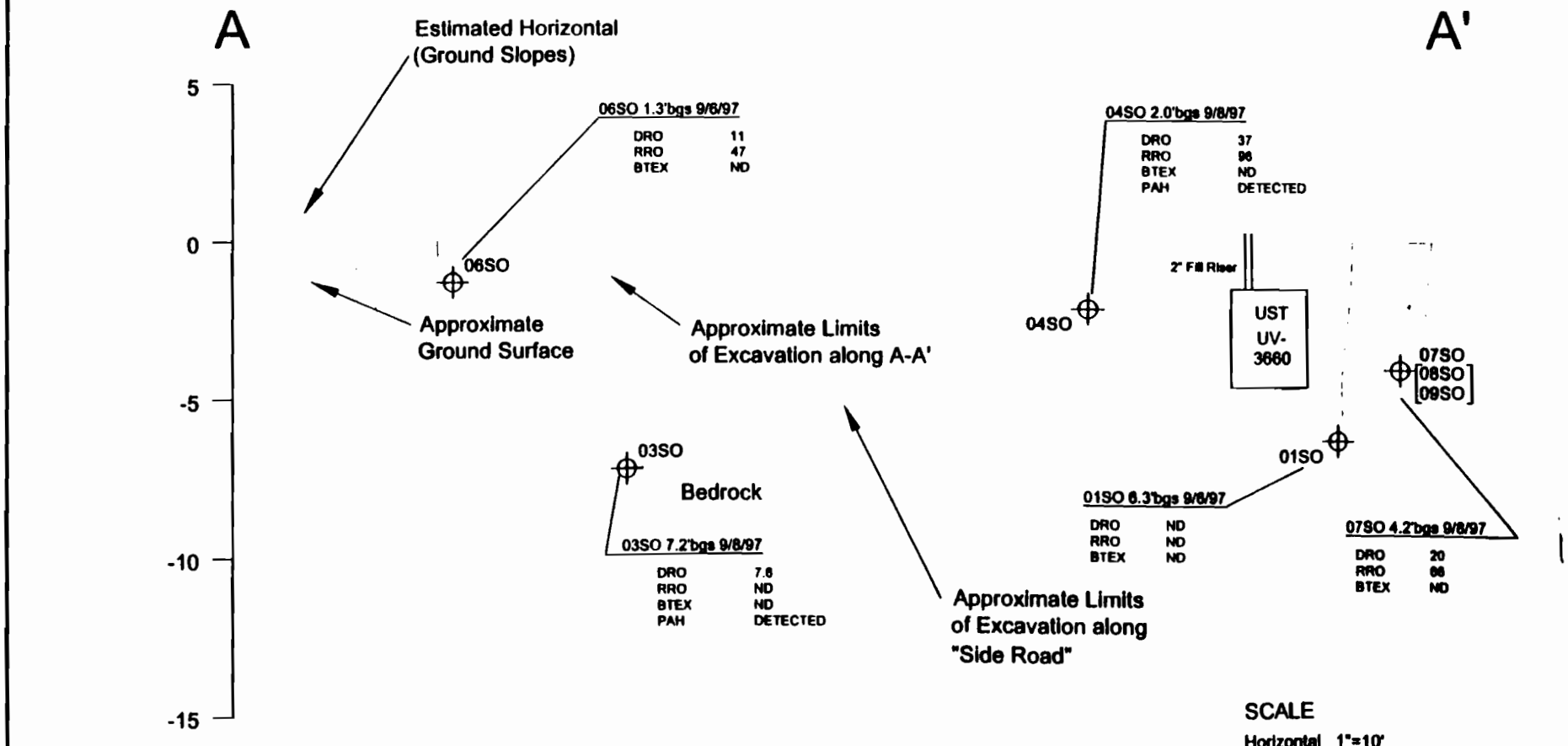
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

07SO
08SO
09SO

Approximate Location Analytical Sample 97AMA-3660-07SO with QC [08SO] and QA [09SO] replicates.

UST UV-3660
UGADAGA PASS ROAD,
UPPER UNALASKA VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV3660	1	6-37
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99



LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

07SO
[08SO]
[09SO]

Approximate Location Analytical Sample 97AMA-3660-07SO with QC [08SO] and QA [09SO] replicates.

UST FIELD OBSERVATIONS

Size:	300 Gallons
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	7.2 Feet bgs
Impacted Soil Excavated (1997):	248 yd³

UST UV-3660
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	Xsec3660	1	6-38
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		12 OCT 99

6.19.2 Risk-Based Screening Results

The soil samples collected from the UST 3660 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.

A total of seven soil samples collected from the UST 3660 excavation were subjected to the risk-based screening process. Sample depths for soils collected in the excavation ranged between 1.3 and 7.2 feet bgs.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 3660 is located in an area zoned as a holding zone. However, because residential areas are located in the vicinity of building 3660, the site was evaluated under a residential land use scenario.

Table 6-41 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of the screening, no maximum detected concentrations of DRO, RRO or PAHs exceed the most stringent ADEC Method 1 or Method 2 cleanup levels for soils. BTEX constituents were not detected in any of the seven samples.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO, RRO, and five PAHs was 0.02 for the ingestion pathway, 0.007 for the inhalation pathway, and 0.17 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.19.3 Conclusions and Recommendations

A 300-gallon UST and 248 cy of contaminated soils were removed during IRA activities performed at the site. Seven soil samples were collected from the excavation and submitted for DRO, RRO, and BTEX analyses. Two of the soil samples were also submitted for PAH analyses.

Based on the results of the screening, no maximum detected concentrations of DRO, RRO or PAHs exceed the most stringent ADEC Method 1 or Method 2 cleanup levels for soils (Table 6-41). BTEX constituents were not detected in any of the seven samples. Cumulative hazard indexes for each exposure pathway was less than the limitation of 1.0. Based on these results, it is apparent that POL-contaminated soil was successfully removed during IRA activities performed at UST 3660. NFA is recommended.

Table 6-40
Analytical Data Summary, Soil
UST 3660
Amaknak and Unalaska Islands, Alaska

Sample Location:	3660-01	3660-02	3660-03	3660-04
Sample Identification Number:	97AMA-3660-01SO	97AMA-3660-02SO	97AMA-3660-03SO	97AMA-3660-04SO
Date Sampled:	9/6/97	9/6/97	9/8/97	9/6/97
Sample Depth (feet):	6.3	1.3-1.5	7.2	2
TEST GROUP: AROMATICS - UNITS: MG/KG				
Benzene	ND[0.0169]	ND[0.0175]	ND[0.0118]	ND[0.0147]
Toluene	ND[0.0169]	ND[0.0175]	ND[0.0118]	ND[0.0147]
Ethylbenzene	ND[0.0169]	ND[0.0175]	ND[0.0118]	ND[0.0147]
Xylenes	ND[0.0508]	ND[0.0526]	ND[0.0353]	ND[0.0441]
TEST GROUP: PETROLEUM - UNITS: MG/KG				
Diesel Range Organics	ND[6.8]	14	7.6	37.
Residual Range Organics	ND[17]	60	ND[12]	96
TEST GROUP: SEMI-VOA - UNITS: MG/KG				
Acenaphthene	NA	NA	ND[0.0059]	0.0019
Acenaphthylene	NA	NA	ND[0.0059]	ND[0.0074]
Anthracene	NA	NA	ND[0.0059]	ND[0.0074]
Benzo(a)anthracene	NA	NA	ND[0.0059]	ND[0.0074]
Benzo(a)pyrene	NA	NA	ND[0.0059]	ND[0.0074]
Benzo(b)fluoranthene	NA	NA	ND[0.0059]	ND[0.0074]
Benzo(g,h,i)perylene	NA	NA	ND[0.0059]	ND[0.0074]
Benzo(k)fluoranthene	NA	NA	ND[0.0059]	ND[0.0074]
Chrysene	NA	NA	ND[0.0059]	ND[0.0074]
Dibenzo(a,h)anthracene	NA	NA	ND[0.0059]	ND[0.0074]
Fluorene	NA	NA	ND[0.0059]	0.006
Fluoranthene	NA	NA	0.0014	ND[0.0074]
Indeno(1,2,3-cd)pyrene	NA	NA	ND[0.0059]	ND[0.0074]
2-Methylnaphthalene	NA	NA	ND[0.0059]	ND[0.0074]
Naphthalene	NA	NA	ND[0.0059]	0.011
Phenanthrene	NA	NA	0.001:::Z	ND[0.0074]
Pyrene	NA	NA	0.0015	ND[0.0074]

Table 6-40
Analytical Data Summary, Soil
UST 3660
Amaknak and Unalaska Islands, Alaska

Sample Location:	3660-05	3660-06	3660-07
Sample Identification Number:	97AMA-3660-05SO	97AMA-3660-06SO	97AMA-3660-07SO
Date Sampled:	9/6/97	9/6/97	9/8/97
Sample Depth (feet):	1.8	1.3	4.0-4.2
TEST GROUP: AROMATICS - UNITS: MG/KG			
Benzene	ND[0.0115]	ND[0.0137]	ND[0.02:::D]
Toluene	ND[0.0115]	ND[0.0137]	ND[0.02]
Ethylbenzene	ND[0.0115]	ND[0.0137]	ND[0.02]
Xylenes	ND[0.0345]	ND[0.0411]	ND[0.06]
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	ND[4.6]	11	20
Residual Range Organics	28	47	66
TEST GROUP: SEMI-VOA - UNITS: MG/KG			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA
Fluorene	NA	NA	NA
Fluoranthene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA
Naphthalene	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA

Table 6-40
Analytical Data Summary, Soil
UST 3660
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.
SEMI-VOA	Semivolatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-41
Compounds of Potential Concern, Soil
UST 3660
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	7	0			0 0076	0 02	2 00E-02	D	none	0
Toluene	7	0			0 0076	0 02	4 80E+00	D	none	0
Ethylbenzene	7	0			0 0076	0 02	5 00E+00	D	none	0
Xylenes	7	0			0 0227	0 06	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	7	5	7 6	37	13 6143	6 8	2 30E+02	D	none	0
Residual Range Organics	7	5	28	96	44 5	17	8 30E+03	D	none	0
TEST GROUP: SEMI-VOA - UNITS: MG/KG										
Acenaphthene	2	1	0 0019	0 0019	0 0024	0 0059	1 90E+02	D	none	0
Acenaphthylene	2	0			0 0033	0 0074	none		none	0
Anthracene	2	0			0 0033	0 0074	3 90E+03	D	none	0
Benzo(a)anthracene	2	0			0 0033	0 0074	5 50E+00	D	none	0
Benzo(a)pyrene	2	0			0 0033	0 0074	9 00E-01	D	none	0
Benzo(b)fluoranthene	2	0			0 0033	0 0074	9 00E+00	D	none	0
Benzo(g,h,i)perylene	2	0			0 0033	0 0074	none		none	0
Benzo(k)fluoranthene	2	0			0 0033	0 0074	9 30E+01	D	none	0
Chrysene	2	0			0 0033	0 0074	5 50E+02	D	none	0
Dibenzo(a,h)anthracene	2	0			0 0033	0 0074	9 00E-01	D	none	0
Fluorene	2	1	0 006	0 006	0 0045	0 0059	2 40E+02	D	none	0
Fluoranthene	2	1	0 0014	0 0014	0 0025	0 0074	1 90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	2	0			0 0033	0 0074	9 00E+00	D	none	0
2-Methylnaphthalene	2	0			0 0033	0 0074	none		none	0
Naphthalene	2	1	0 011	0 011	0 007	0 0059	3 80E+01	D	none	0
Phenanthrene	2	1	0 001 Z	0 001 Z	0 0023	0 0074	none		none	0
Pyrene	2	1	0 0015	0 0015	0 0026	0 0074	1 40E+03	D	none	0

Table 6-41
Compounds of Potential Concern, Soil
UST 3660
Amaknak and Unalaska Islands, Alaska

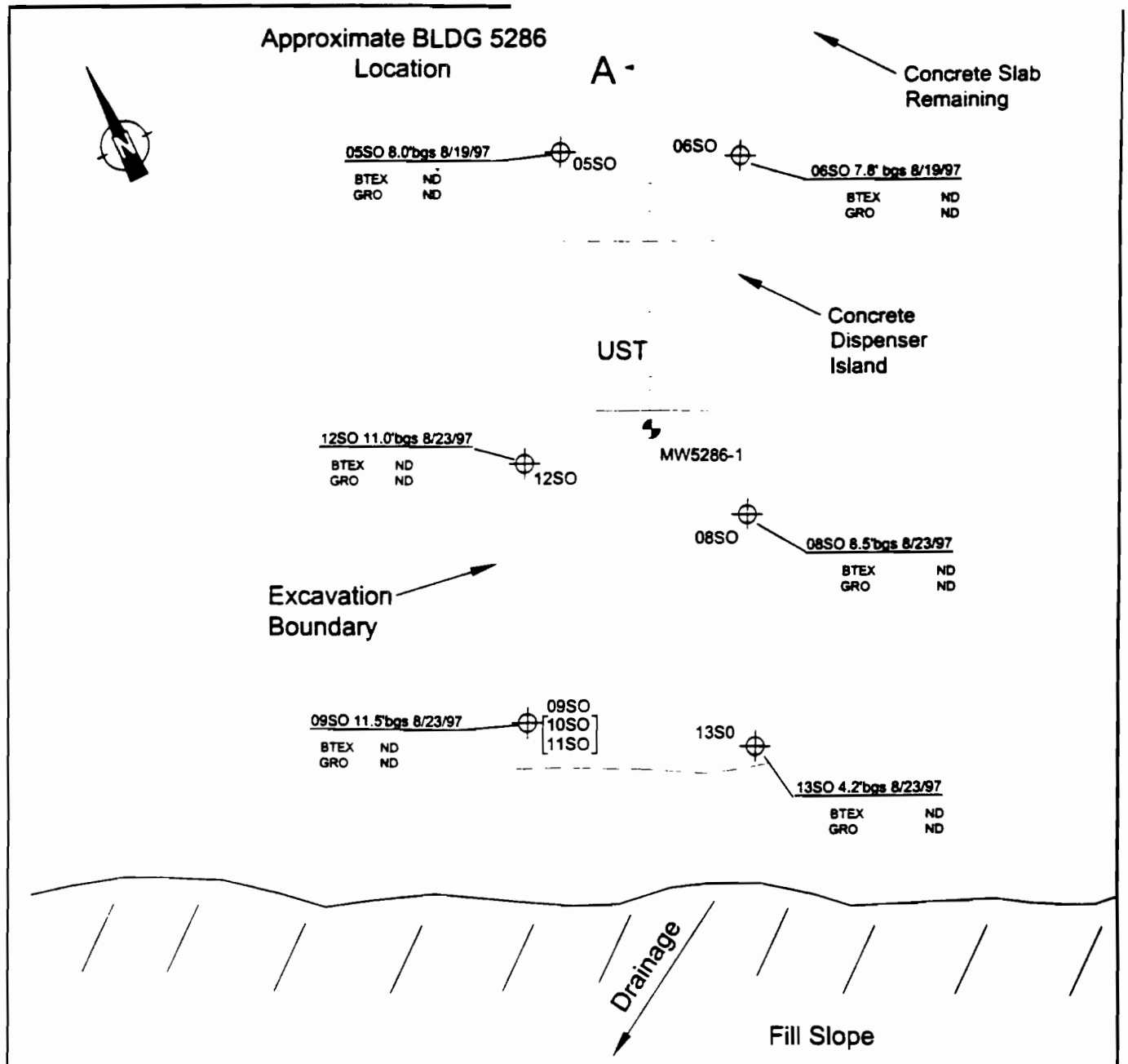
**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SEMI-VOA	Semivolatile organic compounds
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

6.23 UST 5286

The Building 5286 garage site is one of the southernmost building locations in the Pyramid Valley hospital complex located on Unalaska Island (Figure 3-5). The UST-5286 was a 5,600-gallon single-wall steel tank located adjacent to the remaining concrete building slab (Figure 6-45). The tank was likely used to store MoGas (gasoline), making it regulated under the ADEC UST program. This assumption is based on the presence of a concrete saddle located over the tank, which acted as a dispenser island for fueling vehicles. About 2.5 feet of soil covered the tank and two straps held the tank to a concrete ballast slab. About 5,000 gallons of water and 100 gallons of weathered gasoline were removed from the tank for treatment and energy recovery, respectively. The tank was moderately corroded and did not appear to be perforated.

POL-impacted soil was detected overlying a wet gravel layer at about 8 feet bgs. Excavated POL-contaminated soil was stockpiled on an adjacent concrete slab before transport. Water in the excavation was a problem while excavating the contaminated soil from the top of the ballast slab. This necessitated the construction of a clean soil berm around the stockpile. The concrete ballast under the tank was removed to access the soil below. Levels of POL contamination appeared to decrease beneath the ballast. Once impacted soil was removed to the apparent groundwater table, soil samples were collected. Soil samples were collected from four locations at the bottom of the excavation (Figures 6-45 and 6-46). A monitoring well point (MW5286-1) was placed in the downgradient end of the excavation and held in place with gravel from the surface of the site. The concrete ballast rubble was placed in the hole and the excavation was backfilled with soil from the cut banks surrounding the site.

Wetlands were located around the Building 5286 footprint. A test pit (TP-1) was excavated between the former UST location and the Pyramid Valley Road to evaluate the extent of POL migration. Field screening did not reveal the presence of POL in the tight organic silt found in TP-1. However, to further address the extent of contamination, the UST excavation was re-opened and POL-impacted soil between the monitoring well and test pit was removed. Two soil samples were collected from this additional area of excavation. Approximately 225 cubic



UST FIELD OBSERVATIONS

Size:	5600 Gallons
Product:	Mogas
Tank Corrosion:	Moderate
Maximum Excavation Depth:	12 Feet bgs
Impacted Soil Excavated (1997):	225 yd^3

0 5 10 20

SCALE IN FEET

LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

09SO
10SO
11SO

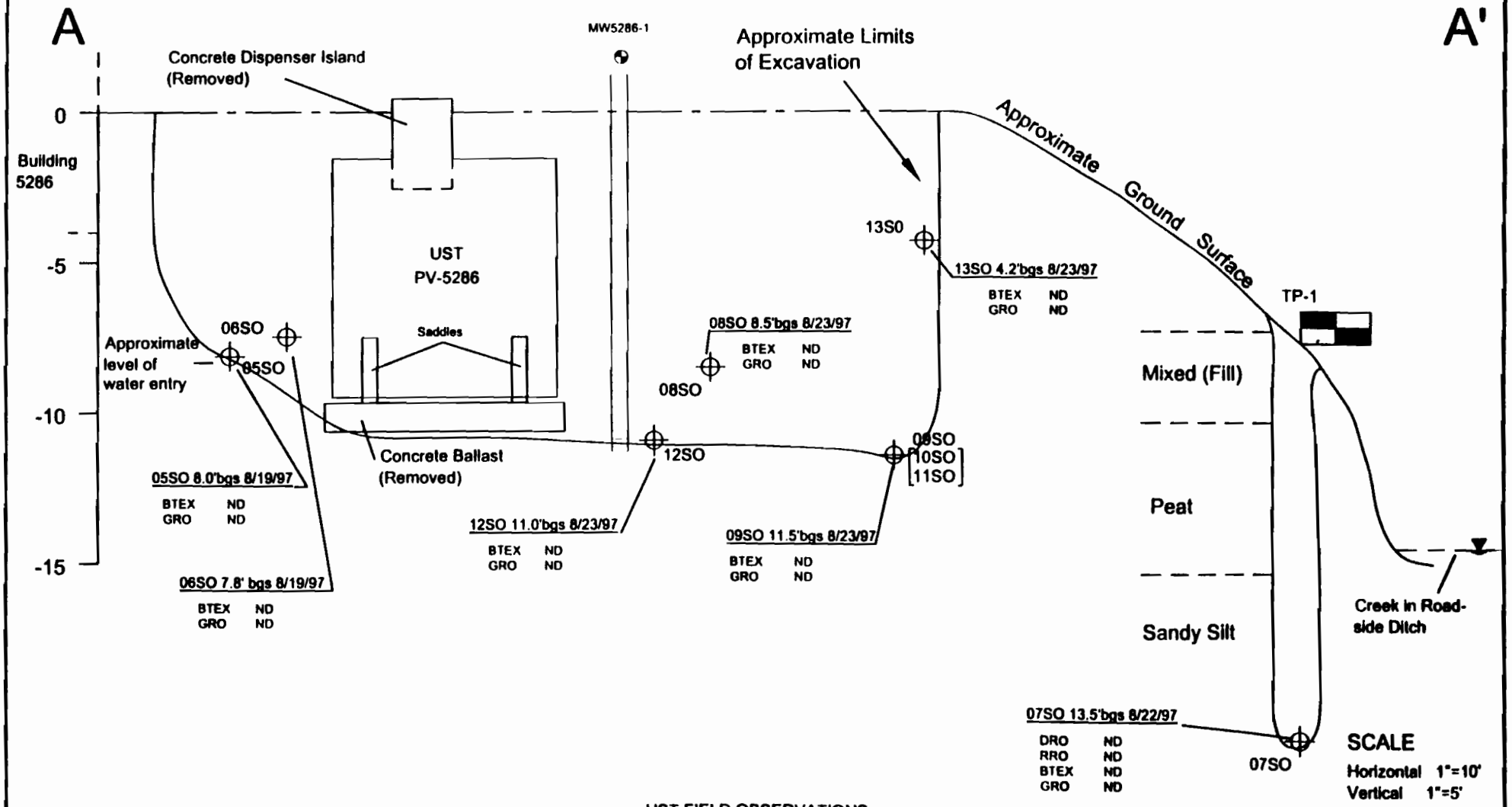
Approximate Location Analytical Sample 97AMA-5286-09SO with QC (10SO) and QA (11SO) replicates.

MW5286-1 Approximate location of 1997 Well Point

TP1 Approximate location of 1997 Test Pit

UST PV-5286
PYRAMID VALLEY
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	PV5286	1	6-45
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK/COMP.RI		12 OCT 99



LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Below Detection Limit
BTEX

09SO
[10SO]
[11SO]

Approximate Location Analytical Sample 97AMA-5286-09SO with QC [10SO] and QA [11SO] replicates.

MW5286-1 — Approximate location of 1997 Monitoring Well

TP1 — Approximate location of 1997 Test Pit

UST FIELD OBSERVATIONS

Size:	5600 Gallons
Product:	Mogas
Tank Corrosion:	Moderate
Maximum Excavation Depth:	12 Feet bgs
Impacted Soil Excavated (1997):	225 yd^3

UST PV-5286
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	Xsec5286	1	6-46
DRAWN BY: S.B.K.	FILE LOCATION:		DATE:

yards of soil were transported from the PV-5286 site for thermal treatment. Soil for backfilling the excavation was obtained from the cut banks surrounding the site.

6.23.1 Analytical Data Evaluation

Six soil samples were collected to characterize the effectiveness of the IRA. All of the soil samples were analyzed for GRO and BTEX. Sample depths in the excavation area ranged between 4.2 and 11.5 feet bgs. A seventh sample, the test pit sample (5286-07SO), was collected at 13.5 feet bgs. Sample 5286-07SO was analyzed for RRO and DRO in addition to GRO and BTEX. Although a well point (MW5286-1) was placed within the excavation, a groundwater sample was not collected.

Samples 5286-01SO through 5286-04SO were field screening samples, analyzed via headspace/PID, and used to guide the extent of excavation. Samples 5286-10SO and 5286-11SO were QC and QA samples.

For the samples from the UST-5286 excavation (5286-05SO, 5286-06SO, 5286-08SO, 5286-09SO, 5286-12SO, and 5286-13SO), no GRO or BTEX compounds were detected in any of the samples. In sample 5286-07SO from the test pit, none of the contaminants analyzed for (RRO, DRO, GRO and BTEX) were detected (Table 6-48).

6.23.2 Risk-Based Screening Results

The soil samples collected from the UST 5286 excavation were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.

6.23.2.1 Soils

Seven soil samples collected from the UST 5286 excavation and test pit were subjected to the risk-based screening process. Sample depths for soils collected in the excavation ranged between 4.2 and 13.5 feet bgs.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 5286 is located in an area zoned as holding zone. However, because Building 5286 is located in the vicinity of residential areas, the site was evaluated under a residential land use scenario.

Table 6-49 presents the results of the risk-based screening. DRO, RRO, GRO, and BTEX were not detected in any of the samples collected from the UST-5286 excavation or test pit. Therefore, no compounds exceeded ADEC Method 2 cleanup criteria for soils. Maximum SQLs were all less than their corresponding Method 2 cleanup criteria.

Since no contaminants were detected, a cumulative risk evaluation is not required at this site.

6.23.3 Conclusions and Recommendations

A 5,600-gallon UST and approximately 225 cy of soil were removed during IRA activities. A total of seven soil samples were collected to characterize the site. DRO, RRO, GRO, and BTEX concentrations were not detected in any of the samples collected from the UST-5286 excavation or test pit. Based on these results, NFA is recommended at this site.

Table 6-48
Analytical Data Summary, Soil
UST 5286
Amaknak and Unalaska Islands, Alaska

Sample Location:	5286-05	5286-06	5286-07	5286-08
Sample Identification Number:	97AMA-5286-05SO	97AMA-5286-06SO	97AMA-5286-07SO	97AMA-5286-08SO
Date Sampled:	8/19/97	8/19/97	8/23/97	8/23/97
Sample Depth (feet):	8	7.5-7.8	13.5	8.5
TEST GROUP: AROMATICS - UNITS: MG/KG				
Benzene	ND[0.0116]	ND[0.011]	ND[0.013]	ND[0.0127]
Toluene	ND[0.0116]	ND[0.011]	ND[0.013]	ND[0.0127]
Ethylbenzene	ND[0.0116]	ND[0.011]	ND[0.013]	ND[0.0127]
Xylenes	ND[0.0349]	ND[0.033]	ND[0.039]	ND[0.038]
TEST GROUP: PETROLEUM - UNITS: MG/KG				
Diesel Range Organics	NA	NA	ND[5.2]	NA
Gasoline Range Organics	ND[1.2]	ND[1.1]	ND[1.3]	ND[1.3]
Residual Range Organics	NA	NA	ND[13]	NA

Table 6-48
Analytical Data Summary, Soil
UST 5286
Amaknak and Unalaska Islands, Alaska

Sample Location:	5286-09	5286-12	5286-13
Sample Identification Number:	97AMA-5286-09SO	97AMA-5286-12SO	97AMA-5286-13SO
Date Sampled:	8/23/97	8/23/97	8/23/97
Sample Depth (feet):	11.5	10.5-11.0	4.2
TEST GROUP: AROMATICS - UNITS: MG/KG			
Benzene	ND[0.0278:::D]	ND[0.0227:::D]	ND[0.0167]
Toluene	ND[0.0278]	ND[0.0227]	ND[0.0167]
Ethylbenzene	ND[0.0278]	ND[0.0227]	ND[0.0167]
Xylenes	ND[0.0833]	ND[0.0682]	ND[0.05]
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	NA	NA	NA
Gasoline Range Organics	ND[2.8]	ND[2.3]	ND[1.7]
Residual Range Organics	NA	NA	NA

Table 6-48
Analytical Data Summary, Soil
UST 5286
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.

Table 6-49
Compounds of Potential Concern, Soil
UST 5286
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	7	0			0 0082	0 0278	2 00E-02	D	none	0
Toluene	7	0			0 0082	0 0278	4 80E+00	D	none	0
Ethylbenzene	7	0			0 0082	0 0278	5.00E+00	D	none	0
Xylenes	7	0			0.0247	0 0833	6 90E+01	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	1	0			2 6	5 2	2 30E+02	D	none	0
Gasoline Range Organics	7	0			0 8357	2 8	2.60E+02	D	none	0
Residual Range Organics	1	0			6.5	13	8.30E+03	D	none	0

Table 6-49
Compounds of Potential Concern, Soil
UST 5286
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

6.27 EASTPOINT LOOP ROAD PUMPHOUSE

The Eastpoint Loop Road Pumphouse is located in a heavily traveled area near the eastern entrance to Iliuliuk Harbor, and the southern corner of Eastpoint Loop Road on Amaknak Island (Figure 6-55). A City of Unalaska work crew reportedly discovered an UST during pumphouse demolition activities conducted during the fall of 1997. Historical information about the use of the Eastpoint Loop Road Pumphouse is unknown and no previous investigations have been found for the Eastpoint Loop Road Pumphouse location. A site reconnaissance was conducted during the 1998 field season. Refer to the 1998 Work Plan Addendum for a complete site description and details of the investigation strategy (USAED 1998e).

6.27.1 Field Activities

On 16 July 1998, site reconnaissance conducted at the Eastpoint Loop Road Pumphouse identified one 1.5-inch and one 3-inch diameter vertical pipe risers coming from the area of the reported UST location. A tape inserted 18 feet into the 1.5-inch riser became coated with a kerosene-smelling oil. The site was staked for future exploratory digging. Additionally, the piping was possibly related to post-WWII fuel lines utilized by the Delta-Western Bulk Fuel Facility or a nearby former fish processing facility. On 19 and 20 August 1998, SI field activity resumed with hand digging to confirm the presence or absence of a potential FUDS UST. Representatives from Delta-Western were onsite during the activity. The 1.5-inch riser was excavated to the edge of the road (excavated to approximately 1.25 feet bgs), where a pipe "T" was encountered. The piping was identified as post WWII-era and no UST was located. The 3 inch riser was plugged with soil. The compacted rocky ground surface along with the proximity of the road limited further investigation of the riser.

6.27.2 Conclusions and Recommendations

The pipelines identified during site reconnaissance were determined to be part of fuel lines installed after WWII, possibly related to the Delta-Western Bulk Fuel Facility or the former fish processing facility. No USTs were observed. NFA is recommended for this site under the FUDS program.

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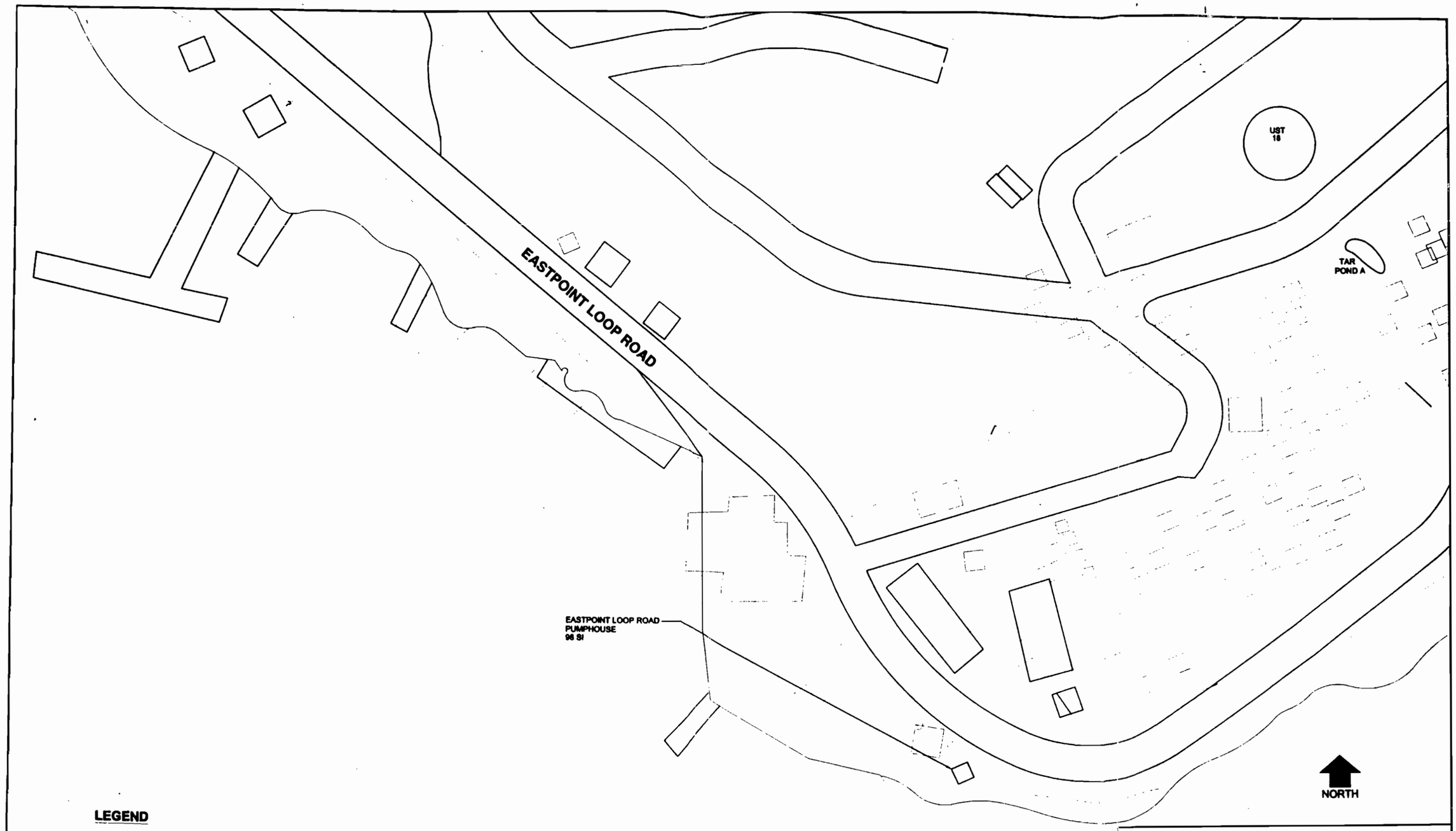


EASTPOINT LOOP ROAD PUMPHOUSE
LOCATION MAP
AMAKNAK AND UNALASKA ISLANDS, ALASKA

PROJ. MGR:	ACAD FILE NAME:	VIEW	FIGURE NO:
L. PHYFE	RIBASE	15	6-55
DRAWN BY:	FILE LOCATION:		DATE:
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP. RI		12 OCT 99

6.30 DRY WELL OUTFALLS

The Dry Well Outfalls were investigated during 1997. The initial discussion of results was presented in the 1997 IRA/SI/RI Report (USAED 1999e).

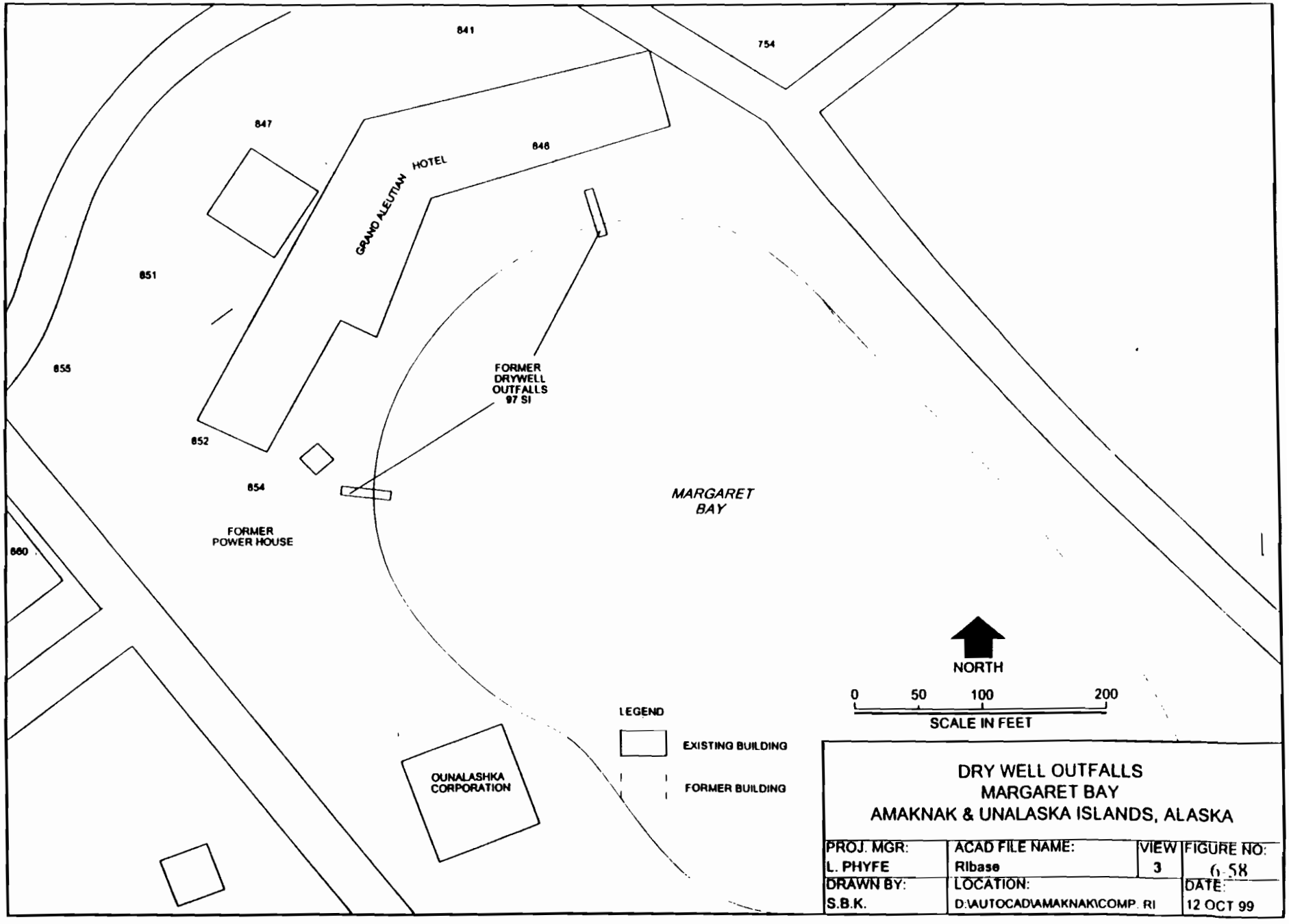
The dry well and outfalls are located in the vicinity of former Buildings 854 and 846, which are located at the north end of Margaret Bay (Figure 6-58). An additional dry well (Building 860) is located within the footprint of the existing AC Building. The outfalls for these dry wells are located in two locations in Margaret Bay.

The first outfall is located approximately 100 feet southeast from the northeast corner of the Grand Aleutian Hotel; the second outfall is located approximately 100 feet to the southeast of the southwest corner of the Grand Aleutian Hotel. The dry wells and outfalls are shown connected to sewer lines and a gasoline storage facility on historical drawings. Previous investigations specific to the dry wells and outfalls have not been performed. It is suspected that the dry wells were removed during construction of the Grand Aleutian Hotel and other buildings.

6.30.1 Field Activities

Reconnaissance of the Margaret Bay shoreline, east of the Grand Aleutian Hotel, was performed on 1 August 1997. A single 2-inch diameter pipe was observed extending 10 feet out into Margaret Bay. No evidence of the pipe was found above the water level. Much of the shoreline appeared to be recent construction material related to the Grand Aleutian Hotel. Marine life around the margins of Margaret Bay appeared to be diverse and healthy. Two hand-excavated test pits along the Margaret Bay shoreline revealed black organic sediment within the rocks and cobbles. No petroleum odor or sheen was noted in the test pits, and the sediment is believed to be biogenic. Therefore, no intertidal sediment samples were collected.

The dry well and outfalls are connected to sewer lines and a gasoline storage facility based on a review of 1945 as-built drawings. The dry well and outfall locations are suspect because of


841
754
847
848
GRAND ALEUTIAN HOTEL
851
855
FORMER DRYWELL OUTFALLS 97 SI
852
854
MARGARET BAY
FORMER POWER HOUSE
860
OUNALASHKA CORPORATION
LEGEND
EXISTING BUILDING
FORMER BUILDING
NORTH
0 50 100 200
SCALE IN FEET
DRY WELL OUTFALLS
MARGARET BAY
AMAKNAK & UNALASKA ISLANDS, ALASKA
PROJ. MGR: L. PHYFE
ACAD FILE NAME: Rlbase
VIEW 3
FIGURE NO: 6-58
DRAWN BY: S.B.K.
LOCATION: D:\AUTOCAD\AMAKNAK\COMP_RI
DATE: 12 OCT 99

what may have been passed through or connected to them. and thus have been identified as an AOPC (USAED 1997c and USAED 1999a).

No visual signs of contamination were observed from the Drywell Outfalls thought to discharge to Margaret Bay. Because the outfalls could not be located and there are no visible signs of contamination, no samples were collected. Hence, a risk-based screening was also not performed.

6.30.2 Conclusions and Recommendations

The 1997 investigation could not locate the two Dry Well Outfalls. Only a single 2-inch diameter pipe was observed extending 10 feet out in to Margaret Bay. However, no evidence of the pipe was found above the water level. Much of the shoreline appeared to be recent construction material related to the Grand Aleutian Hotel.

Marine life around the margins of Margaret Bay appears to be diverse and healthy. Two hand-excavated test pits along the Margaret Bay shoreline revealed black organic sediment within the rocks and cobbles. No petroleum odor or sheen was noted in the test pits or the sediments. The black organic sediments are assumed to have biogenic origins. No further investigation of this area is recommended.

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6.32 MARGARET BAY STOCKPILES

As part of the 1996 field effort, several cubic yards of impacted soil from previous removal actions were removed, transported, and treated. Two of these pre-existing stockpiles were located within the Margaret Bay area. These stockpiles contained affected soil that was removed during the construction of the Dutch Harbor Post Office and the Eagle Quality Center.

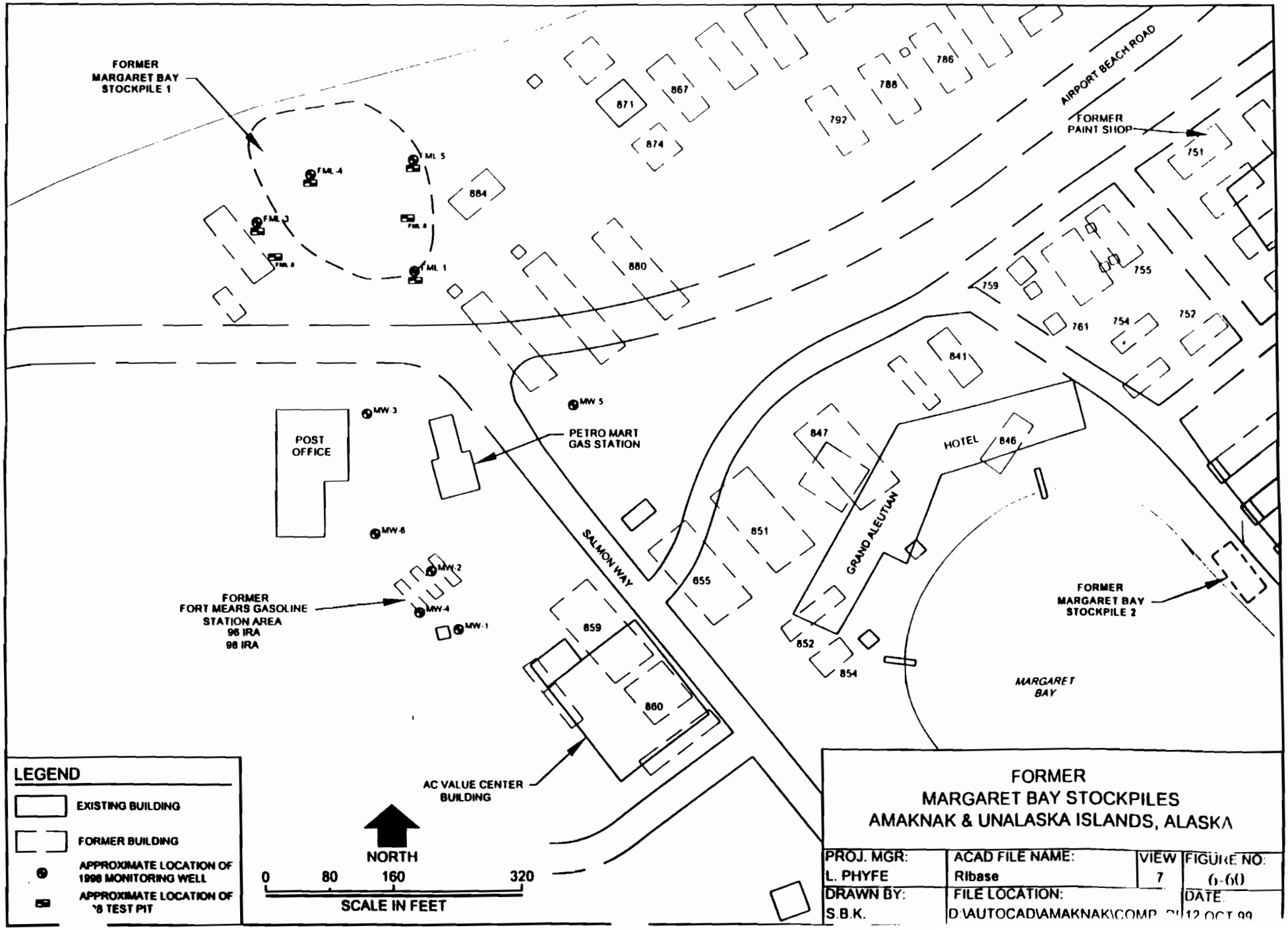
This section describes field activities and data evaluation involved in the removal of the two stockpiles whose approximate locations are indicated in Figure 6-60. It should be noted that additional activities were conducted in 1998 in the area of Stockpile 1 as part of the Fort Mears Landfill RI and drilling program. Section 6.50 presents discussion of activities and evaluation of resulting analytical data for 1998 activities at this area.

6.32.1 Field Activities

At the larger stockpile, referred to as Stockpile 1 in the analytical data summary tables, approximately 1,000 cy were situated on the northwest side of Airport Beach Road across from Dutch Harbor Post Office. Stockpile 1 was located west of the concrete pad where 15 previously removed tanks were staged. Field crews collected the soil and transported the material to a designated cell at the TDU area. Figure 6-60 shows the approximate location of Stockpile 1.

The smaller of the two stockpiles (Stockpile 2) was located behind the Eagle Quality Center, approximately 100 feet from Margaret Bay. This stockpile contained approximately 200 cy of affected soil. As with the larger stockpile, field crews removed and transported the affected soil for treatment. Figure 6-60 shows the approximate location of Stockpile 2.

After the soil stockpiles were removed, crews collected and disposed of the liner material from both locations and sampled the underlying soils. The liner material and fugitive pieces of Visqueen® were collected, shaken to remove residual material, and then transported to the


FORMER MARGARET BAY STOCKPILE 1
FML 5
FML 4
FML 3
FML 2
FML 1
884
880
867
871
874
792
788
786
AIRPORT BEACH ROAD
FORMER PAINT SHOP
751
755
759
761
754
752
841
MW 5
MW-3
POST OFFICE
PETRO MART GAS STATION
847
HOTEL
846
851
GRAND ALEUTIAN
SALMON WAY
655
MW-6
MW-2
MW-4
MW-1
FORMER FORT MEARS GASOLINE STATION AREA
96 IRA
98 IRA
859
852
854
860
FORMER MARGARET BAY STOCKPILE 2
MARGARET BAY
AC VALUE CENTER BUILDING
LEGEND
EXISTING BUILDING
FORMER BUILDING
APPROXIMATE LOCATION OF 1998 MONITORING WELL
APPROXIMATE LOCATION OF '8 TEST PIT
NORTH
0
80
160
320
SCALE IN FEET
FORMER
MARGARET BAY STOCKPILES
AMAKNAK & UNALASKA ISLANDS, ALASKA
PROJ. MGR:
L. PHYFE
ACAD FILE NAME:
Ribase
VIEW
7
FIGURE NO:
6-60
DRAWN BY:
S.B.K.
FILE LOCATION:
D:\AUTOCAD\AMAKNAK\COMP
DATE:
12 OCT 99

Dutch Harbor Landfill for disposal. Disposal of the woven liner and Visqueen® materials was verbally approved by the City of Unalaska Solid Waste Department. Twelve cy of material were disposed of from the larger stockpile and 5 cy from the smaller stockpile.

6.32.2 Analytical Data Evaluation

Three surface soil samples were collected from beneath Stockpile 1 after soil and liner removal. The footprint of this stockpile was approximately 42 by 50 feet. Samples were collected at evenly divided segments of the stockpile at depths of 6 inches bgs. The soil samples from Stockpile 1 were analyzed for DRO, RRO, VOCs, and SVOCs.

At Stockpile 1, DRO was detected in two of three samples with the maximum detected concentration reported at 21.8 mg/kg. RRO was detected in one of the three samples with the maximum detected concentration reported at 123 mg/kg (Table 6-54). VOCs and SVOCs were not detected in any of the Stockpile 1 samples.

Five surface soil samples were collected from beneath Stockpile 2 after soil and liner removal. The footprint of this stockpile was approximately 66 by 93 feet; samples were collected at evenly divided portions of the entire area at depths of 4 inches bgs. Surface soil samples from Stockpile 2 were analyzed for DRO, RRO, and SVOCs. Additionally, two of the five soil samples were submitted for VOC analysis.

At Stockpile 2, DRO was detected in two soil samples with the maximum detected concentration reported at 12.1 mg/kg (Table 6-54). RRO, VOCs, and SVOCs were not detected in any of the five soil samples collected from Stockpile 2.

6.32.3 Risk-Based Screening Results

A total of eight samples were collected from Stockpiles 1 and 2. For purposes of the risk-based screening, the data sets for both stockpiles were combined and screened against ADEC Method 2 cleanup standards. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in

detail in Section 5.0 of this report. Analytical data and risk-based assumptions for each of the environmental media evaluated are presented below.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is not used as drinking water at this site. Groundwater use conclusions are based on 1) the groundwater on Amaknak Island has never historically been used for drinking water; and 2) the groundwater is not potable because of the site's proximate location to marine (salt) water (i.e., Margaret Bay). Based on these assumptions, the ADEC Method 2 soil cleanup criteria for the protection of contaminant migration from soil to groundwater was multiplied times 10 for this site per 18 AAC 75. This soil cleanup value is protective of groundwater that is not used as drinking water and both the ingestion and inhalation pathways.

Table 6-55 presents the results of the risk-based screening using the maximum concentration for each detected compound. Based on the results of this screening, there are no maximum detected concentrations of DRO or RRO that exceed the ADEC Method 2 cleanup criteria for soils. VOCs and SVOCs were not detected in any of the samples.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Since no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO and RRO was 0.02 for the ingestion pathway, 0.007 for the inhalation pathway, and 0.02 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.32.4 Conclusions and Recommendations

Activities related to the removal, transportation, and treatment of pre-existing soils from two stockpiles within the Margaret bay area were conducted during the 1996 field event. These stockpiles contained soils from previous removal actions at the Dutch Harbor Post Office and the Eagle Quality Center. The first area located in the Margaret Bay vicinity consisted of

approximately 1,000 cy of soils that were excavated, transported, and treated at the TDU from the pile designated Stockpile 1. The other pile, Stockpile 2, contained about 200 cy of soils, and was also excavated, transported, and treated. Surface soil samples were collected after the stockpiles were removed and analytical results evaluated.

Based on the results of this screening, there are no maximum detected concentrations of DRO or RRO that exceed the ADEC Method 2 cleanup criteria for soils. VOCs and SVOCs were not detected in any of the samples. No other constituents were detected. Cumulative hazard indexes for each exposure pathway was less than the limitation of 1.0. Based on the analytical results and the risk-based screening, NFA is recommended for these two former stockpile areas.

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE1	STKPILE1	STKPILE1	STKPILE2
Sample Identification Number:	JE-96-AMA0050	JE-96-AMA0051	JE-96-AMA0052	JE-96-AMA0053
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
TEST GROUP: PETROLEUM - UNITS: MG/KG				
Diesel Range Organics	10.6	21.8	ND[4.58]	ND[4.24]
Residual Range Organics	ND[67.1]	123	ND[57.2]	ND[52.9]
TEST GROUP: SEMI-VOA - UNITS: MG/KG				
Acenaphthene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Acenaphthylene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Aniline	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Anthracene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Azobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzyl butyl phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
bis-(2-chloroethoxy)methane	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
bis-(2-chloroethyl)ether	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Bis(2-chloroisopropyl)ether	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
bis-(2-ethylhexyl)phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Bromophenyl phenyl ether	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzo(a)anthracene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzoic acid	ND[0.89]	ND[1.7]	ND[0.74]	ND[0.71]
Benzo(a)pyrene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzo(b)fluoranthene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzo(g,h,i)perylene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzo(k)fluoranthene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Benzyl alcohol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Chloro-3-methyl phenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Chrysene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Chloroaniline	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Chlorophenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Chloronaphthalene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Chlorophenyl phenyl ether	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE1	STKPILE1	STKPILE1	STKPILE2
Sample Identification Number:	JE-96-AMA0050	JE-96-AMA0051	JE-96-AMA0052	JE-96-AMA0053
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
Dibenzo(a,h)anthracene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Dibenzofuran	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
3,3'-Dichlorobenzidine	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
1,2-Dichlorobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
1,3-Dichlorobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
1,4-Dichlorobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,4-Dichlorophenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Diethyl phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,4-Dimethylphenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Dimethyl phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Methyl-4,6-dinitrophenol	ND[0.89]	ND[1.7]	ND[0.74]	ND[0.71]
Di-n-butyl phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Di-n-octyl phthalate	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,4-Dinitrophenol	ND[2.2]	ND[4.4]	ND[1.9]	ND[1.8]
2,4-Dinitrotoluene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,6-Dinitrotoluene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Fluorene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Fluoranthene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Hexachlorobutadiene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Hexachlorocyclopentadiene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Hexachlorobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Hexachloroethane	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Indeno(1,2,3-cd)pyrene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Isophorone	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Methylphenol (o-cresol)	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Methylphenol (p-cresol)	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Methylnaphthalene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Naphthalene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE1	STKPILE1	STKPILE1	STKPILE2
Sample Identification Number:	JE-96-AMA0050	JE-96-AMA0051	JE-96-AMA0052	JE-96-AMA0053
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
n-Nitrosodimethylamine	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
n-Nitrosodiphenylamine	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
n-Nitrosodi-n-propylamine	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Nitroaniline	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
3-Nitroaniline	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Nitroaniline	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Nitrobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2-Nitrophenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
4-Nitrophenol	ND[2.2]	ND[4.4]	ND[1.9]	ND[1.8]
Pentachlorophenol	ND[0.89]	ND[1.7]	ND[0.74]	ND[0.71]
Phenanthrene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Phenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Pyrene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
Pyridine	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
1,2,4-Trichlorobenzene	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,4,5-Trichlorophenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
2,4,6-Trichlorophenol	ND[0.22]	ND[0.44]	ND[0.19]	ND[0.18]
TEST GROUP: VOLATILES - UNITS: MG/KG				
Bromodichloromethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Bromomethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Benzene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Toluene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Carbon disulfide	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
2-Chloroethyl vinyl ether	ND[0.012]	NA	ND[0.011]	ND[0.011]
Chlorobenzene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Chloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Chloromethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Carbon tetrachloride	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE1	STKPILE1	STKPILE1	STKPILE2
Sample Identification Number:	JE-96-AMA0050	JE-96-AMA0051	JE-96-AMA0052	JE-96-AMA0053
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
1,1-Dichloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,2-Dichloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,1-Dichloroethene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
trans-1,2-Dichloroethene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,3-Dichloropropene (Total)	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,2-Dichloropropane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Ethylbenzene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
2-Hexanone	ND[0.012]	NA	ND[0.011]	ND[0.011]
Methylene chloride	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,1,2,2-Tetrachloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Tetrachloroethene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Styrene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Bromoform	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,1,1-Trichloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
1,1,2-Trichloroethane	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Trichloroethene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Chloroform	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
Vinyl chloride	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
m,p-Xylene (Sum of Isomers)	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]
o-Xylene	ND[0.0012]	NA	ND[0.0011]	ND[0.0011]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE2	STKPILE2	STKPILE2	STKPILE2
Sample Identification Number:	JE-96-AMA0054	JE-96-AMA0055	JE-96-AMA0056	JE-96-AMA0057
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
TEST GROUP: PETROLEUM - UNITS: MG/KG				
Diesel Range Organics	ND[4.37]	6.28	12.1	ND[4.34]
Residual Range Organics	ND[54.6]	ND[62.6]	ND[59.8]	ND[54.3]
TEST GROUP: SEMI-VOA - UNITS: MG/KG				
Acenaphthene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Acenaphthylene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Aniline	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Anthracene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Azobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzyl butyl phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
bis-(2-chloroethoxy)methane	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
bis-(2-chloroethyl)ether	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Bis(2-chloroisopropyl)ether	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
bis-(2-ethylhexyl)phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Bromophenyl phenyl ether	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzo(a)anthracene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzoic acid	ND[0.71]	ND[0.84]	ND[0.8]	ND[0.72]
Benzo(a)pyrene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzo(b)fluoranthene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzo(g,h,i)perylene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzo(k)fluoranthene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Benzyl alcohol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Chloro-3-methyl phenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Chrysene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Chloroaniline	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Chlorophenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Chloronaphthalene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Chlorophenyl phenyl ether	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE2	STKPILE2	STKPILE2	STKPILE2
Sample Identification Number:	JE-96-AMA0054	JE-96-AMA0055	JE-96-AMA0056	JE-96-AMA0057
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
Dibenzo(a,h)anthracene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Dibenzofuran	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
3,3'-Dichlorobenzidine	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
1,2-Dichlorobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
1,3-Dichlorobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
1,4-Dichlorobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,4-Dichlorophenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Diethyl phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,4-Dimethylphenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Dimethyl phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Methyl-4,6-dinitrophenol	ND[0.71]	ND[0.84]	ND[0.8]	ND[0.72]
Di-n-butyl phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Di-n-octyl phthalate	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,4-Dinitrophenol	ND[1.8]	ND[2.1]	ND[2]	ND[1.8]
2,4-Dinitrotoluene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,6-Dinitrotoluene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Fluorene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Fluoranthene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Hexachlorobutadiene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Hexachlorocyclopentadiene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Hexachlorobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Hexachloroethane	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Indeno(1,2,3-cd)pyrene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Isophorone	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Methylphenol (o-cresol)	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Methylphenol (p-cresol)	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Methylnaphthalene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Naphthalene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE2	STKPILE2	STKPILE2	STKPILE2
Sample Identification Number:	JE-96-AMA0054	JE-96-AMA0055	JE-96-AMA0056	JE-96-AMA0057
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
n-Nitrosodimethylamine	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
n-Nitrosodiphenylamine	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
n-Nitrosodi-n-propylamine	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Nitroaniline	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
3-Nitroaniline	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Nitroaniline	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Nitrobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2-Nitrophenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
4-Nitrophenol	ND[1.8]	ND[2.1]	ND[2]	ND[1.8]
Pentachlorophenol	ND[0.71]	ND[0.84]	ND[0.8]	ND[0.72]
Phenanthrene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Phenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Pyrene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
Pyridine	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
1,2,4-Trichlorobenzene	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,4,5-Trichlorophenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
2,4,6-Trichlorophenol	ND[0.18]	ND[0.21]	ND[0.2]	ND[0.18]
TEST GROUP: VOLATILES - UNITS: MG/KG				
Bromodichloromethane	ND[0.0011]	NA	NA	NA
Bromomethane	ND[0.0011]	NA	NA	NA
Benzene	ND[0.0011]	NA	NA	NA
Toluene	ND[0.0011]	NA	NA	NA
Carbon disulfide	ND[0.0011]	NA	NA	NA
2-Chloroethyl vinyl ether	ND[0.011]	NA	NA	NA
Chlorobenzene	ND[0.0011]	NA	NA	NA
Chloroethane	ND[0.0011]	NA	NA	NA
Chloromethane	ND[0.0011]	NA	NA	NA
Carbon tetrachloride	ND[0.0011]	NA	NA	NA

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

Sample Location:	STKPILE2	STKPILE2	STKPILE2	STKPILE2
Sample Identification Number:	JE-96-AMA0054	JE-96-AMA0055	JE-96-AMA0056	JE-96-AMA0057
Date Sampled:	7/27/96	7/27/96	7/27/96	7/27/96
Sample Depth (feet):	0.5	0.5	0.5	0.5
1,1-Dichloroethane	ND[0.0011]	NA	NA	NA
1,2-Dichloroethane	ND[0.0011]	NA	NA	NA
1,1-Dichloroethene	ND[0.0011]	NA	NA	NA
trans-1,2-Dichloroethene	ND[0.0011]	NA	NA	NA
1,3-Dichloropropene (Total)	ND[0.0011]	NA	NA	NA
1,2-Dichloropropane	ND[0.0011]	NA	NA	NA
Ethylbenzene	ND[0.0011]	NA	NA	NA
2-Hexanone	ND[0.011]	NA	NA	NA
Methylene chloride	ND[0.0011]	NA	NA	NA
1,1,2,2-Tetrachloroethane	ND[0.0011]	NA	NA	NA
Tetrachloroethene	ND[0.0011]	NA	NA	NA
Styrene	ND[0.0011]	NA	NA	NA
Bromoform	ND[0.0011]	NA	NA	NA
1,1,1-Trichloroethane	ND[0.0011]	NA	NA	NA
1,1,2-Trichloroethane	ND[0.0011]	NA	NA	NA
Trichloroethene	ND[0.0011]	NA	NA	NA
Chloroform	ND[0.0011]	NA	NA	NA
Vinyl chloride	ND[0.0011]	NA	NA	NA
m,p-Xylene (Sum of Isomers)	ND[0.0011]	NA	NA	NA
o-Xylene	ND[0.0011]	NA	NA	NA

Table 6-54
Analytical Data Summary, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.
SEMI-VOA	Semivolatile organic compounds
VOLATILES	Volatile organic compounds

Table 6-55
Compounds of Potential Concern, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
Chloromethane	4	0			0 0006	0 0012	none		none	0
Carbon tetrachloride	4	0			0 0006	0 0012	3 00E-01	N	none	0
1,1-Dichloroethane	4	0			0 0006	0 0012	1 10E+02	N	none	0
1,2-Dichloroethane	4	0			0 0006	0 0012	1 00E-01	N	none	0
1,1-Dichloroethene	4	0			0 0006	0 0012	none		none	0
trans-1,2-Dichloroethene	4	0			0 0006	0 0012	none		none	0
1,3-Dichloropropene (Total)	4	0			0 0006	0 0012	2 00E-01	N	none	0
1,2-Dichloropropane	4	0			0.0006	0 0012	1 50E-01	N	none	0
Ethylbenzene	4	0			0 0006	0 0012	5 00E+01	N	none	0
2-Hexanone	4	0			0 0056	0 012	none		none	0
Methylene chloride	4	0			0 0006	0 0012	1 00E-01	N	none	0
1,1,2,2-Tetrachloroethane	4	0			0.0006	0 0012	1 00E-01	N	none	0
Tetrachloroethene	4	0			0 0006	0 0012	none		none	0
Styrene	4	0			0 0006	0 0012	1 20E+01	N	none	0
Bromoform	4	0			0 0006	0 0012	3 40E+00	N	none	0
1,1,1-Trichloroethane	4	0			0 0006	0 0012	9 00E+00	N	none	0
1,1,2-Trichloroethane	4	0			0 0006	0 0012	1 50E-01	N	none	0
Trichloroethene	4	0			0 0006	0 0012	none		none	0
Chloroform	4	0			0 0006	0 0012	3 00E+00	N	none	0
Vinyl chloride	4	0			0 0006	0 0012	8 00E-02	N	none	0
m,p-Xylene (Sum of Isomers)	4	0			0 0006	0 0012	none		none	0
o-Xylene	4	0			0.0006	0.0012	none		none	0

Table 6-55
Compounds of Potential Concern, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

Table 6-55
Compounds of Potential Concern, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	8	4	6 28	21 8	7 4431	4 58	2 30E+03	N	none	0
Residual Range Organics	8	1	123	123	40 9063	67 1	8 30E+03	N	none	0
TEST GROUP: SEMI-VOA - UNITS: MG/KG										
Acenaphthene	8	0			0 1125	0 44	1 90E+03	N	none	0
Acenaphthylene	8	0			0 1125	0 44	none		none	0
Aniline	8	0			0 1125	0 44	none		none	0
Anthracene	8	0			0 1125	0 44	2 49E+04	N	none	0
Azobenzene	8	0			0 1125	0 44	none		none	0
Benzyl butyl phthalate	8	0			0 1125	0 44	none		none	0
bis-(2-chloroethoxy)methane	8	0			0 1125	0 44	none		none	0
bis-(2-chloroethyl)ether	8	0			0 1125	0 44	none		none	0
Bis(2-chloroisopropyl)ether	8	0			0 1125	0 44	none		none	0
bis-(2-ethylhexyl)phthalate	8	0			0 1125	0 44	none		none	0
4-Bromophenyl phenyl ether	8	0			0 1125	0 44	none		none	0
Benzo(a)anthracene	8	0			0 1125	0 44	9 00E+00	N	none	0
Benzoic acid	8	0			0 4444	1 7	3 50E+03	N	none	0
Benzo(a)pyrene	8	0			0 1125	0 44	9 00E-01	N	none	0
Benzo(b)fluoranthene	8	0			0 1125	0 44	9 00E+00	N	none	0
Benzo(g,h,i)perylene	8	0			0 1125	0 44	none		none	0
Benzo(k)fluoranthene	8	0			0 1125	0 44	9 30E+01	N	none	0
Benzyl alcohol	8	0			0 1125	0 44	none		none	0
4-Chloro-3-methyl phenol	8	0			0 1125	0 44	none		none	0
Chrysene	8	0			0 1125	0 44	9 30E+02	N	none	0
4-Chloroaniline	8	0			0 1125	0 44	none		none	0
2-Chlorophenol	8	0			0 1125	0 44	none		none	0
2-Chloronaphthalene	8	0			0 1125	0 44	none		none	0
4-Chlorophenyl phenyl ether	8	0			0 1125	0 44	none		none	0
Dibenzo(a,h)anthracene	8	0			0 1125	0 44	9 00E-01	N	none	0
Dibenzofuran	8	0			0 1125	0 44	none		none	0
3,3'-Dichlorobenzidine	8	0			0 1125	0 44	none		none	0
1,2-Dichlorobenzene	8	0			0 1125	0 44	6 00E+01	N	none	0
1,3-Dichlorobenzene	8	0			0 1125	0 44	none		none	0
1,4-Dichlorobenzene	8	0			0 1125	0 44	7 00E+00	N	none	0
2,4-Dichlorophenol	8	0			0 1125	0 44	none		none	0
Diethyl phthalate	8	0			0 1125	0 44	none		none	0
2,4-Dimethylphenol	8	0			0 1125	0 44	3 60E+01	N	none	0
Dimethyl phthalate	8	0			0 1125	0 44	none		none	0
2-Methyl-4,6-dinitrophenol	8	0			0 4444	1 7	none		none	0
Di-n-butyl phthalate	8	0			0 1125	0 44	none		none	0
Di-n-octyl phthalate	8	0			0 1125	0 44	none		none	0

Table 6-55
Compounds of Potential Concern, Soil
Margaret Bay Stockpile
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
2,4-Dinitrophenol	8	0			1 125	4 4	none		none	0
2,4-Dinitrotoluene	8	0			0 1125	0 44	none		none	0
2,6-Dinitrotoluene	8	0			0 1125	0 44	none		none	0
Fluorene	8	0			0 1125	0 44	2 40E+03	N	none	0
Fluoranthene	8	0			0 1125	0 44	3 30E+03	N	none	0
Hexachlorobutadiene	8	0			0 1125	0 44	1 70E+01	N	none	0
Hexachlorocyclopentadiene	8	0			0 1125	0 44	none		none	0
Hexachlorobenzene	8	0			0 1125	0 44	none		none	0
Hexachloroethane	8	0			0 1125	0 44	none		none	0
Indeno(1,2,3-cd)pyrene	8	0			0 1125	0 44	9 00E+00	N	none	0
Isophorone	8	0			0 1125	0 44	none		none	0
2-Methylphenol (o-cresol)	8	0			0 1125	0 44	6 00E+01	N	none	0
4-Methylphenol (p-cresol)	8	0			0 1125	0 44	none		none	0
2-Methylnaphthalene	8	0			0 1125	0 44	none		none	0
Naphthalene	8	0			0 1125	0 44	3 80E+02	N	none	0
n-Nitrosodimethylamine	8	0			0 1125	0 44	none		none	0
n-Nitrosodiphenylamine	8	0			0 1125	0 44	none		none	0
n-Nitrosodi-n-propylamine	8	0			0 1125	0 44	none		none	0
2-Nitroaniline	8	0			0 1125	0 44	none		none	0
3-Nitroaniline	8	0			0 1125	0 44	none		none	0
4-Nitroaniline	8	0			0 1125	0 44	none		none	0
Nitrobenzene	8	0			0 1125	0 44	none		none	0
2-Nitrophenol	8	0			0 1125	0 44	none		none	0
4-Nitrophenol	8	0			1 125	4 4	none		none	0
Pentachlorophenol	8	0			0 4444	1 7	none		none	0
Phenanthrene	8	0			0 1125	0 44	none		none	0
Phenol	8	0			0 1125	0 44	6 00E+02	N	none	0
Pyrene	8	0			0 1125	0 44	2 50E+03	N	none	0
Pyridine	8	0			0 1125	0 44	none		none	0
1,2,4-Trichlorobenzene	8	0			0 1125	0 44	1 70E+01	N	none	0
2,4,5-Trichlorophenol	8	0			0 1125	0 44	none		none	0
2,4,6-Trichlorophenol	8	0			0 1125	0 44	none		none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Bromodichloromethane	4	0			0 0006	0 0012	3 00E+00	N	none	0
Bromomethane	4	0			0 0006	0 0012	none		none	0
Benzene	4	0			0 0006	0 0012	2 00E-01	N	none	0
Toluene	4	0			0 0006	0 0012	4 80E+01	N	none	0
Carbon disulfide	4	0			0 0006	0 0012	1 60E+02	N	none	0
2-Chloroethyl vinyl ether	4	0			0 0056	0 012	none		none	0
Chlorobenzene	4	0			0 0006	0 0012	5 00E+00	N	none	0
Chloroethane	4	0			0 0006	0 0012	none		none	0

6.36 LOWER UNALASKA VALLEY

The Lower Unalaska Valley UST sites are located approximately 1 mile southeast of the City of Unalaska on Unalaska Island (Figure 3-3). This area includes structures associated with the Army's Unalaska Army Garrison.

IRA activities conducted during the 1997 and 1998 field seasons in the Lower Unalaska Valley area included removing four USTs, excavating and remediating POL-impacted soils, installing one well point, drilling two soil borings, and installing two monitoring wells. Detailed information regarding these activities is presented in the 1997 IRA/SI/RI Report (USAED 1999e) and the 1998 SI/RI/IRA Report (USAED 1999d).

6.36.1 Site Description

The Iliuliuk River flows through the Unalaska Valley into Unalaska Lake. The valley is primarily a residential area with some light industry in the lower portions. Most new residential development in the City of Unalaska occurs in Unalaska Valley. A review of the 1980, 1985, and 1994 aerial photographs shows development occurring in the northeast side of the valley. Remnants of numerous military structures, foundations, and debris exist throughout the valley. The following paragraphs describe USTs investigated in the area.

UST 2667 was encountered during excavation work at the new DPW Building. The tank was the source of heating oil for a WWII military building (Warehouse 2667). A portion of the existing Public Works facility was built on the Warehouse 2667 foundation.

UST 1765 was discovered during excavations at the new library building. The tank was located on the north side of a WWII military building foundation, and was the source of heating oil for the building (Latrine 1765). This site is located northwest of Unalaska Lake, on the southern side of the Iliuliuk River, adjacent to the City Senior Center.

UST 2060 stored heating oil used at the former Mess Hall 2060. The UST 2060 site is bordered by a gravel access road on the north and east sides. A small pond is located along the east edge of the east gravel access road. The site slopes upward to the south and east, and

slopes downward to the north and west, draining toward Unalaska Lake. The residential area around the UST 2060 site is known locally as Nirvana Hill.

UST 2664 is located at the Building 2664 foundation on the southwest corner of the intersection of Broadway Avenue and Whittern Lane, west of the DPW facility. The former warehouse and its heating system appeared to be similar in design to Building MB-820. UST 2664 was a single-walled steel vessel with an approximate capacity of 680 gallons.

6.36.2 Previous Investigations

Previous investigations in Lower Unalaska Valley included a 1997 reconnaissance of 88 WWII (former and existing) building sites located throughout Unalaska Valley. During the 24 July 1997 site visit to Building 2060, structure remnants consisting of significant building debris (from the collapse of the building) and one UST were identified. After completion of the utility clearance at this site, one test pit was excavated on 7 August 1997, which confirmed the presence of UST 2060 (USAED 1999e).

In preparation for construction activities of the new DPW building and the new library in 1997, the City of Unalaska requested that field samplers screen soils with a PID while test pits were excavated by city crews at Buildings 2667 and 1765. A structure was present in 1997 at the approximate location of UST 2667. One test pit in the area indicated minor POL impacts. No indication of POL impacts was encountered during direct screening of the soil in the test pits at the UST 1765 site, which was a vacant gravel area.

6.36.3 UST 2667 Field Activities

IRA field activities were conducted at the UST 2667 site (near the new DPW building) on 10 July 1998. These activities included removing tank contents, removing the tank, excavating contaminated soils, field screening and soil sampling, and partially backfilling the excavation. The tank and soils were excavated by the City of Unalaska's contractor, Osborne Construction, because the city was constructing the new DPW building. The tank contents were pumped out and the tank transported from the site on 27 July 1998. The 1,000-gallon tank was nearly full of sand and gravel, with about 3 inches of product measured above the

sand through the fill hole. The volume of product was less than 55 gallons. The steel tank measured 12 feet in length and had a diameter of 3.8 feet. The depth of burial of the tank and its exact location are not known, as the tank was removed from the excavation prior to the field sampler's arrival onsite. The tank was transported to the AITF for decontamination. Moderate corrosion of the tank was noted. No piping or dispensers were encountered. Fractured bedrock dipping westward was encountered at the bottom of the excavation, about 7 feet bgs, preventing the excavation from continuing any deeper. Groundwater was encountered at the same depth. Approximately 150 cy of soil were identified as impacted by field screening and excavated. Impacted soils were placed directly into trucks and then transported to the AITF.

The final excavation measured approximately 800 square feet in plan area and was a maximum of 7.5 feet below the bottom of the footing for the new building. Soils encountered onsite were mixed silt and gravel over fractured bedrock. No soils were stockpiled onsite. The City of Unalaska was unable to stockpile "clean" soils (due to lack of space), collect analytical samples, and wait for results. Approximately 40 cy of silty soil from the vicinity of the former UST identified as "clean" based on field screening were transported directly to the municipal landfill.

The impacted soils at the eastern edge of the excavation had a different odor than those from the immediate vicinity of the UST. A strong "carpet-glue"-like odor was encountered along with elevated ambient PID readings up to 243 ppm. These soils were located at an elevation higher than the subject UST, and were upgradient and at a distance from the tank. Other (non-WWII-era) sources (i.e., recent spills or releases) may be the source of impact to these soils. Excavation was temporarily halted in this direction until analytical results characterizing the soils were received. Rush analysis of the soil indicated the soils were not hazardous. After receiving the analytical results on 15 July 1998, an additional 10 cy of POL-impacted soil were removed from the east edge of the excavation and transported to the AITF. Additional confirmation samples were not taken after the soil removal as the city was working at the site.

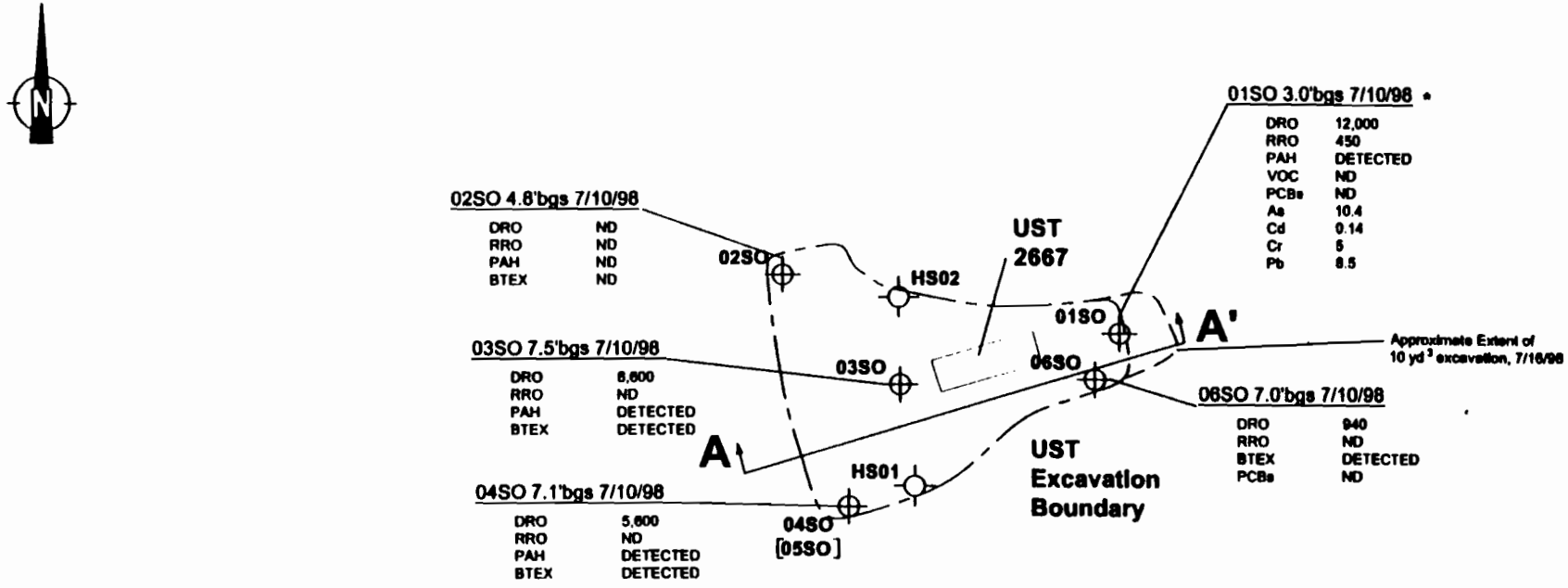
Sample collection locations, the contamination extent, and suitability of certain soils for backfilling were determined by field screening. Five soil samples and two headspace samples were collected from the excavation sidewalls and bottom. Sample locations are shown in Figures 6-69 and 6-70. Material onsite for support of the new footing foundations was used to backfill the excavation to the bottom of the planned footings for the new building.

UST 2667 was decommissioned by physically removing the tank ends. The sand fill was transferred to the impacted soil stockpiles at the AITF. The tank was cleaned by triple-rinsing with steam. The resultant scrap metal was discarded at the Unalaska Landfill. Water generated from cleaning the UST (about 5 gallons) was transported to the WWTP at the AITF. Sludge generated from the cleaning procedure (about 0.25 gallon) was transported to the AITF for treatment in the TDU.

6.36.3.1 UST 2667 Analytical Data Evaluation

At the UST 2667 site, five soil samples were collected from within the excavation area (Figures 6-69 and 6-70). Samples were collected from 3.0 to 7.5 feet bgs. All samples were submitted for DRO, RRO, and BTEX analyses. Four of the five samples were submitted for PAH SIM analyses. Sample 2667-01SO was also analyzed for VOCs, PCBs, and select metals. Samples 2667-01SO and 2776-06SO were eliminated from the data set for risk-based screening as the locations of these samples were excavated during additional removal actions performed on 16 July 1998. Therefore, these two samples are not presented in the analytical data set presented in Table 6-63. The former locations are shown in Figures 6-69 and 6-70 with their corresponding analytical results. Confirmation samples were not collected from the area of additional excavation because the City was working at the site.

Analytical results indicate detected concentrations of DRO, PAHs and VOCs. RRO was not detected above laboratory reporting limits in any of the samples evaluated as part of risk-based screening (2667-02SO, -03SO, and 07SO). Analytical results for these samples are presented in Table 6-63.



UST FIELD OBSERVATIONS

Size:	1,000
Product:	Heating Oil
Tank Corrosion:	Moderate
Maximum Excavation Depth:	7.5 Feet bgs
Impacted Soil Excavated (1998):	160 yd³

LEGEND

HS01 Headspace Screening Sample

Sample ID/Depth(Feet)/Date
DRO 940 = Result in Mg/Kg
RRO ND = Not Detected
PAH
PCBs
BTEX

04SO [05SO] Approximate Location Analytical Sample with QC [05SO] duplicate.

* Soil removed from 01SO location for treatment

LOWER UNALASKA VALLEY
UST 2667 SITE PLAN
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV2667	1	6-69
DRAWN BY:	FILE LOCATION:		DATE:
JAKE	D:\AUTOCAD\AMAKNAK\COMP.RI		13 OCT 99

assuming residential exposure. Both of these pathways require consideration because the new DPW building has been constructed over the former UST location and excavation.

None of the maximum detected concentrations of PAHs and VOCs exceed the most stringent ADEC Method 2 soil cleanup levels. RRO was not detected in the evaluated samples.

A cumulative risk evaluation was not conducted because physical constraints made further action impracticable at this site.

6.36.3.3 UST 2667 Recommendations and Conclusions

Three soil samples collected from UST 2667 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 included the removal of the 1,000-gallon UST and approximately 160 cy of POL-impacted soil. Fractured bedrock dipping westward was encountered at the bottom of the excavation, about 7 feet bgs, preventing the excavation from continuing any deeper. Groundwater was encountered at the same depth. The new DPW building has been constructed at the location of the former UST.

Two samples have detected concentrations exceeding the ADEC cleanup level for DRO assuming that groundwater is used as drinking water (230 mg/kg). At both of these locations, fractured bedrock was encountered prohibiting additional excavation. It should be noted that the detected DRO concentrations are less than the ADEC ingestion and inhalation standards assuming residential exposure.

To address whether groundwater has been impacted at the site, groundwater data from the monitoring wells installed as part of the UST 2664 removal were reviewed. These wells are located approximately 450 feet downgradient (west-southwest) of the UST 2667 site. Analytical results from the 1998 sampling of these wells indicate that groundwater downgradient of the site does not contain any detectable constituent concentrations exceeding the ADEC Table C values for drinking water, assuming residential use. Further discussion of the analytical results and risk-based screening for these two groundwater samples is presented in Section 6.36.6. Lastly, the City of Unalaska Municipal Well analytical data have never had

DRO was detected in two of the three soil samples collected and evaluated as part of risk-based screening. DRO concentrations were reported at 5.800 and 6.600 mg/kg DRO for samples 2667-04SO and 2667-03SO, respectively (Table 6-63). At both of these sample locations, fractured bedrock was encountered prohibiting additional excavation.

PAH compounds were detected in samples 2667-03SO and 2667-04SO. Detected PAHs correspond with the locations of the elevated DRO levels discussed above (Figures 6-69 and 6-70).

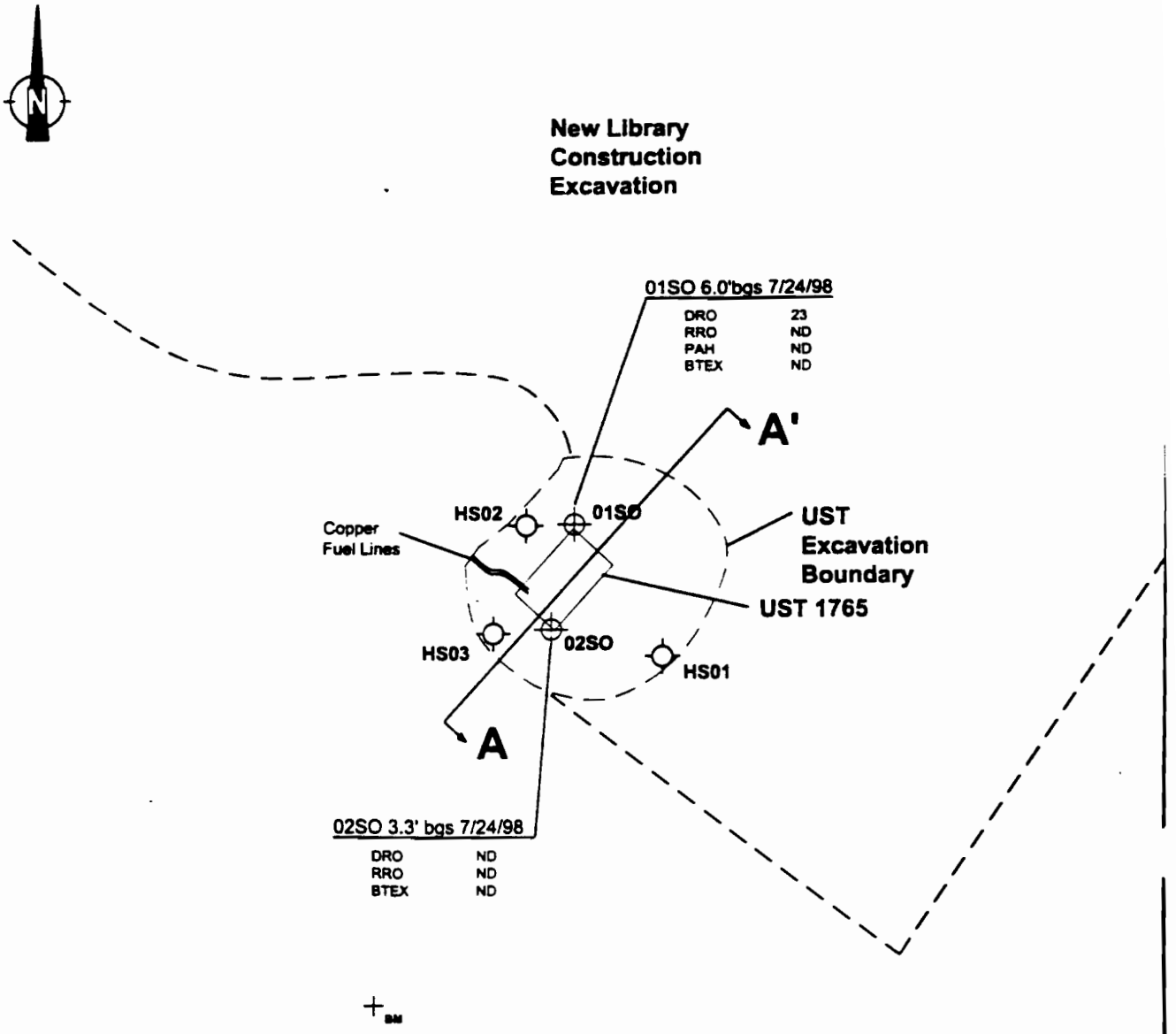
VOCs were detected in samples 2667-03SO and -04SO. Detected VOCs include the dichlorobenzene isomers (samples 2667-03SO and –04SO) and ethylbenzene (samples 2667-03SO). Benzene, toluene, and total xylenes were not detected.

6.36.3.2 UV-2667 Risk-Based Screening Results

Three soil samples collected from UST 2667 were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective ADEC Method 2 levels. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions for the environmental media evaluated are presented below.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 2667 is located in a land use area zoned marine industrial. Sample depths for soils within the UST excavation for samples evaluated as part of the risk-based screening process ranged between 4.8 and 7.5 feet bgs.

As presented in Table 6-64, two samples exceeded the ADEC cleanup level for DRO (230-mg/kg) assuming the migration to groundwater pathway. At both of these locations, fractured bedrock was encountered prohibiting additional excavation. It should be noted that the detected DRO concentrations are less than the ADEC ingestion and inhalation standards



Unalaska
Senior Center

UST FIELD OBSERVATIONS

Size:	300 gal
Product:	Heating Oil
Tank Corrosion:	Heavy, perforated
Maximum Excavation Depth:	6.0 Feet bgs
Impacted Soil Excavated (1998):	22 yd ^{3}

0 5 10 20

APPROXIMATE SCALE IN FEET

LEGEND

HS01 Headspace Sample

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Not Detected
BTEX

02SO Approximate Location Analytical Sample

BM Survey Bench Mark

LOWER UNALASKA VALLEY
UST 1765, SITE PLAN
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NO:	VIEW	FIGURE NO.:
L. PHYFE	UV1765	1	6-71
DRAWN BY:	FILE LOCATION:		DATE:
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detected concentrations exceeding ADEC Table C values. The City wells have had no detected chemical concentrations since 1995.

Based on the removal of the primary source of contamination, the fact that the excavation was to bedrock, and analytical results of area groundwater from the site NFA at UST 2667 is recommended. The foundation of the new DPW building was placed over the site.

6.36.4 UST 1765

IRA field activities at the UST 1765 site (near the new library) occurred on 24 July 1998. These activities included pumping the contents of the tank, removing the tank, excavating impacted soils, field screening, and soil sampling. City workers exposed the UST during excavation for the new library foundation and backfilled the excavation. The original tank burial depth is unknown because it was exposed before the field samplers arrived onsite. IRA activities began by pumping the contents of the UST. The 300-gallon tank contained about 40 gallons of water, which was transported to the WWTP. The steel tank was about 5 feet long and 3.1 feet in diameter. Heavy corrosion and perforations in the tank were noted. The tank was excavated using a backhoe and transported to the AITF for decontamination. Copper piping, about 12 feet long, was removed from the ground during foundation excavation for the library by the City of Unalaska. No associated dispensers were present. Approximately 22 cy of soil were excavated and identified as impacted by visual, odor, and field screening. Impacted soils were loaded directly into trucks and transported to the AITF for treatment in the TDU.

The final excavation measured approximately 180 square feet at the ground surface and was up to 6 feet deep. Soils in the excavation area were mixed organic silt and cobbles underlain by coarse river gravel. According to the City Engineer, groundwater was encountered at 14 to 16 feet bgs during a nearby manhole excavation. The coarse river gravel extended to the bottom of the manhole.

Two soil samples from each end of the tank, as well as three headspace samples were collected from the excavation bottom. Sample locations are shown in Figures 6-71 and 6-72.

The excavation was not backfilled because the footings for the new library building were constructed at a greater depth than the tank excavation.

After UST 1765 was removed, it was decommissioned by physically removing the tank ends. The tank was cleaned by triple-rinsing with steam. The resultant scrap metal was discarded at the Unalaska Landfill. Water generated from cleaning the UST (about 2 gallons) was transported to the WWTP. No sludge was generated during the tank cleaning process.

6.36.4.1 UST 1765 Analytical Data Evaluation

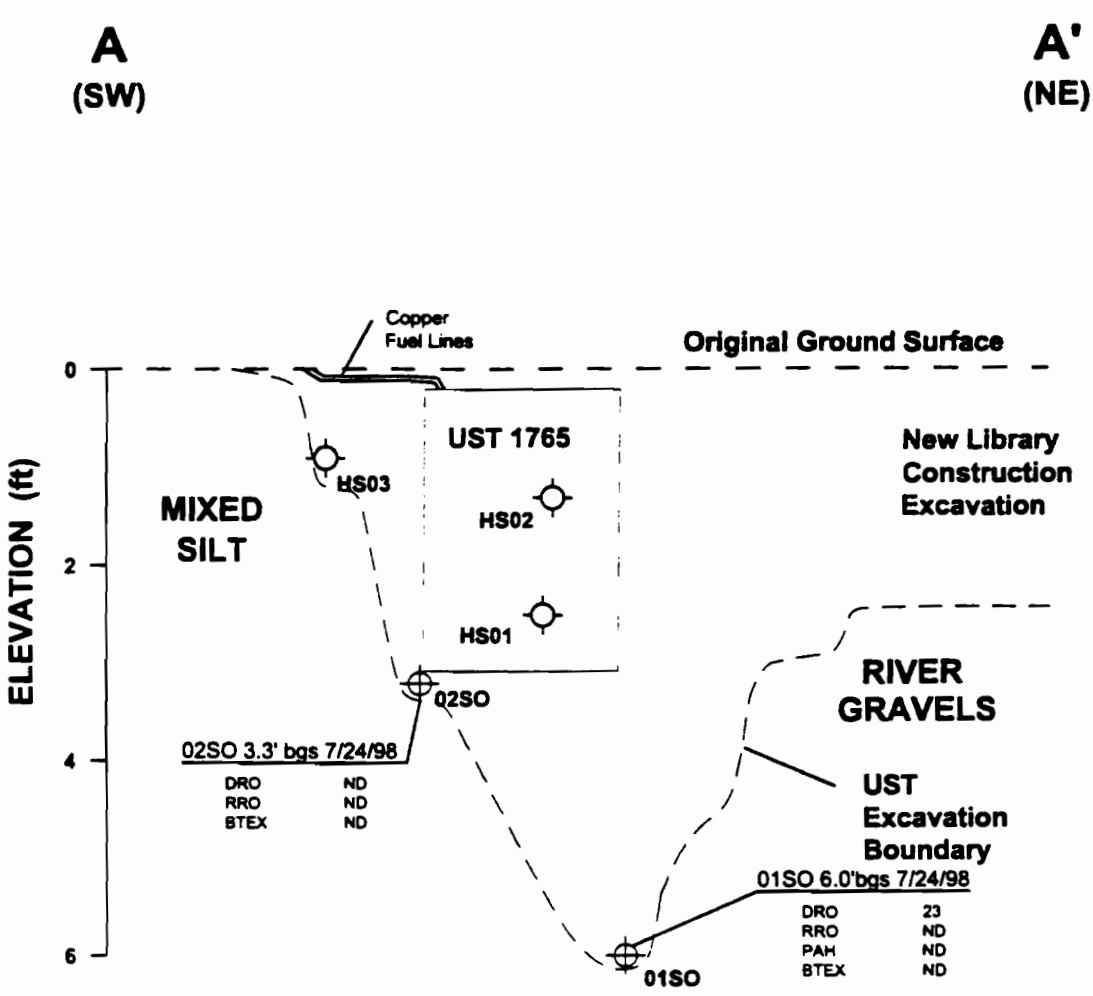
At UST 1765, two soil samples (1765-01SO and -02SO) were collected from two discrete locations within the excavation area. Laboratory analytical results for each sample are listed in Table 6-65. Within the excavation area, samples were collected at a depth of 6.0 feet bgs (1765-01SO) and 3.2 feet bgs (1765-02SO). Both samples were submitted for DRO, RRO, and VOC analyses. Sample 1765-01SO was also submitted for PAH analyses. RRO, VOCs, and PAHs were not detected in the soil samples.

Sample 1765-01SO contained the maximum detected concentration of DRO at 23 mg/kg. This sample was collected from the bottom of the excavation at a depth of 6 feet bgs adjacent to the former UST location. DRO was reported as not detected in sample 1765-02SO. No other compounds were detected in either sample collected.

6.36.4.2 UV-1765 Risk-Based Screening Results

The two soil samples collected from the UST 1765 excavation area were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions for the environmental media evaluated are presented below.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. The Building 1765 UST area is located in a land use area zoned marine industrial. Sample depths



UST FIELD OBSERVATIONS

Size:	300 gal
Product:	Heating Oil
Tank Corrosion:	Heavy, perforated
Maximum Excavation Depth:	6.0 Feet bgs
Impacted Soil Excavated (1998):	22 yd^3

0 5 10

APPROXIMATE SCALE IN FEET
(HORIZONTAL)

LEGEND

HS01 Headspace Sample

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Not Detected
PAH
BTEX

02SO Approximate Location Analytical Sample

LOWER UNALASKA VALLEY
UST 1765, CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV1765	2	6-72
DRAWN BY:	FILE LOCATION:		DATE:
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was removed from the excavation with a backhoe and transported to the AITF for decontamination. Approximately 880 cy of soil were excavated and identified as contaminated by visual, odor and field screening during the removal of the tank. Excavation could not extend any further to the east without affecting the gravel road or the pond. Excavation and screening activities were coordinated so that contaminated soils were placed directly into trucks and then transported to the AITF. The excavation exposed approximately 3 to 4 feet of gravel fill around and over the UST location, underlain by native sandy silt.

Sample collection locations, the extent of contamination, and suitability of certain soils for backfilling were determined by field screening. PID screening during impacted soil removal efforts was minimal at the UST 2060 site because POL-impacted areas were readily discernable by visual and olfactory evidence. Soils with no POL impacts were segregated and stockpiled within the excavated area. These soils were used as backfill.

Thirteen soil samples were collected from the excavation sidewalls and bottom, and three samples were collected from the segregated stockpiled soil. Five of the initial samples (three excavation and two stockpile) did not meet temperature preservation requirements and were not analyzed (samples 2060-14SO through -18SO). These five samples were re-collected on 10 September 1998 (samples 2060-19SO through -23SO). A total of 16 soil samples (13 excavation and three stockpile) were submitted for analysis. Sample locations are shown in Figure 6-73. A cross-section of UST 2060 is shown in Figure 6-74. The site figures indicate which samples exceeded preservation requirements and which samples were re-collected.

UST 2060 was decommissioned by physically removing the tank ends and pressure-washing the tank. The resultant scrap metal was discarded at the Unalaska Landfill. Water generated from cleaning the UST was transported to the WWTP.

Offsite water continually flowed into the excavated area and became contaminated. Water control measures were implemented and included removing the contaminated water for treatment, and constructing a diversion ditch on the east side of the excavation to direct clean water toward an existing drainage ditch before the water would have an opportunity to enter the excavation area. Sources of water entering the excavation included runoff and shallow

for soils within the UST excavation were at 3.2 and 6.0 feet bgs. Both samples were collected from the bottom of the excavation after tank removal.

Table 6-66 presents the results of the risk-based screening using the maximum concentration for each detected compound. As shown in Table 6-66, DRO was the only compound detected in the collected soils. Based on the results of this screening, the maximum detected concentration of DRO does not exceed the most stringent ADEC Method 2 cleanup criteria for soils (230 mg/kg) assuming migration to groundwater for groundwater used as drinking water. RRO, PAH, and BTEX compounds were not detected. Since only one compound was detected, cumulative risks/hazards were not addressed.

6.36.4.3 UST 1765 Conclusions and Recommendations

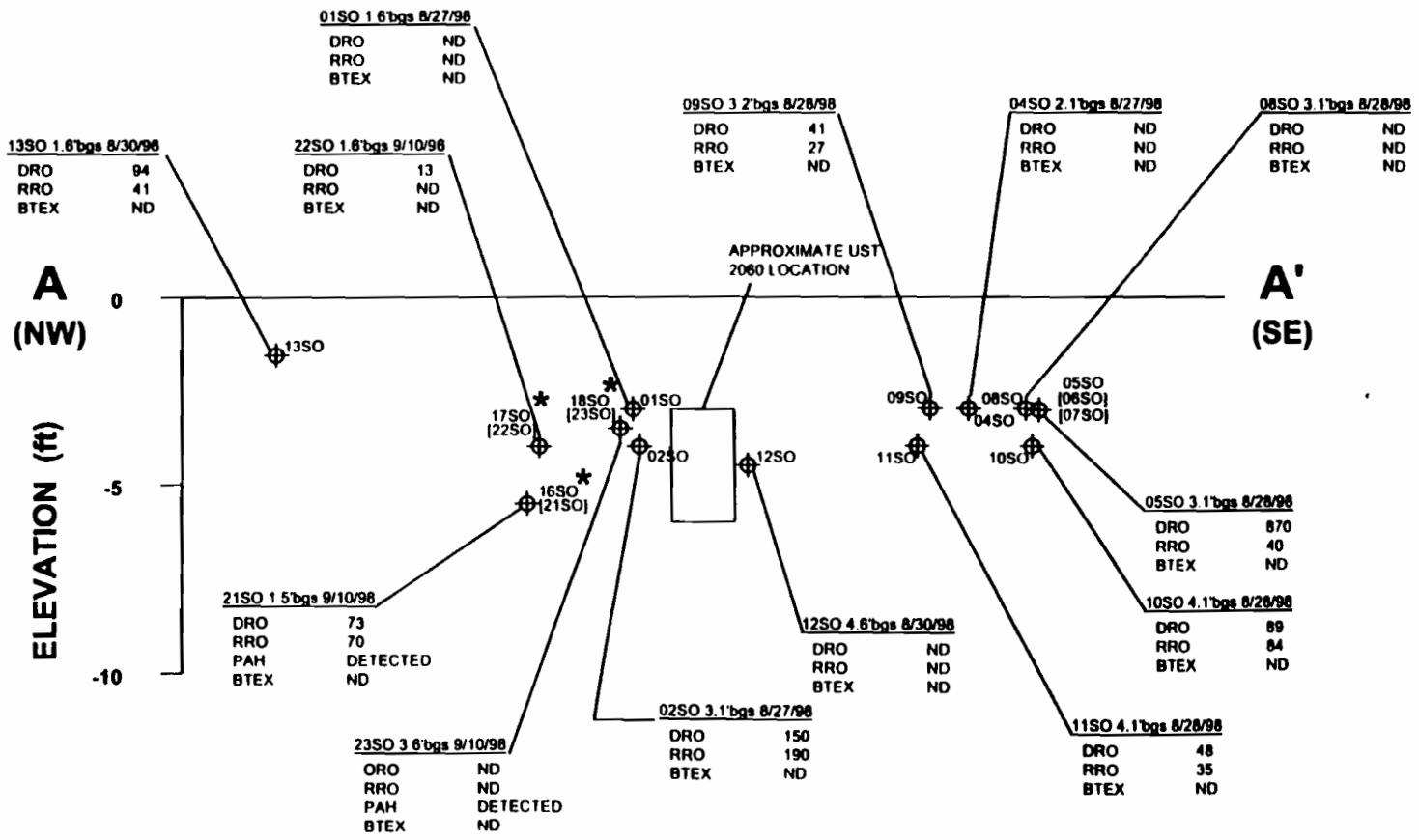
A total of two soil samples collected from UST 1765 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 removed the 300-gallon UST and approximately 22 cy of POL-impacted soil.

Based on the results of this screening, the maximum detected concentration of DRO in soil did not exceed the most stringent ADEC Method 2 soil cleanup level. No concentrations of RRO, VOCs, or PAHs were detected.

Based on the findings of the risk-based screening, NFA is recommended for UST 1765.

6.36.5 UST 2060

From 26 August to 27 September 1998, IRA activities were conducted at UST 2060. Work included excavation of overburden materials including some gravel, (no former building foundation removal), pumping the contents of the tank, removing the UST, excavating contaminated soils, pumping contaminated water from the excavation, field screening, soil sampling, backfilling the excavation, and regrading the area. The 300-gallon tank contained approximately 150 gallons of water with a hydrocarbon odor. The water was pumped out and transported to the WWTP. The steel tank measured approximately 5 feet long, 3.1 feet in diameter, and was extremely corroded, with no apparent dispensers or associated piping. It



UST FIELD OBSERVATIONS

Size:	300 gal
Product:	Heating Oil
Tank Corrosion:	Heavy, perforated
Maximum Excavation Depth:	5.0 Feet bgs
Impacted Soil Excavated (1998):	880 yd ^{3}

0 15 30 60

APPROXIMATE SCALE IN FEET

LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Not Detected
BTEX
PAH

05SO [06SO] [07SO] Approximate Location Analytical Sample QC [06SO] and QA [07SO] replicates.

* Sample Not Analyzed due to exceedence of temperature preservation requirements

LOWER UNALASKA VALLEY
UST 2060 CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO:
L. PHYFE	UV2060		6-74
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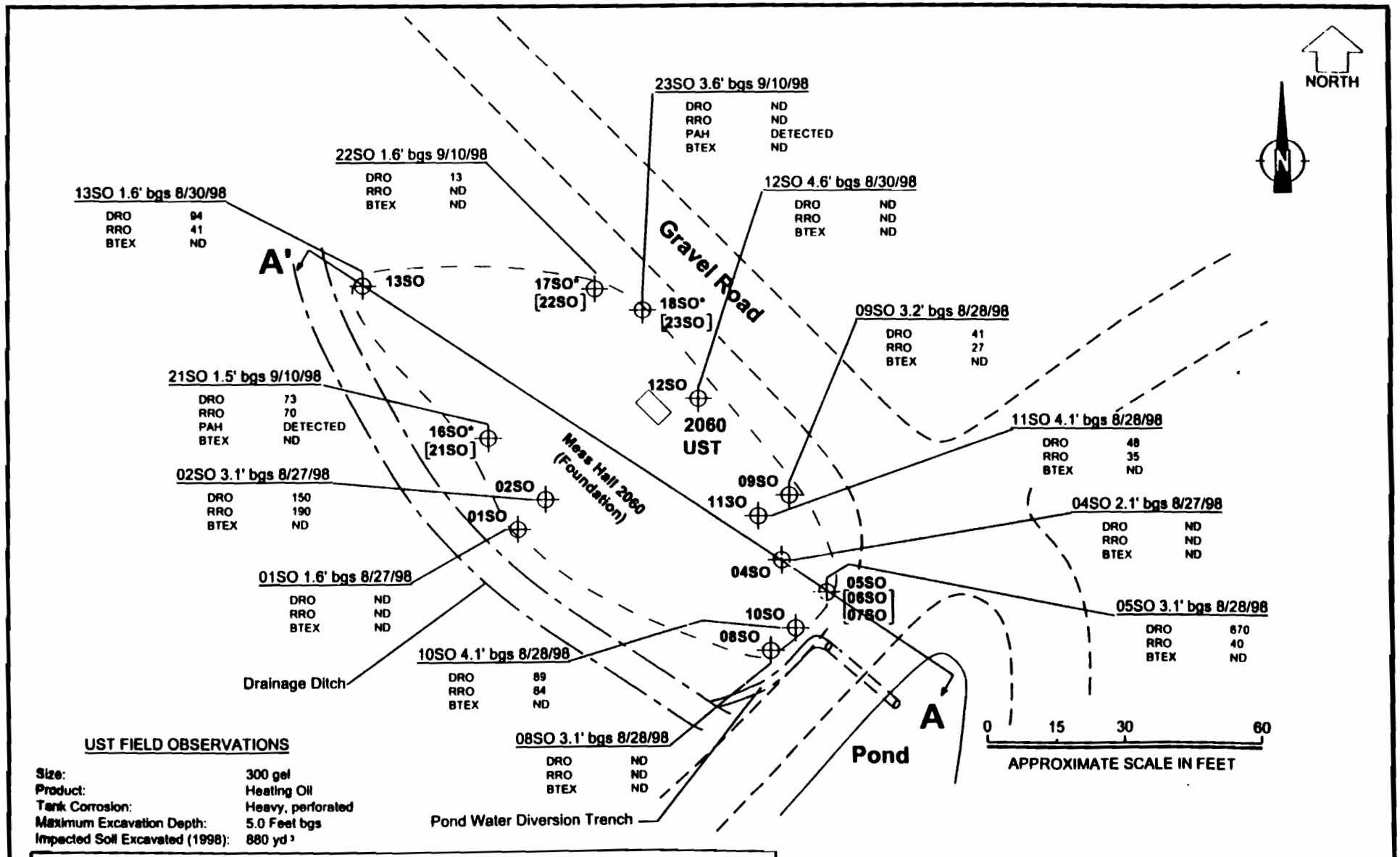

UST FIELD OBSERVATIONS

Size:	300 gal
Product:	Heating Oil
Tank Corrosion:	Heavy, perforated
Maximum Excavation Depth:	5.0 Feet bgs
Impacted Soil Excavated (1998):	880 yd³

LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg
RRO ND = Not Detected
BTEX
PAH

05SO Approximate Location
06SO Analytical Sample with
07SO QC [06SO] and QA [07SO] replicates.

* Sample not analyzed due to exceedance of temperature preservation requirements

Former Foundation Location
Water Diversion Pathway
Excavation Boundary

THE FOLLOWING SAMPLES WERE STOCKPILE SAMPLES AND ARE NOT INDICATED ON THEIR FIGURES 03SO, 14SO* [19SO] AND 15SO* [20SO].

LOWER UNALASKA VALLEY UST 2060, SITE PLAN

UNALASKA ISLAND, ALASKA

PROJ MGR	FILE NAME	FIGURE NO
L. PHYFE	UV2060	6-73
DRAWN BY	FILE LOCATION	DATE
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DRO was detected in 11 of 16 soil samples collected. Of these 11 samples, eight were collected from within the excavation area and three were collected from the stockpiled soil. Detected concentrations ranged from 13 to 670 mg/kg DRO (Table 6-67). Sample 2060-05SO contained the maximum detected concentration of DRO at 670 mg/kg. This sample was collected from the east end of the excavation in the sidewall at a depth of 3 feet bgs. The highest DRO concentration found within the stockpiled soil was 360 mg/kg in sample 2060-19SO.

RRO was detected in nine of the 16 soil samples collected. Of these nine samples, seven came from within the excavation area and two were collected from the stockpiled soil. Concentrations ranged from 27 to 190 mg/kg RRO (Table 6-67). Sample 2060-02SO contained the maximum detected concentration of RRO at 190 mg/kg.

PAH compounds were found in both of the samples submitted for this analysis. The samples submitted for PAH analyses were 2060-21SO and 2060-23SO. Benzo(a)pyrene was detected at a concentration of 0.14 mg/kg in Sample 2060-21SO). Sample 2060-23SO was found to contain benzo(a)pyrene and napthalene at concentrations of 0.062 mg/kg and 0.0071 mg/kg, respectively. Sample 2060-21SO was collected from the base of the excavation, southwest of the former UST at a depth of 5.0 feet bgs. Sample 2060-23SO was collected from the sidewall of the excavation, northwest of the former UST at a depth of 3.0 feet bgs.

6.36.5.2 UV-2060 Risk-Based Screening Results

A total of 16 soil samples were collected from the UST 2060 and subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to the respective screening value. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions for the environmental media evaluated are presented below.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 2060 is located in a land use area zoned marine industrial.

groundwater infiltration. A pond located to the east of the excavation may have contributed to the groundwater infiltration. Approximately 7,350 gallons of impacted water were pumped from the excavation during site activities. Impacted water was transferred to the WWTP. These water control measures were necessary to protect downgradient features, such as a seep located approximately 30 to 40 feet to the northwest. The excavation plan area was approximately 5,500 square feet, with the vertical extent averaging 4 feet to 6 feet bgs. The approximately 880 cy of excavated soils impacted by UST 2060 received thermal treatment at the TDU.

Backfilling activities began after the sampling effort on 10 September 1998. The diversion ditch constructed at the east end of the excavation area kept the excavation dry, allowing backfilling operations to be completed. Approximately 70 cy of suitable excavated stockpiled soil (i.e., soil that passed field screening), 75 cy of imported gravel, and approximately 750 cy of thermally treated soils were used to backfill the excavation. Site work was completed by regrading the excavated area.

6.36.5.1 UST 2060 Analytical Data Evaluation

At the UST 2060 site, 13 soil samples were collected from within the excavation area and three soil samples were collected from the stockpiled soil (Figures 6-73 and 6-74). Within the excavation area, analyzed samples were collected from 1.5 to 4.6 feet bgs. The three samples from the stockpiled soil (2060-03SO, 2060-19SO, and 2060-20SO) not indicated on the figure, were collected from 0 to 1.9 feet bgs. The stockpiled soil was later combined with other thermally-treated soils and used as backfill for the UST excavation.

All samples were submitted for DRO, RRO, and BTEX analyses. Two samples collected from the bottom of the excavation (2060-21SO and 2060-23SO) were also submitted for PAH SIM analyses. Analytical results indicate elevated concentrations of DRO, RRO, and PAH compounds in soil samples collected from the excavation area. In addition, slightly elevated concentrations of DRO and RRO were also found in the stockpiled soils (2060-03SO, -19SO, and –20SO). BTEX compounds were not detected above laboratory reporting limits. Analytical results for these samples are presented in Table 6-67.

most stringent ADEC Method 2 cleanup level. The maximum detected concentration of DRO at the site (670 mg/kg) is also less than the ADEC ingestion and inhalation criteria assuming residential use. Additionally, further soil removal activities along the eastern portion of the excavation are not practical because of potential impacts to the adjacent gravel road and small pond. Based on the results of the screening and the fact that the primary source of contamination has been removed, no further removal actions are recommended at this site. However, the groundwater downgradient of this site should be characterized for possible contamination.

6.36.6 UST 2664

The Building 2664 foundation is located on the southwest corner of the intersection of Broadway Avenue and Whittern Lane, west of the DPW facility (Figure 6-75). The former warehouse and its heating system appeared to be similar in design to Building MB-820. UST UV-2664 was a single-walled steel vessel with an approximate capacity of 680 gallons. About 680 gallons of water with a petroleum odor were removed from the tank on 19 September 1997. The tank had minor corrosion, and concrete had been poured around its mid-section for ballast. POL-impacted soil extended to groundwater and therefore, a well point was placed in the excavation prior to backfilling. A sheen was also noted on the groundwater in the bottom of the excavation (USAED 1999e). The UST 2664 site was initially discussed in detail in the 1997 IRA/SI/RI Report (USAED 1999e). Field activities at UST 2664 were performed over a two-year period (1997 and 1998).

1997: Soil around and beneath UST UV-2664 had a strong petroleum odor and visible POL impacts. Approximately 290 cy of POL-impacted soil were excavated from the area and transported for thermal treatment. Soil samples were collected from five locations from within the boundaries of the 1,500 ft^2 excavation (see Figures 6-75 and 6-76). In addition, one soil sample (2664-08SO) was collected from a test pit excavated approximately 50 feet down gradient of the former UST site. Because excavation activities appeared to intercept the water table, a monitoring well point (WP2664-01) was installed in the excavation at the edge of the building utility room. Groundwater was sampled from the well point in 1998, but not

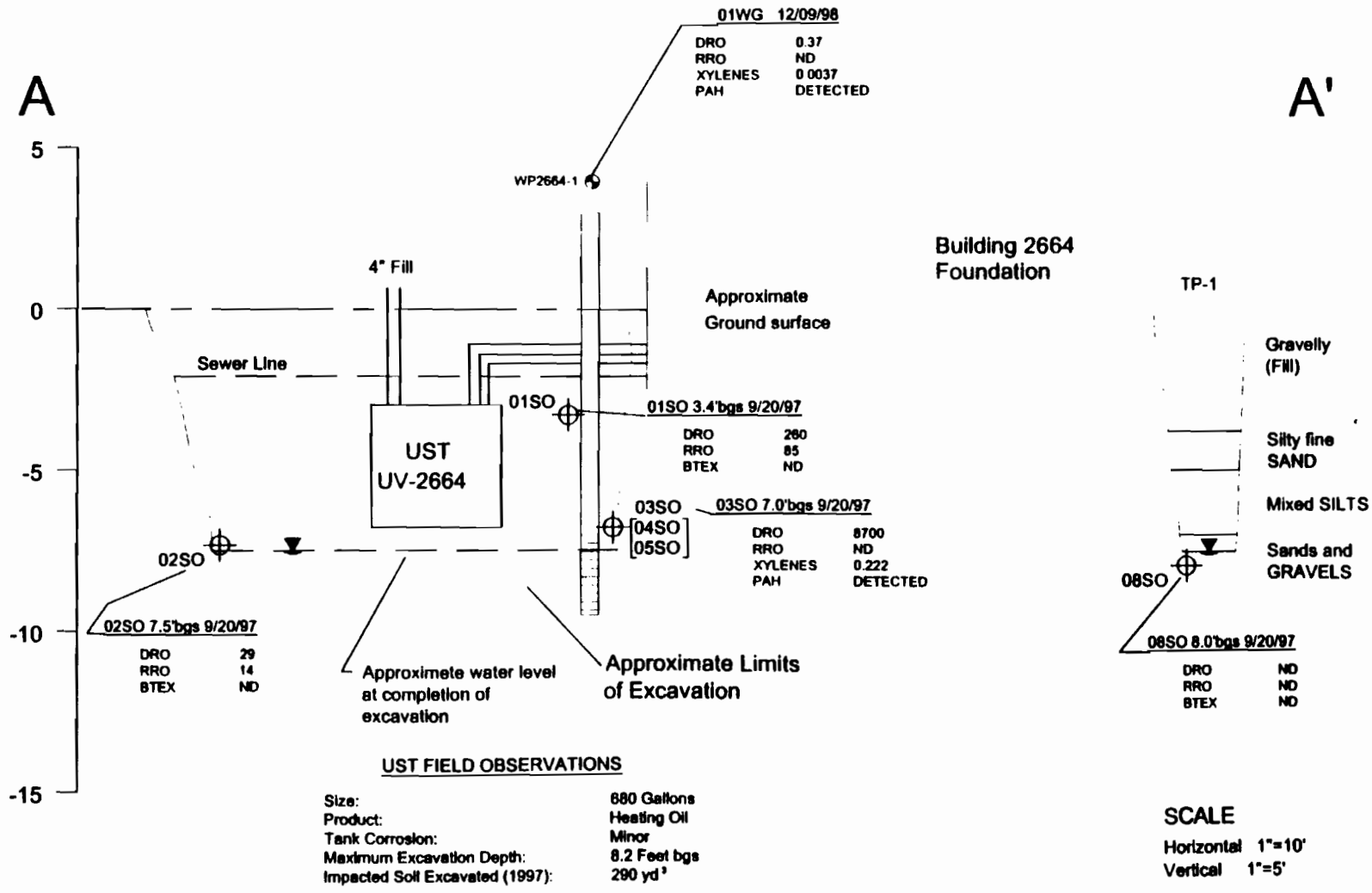
Table 6-68 presents the results of the risk-based screening process. Of the compounds detected, only DRO was detected at concentrations exceeding the appropriate ADEC Method 2 cleanup levels. RRO, VOCs, and PAHs were all at concentrations below the most stringent ADEC Method 2 cleanup levels.

For DRO, two of the 16 samples had detected concentrations exceeding the ADEC Method 2 DRO value (230 mg/kg) protective of contaminants migrating from soil to groundwater. Sample 2060-05SO from within the excavation had a concentration of 670 mg/kg. Sample 2060-19SO from the stockpiled soils placed back in the excavation had a concentration of 360 mg/kg. Because DRO exceeded ADEC levels in only two of 16 soil samples, a 95% UCL on the mean was calculated as the exposure point concentration. The calculation of the 95% UCL is discussed in Appendix D. The 95% UCL for DRO remaining in soils at UST 2060 is 180 mg/kg. This concentration is less than the most stringent ADEC Method 2 cleanup level. The maximum detected concentration of DRO at the site (670 mg/kg) is also less than the ADEC ingestion and inhalation criteria assuming residential use.

6.36.5.3 UST 2060 Recommendations and Conclusions

A total of 16 soil samples collected from UST 2060 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 removed the 300-gallon UST and approximately 880 cy of POL-impacted soil. The excavation plan area was approximately 5,500 square feet, with the vertical extent averaging 4 feet to 6 feet bgs. Excavation and soil removal activities could not extend any further to the east without affecting the adjacent gravel road or pond.

Based on the results of this screening, two soil samples were found to exceed the most stringent ADEC Method 2 cleanup level for DRO (230 mg/kg). The maximum DRO concentration detected was 670 mg/kg. RRO, PAH, and VOC concentrations did not exceed the most stringent ADEC Method 2 cleanup levels. Because DRO exceeded ADEC levels in only two of 16 soil samples, a 95% UCL on the mean was calculated as the exposure point concentration. The calculation of the 95% UCL is discussed in Appendix D. The 95% UCL for DRO remaining in soils at UST 2060 is 180 mg/kg. This concentration is less than the



UST FIELD OBSERVATIONS

Size:	660 Gallons
Product:	Heating Oil
Tank Corrosion:	Minor
Maximum Excavation Depth:	8.2 Feet bgs
Impacted Soil Excavated (1997):	290 yd³

SCALE

Horizontal 1"=10'
Vertical 1"=5'

LEGEND

Sample ID/Depth(Feet)/Date
DRO 45 = Result in Mg/Kg or Mg/L
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

03SO [04SO] [05SO] Approximate Location Analytical Sample 97AMA-2664-03SO with QC [04SO] and QA [05SO] replicates.

MW2664-1 Approximate location of 1997 Monitoring Well

TP1 Approximate location of 1997 Test Pit

LOWER UNALASKA VALLEY
UST UV-2664
CROSS SECTION A-A'
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.
L. PHYFE	Xsec2664	1	6-76
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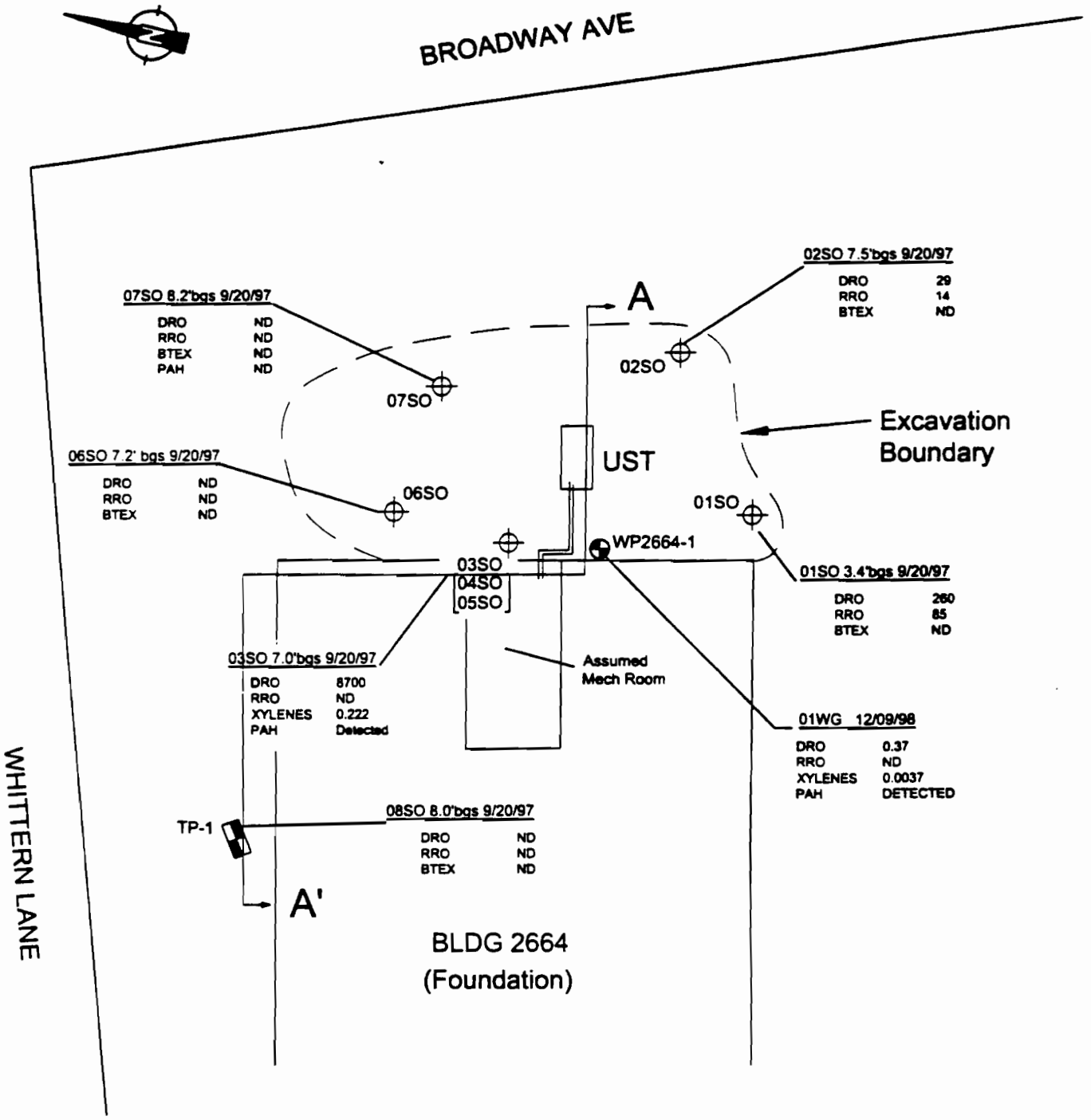
S.B.K.	D:\AUTOCAD\AMAKNAK\COMP.RI		13 OCT 99



UST FIELD OBSERVATIONS

Size:	680 Gallons
Product:	Heating Oil
Tank Corrosion:	Minor
Maximum Excavation Depth:	8.2 Feet bgs
Impacted Soil Excavated (1997):	290 yd³

0 10 20 40

SCALE IN FEET

LEGEND

Sample ID/Depth(Feet)/Date

DRO 45 = Result in Mg/Kg or Mg/L
RRO ND = Below Detection Limit
BTEX - = Not Analyzed

03SO
04SO
05SO

Approximate Location Analytical Sample 97AMA-2664-03SO with QC [04SO] and QA [05SO] replicates.

WP2664-1 Approximate location of 1997 Well Point

TP1 Approximate location of 1997 Test Pit

LOWER UNALASKA VALLEY
UST UV-2664
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO.:
L. PHYFE	UV2664	1	6-75
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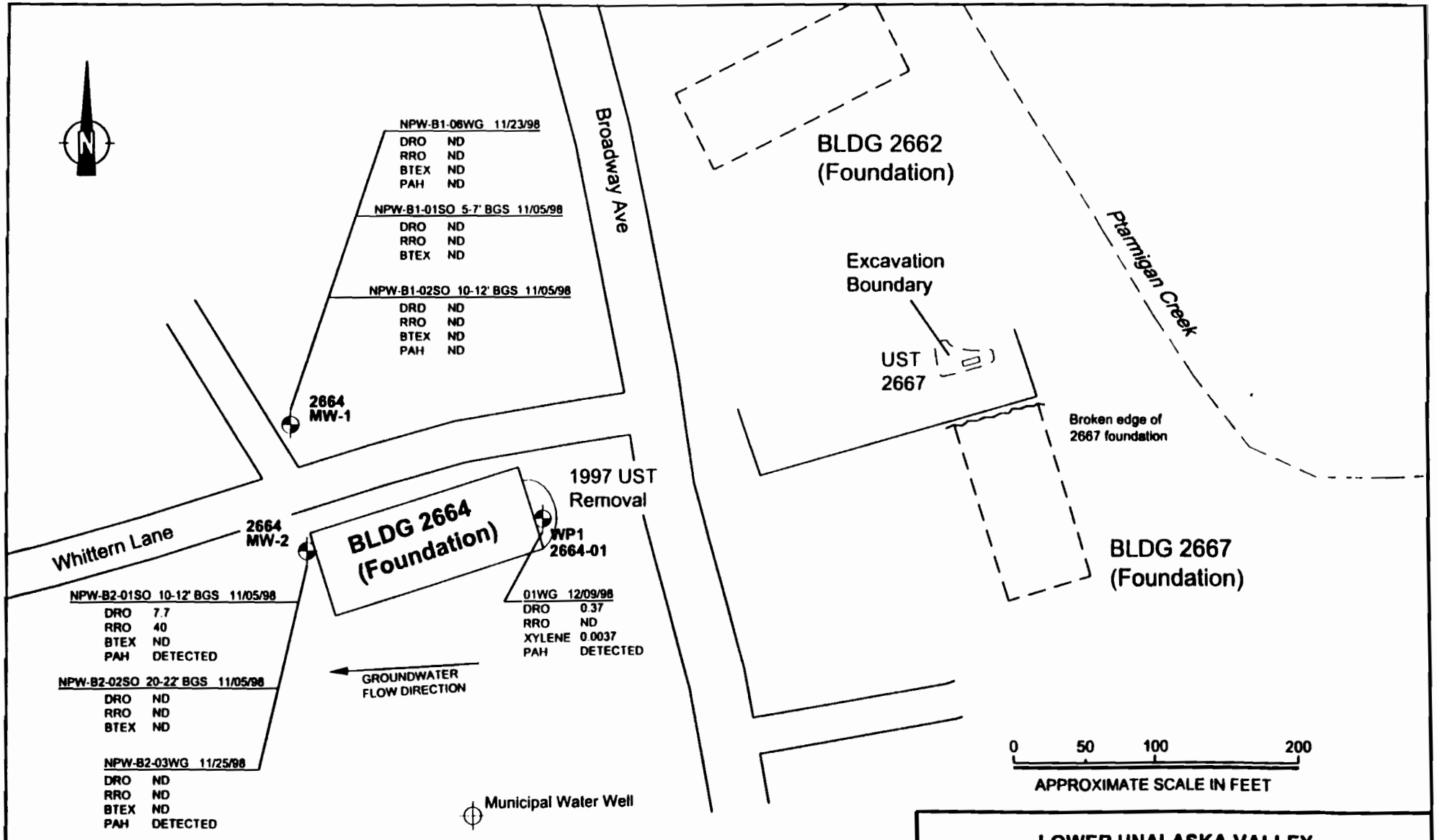

LOWER UNALASKA VALLEY
BLDG 2664
MONITORING WELL LOCATIONS
UNALASKA ISLAND, ALASKA

PROJ. MGR.:	ACAD FILE NAME:	VIEW	FIGURE NO
L. PHYFE	Bldg2664	1	6-77
DRAWN BY: JAKE/OKA	FILE LOCATION:		DATE

in 1997. The excavation area was backfilled with fill material obtained from the nearby City of Unalaska pit.

1998: RI drilling field activities at the UST 2664 site, which is near the Unalaska Valley New Public Works (NPW) building, consisted of conducting an initial site evaluation; drilling two soil borings and collecting analytical soil samples; and installing, developing, purging and sampling two monitoring wells. The existing well point (WP2664-01) at the former UST UV-2664 location was also sampled. The soil borings were installed near the intersection of Broadway Avenue and Whittern Lane. The initial site evaluation included reviewing previous studies, locating the two borings, conducting utility locates, and coordinating activities with the owners of the property. The borings and monitoring wells were located in an area estimated to intercept groundwater flowing from the former UST UV-2667 and UST UV-2664 sites. Locations of soil borings and pertinent site features are shown in Figure 6-77.

The two soil borings were advanced at the site on 4 November 1998 using a Nodwell track mounted, Mobile B-61 drill rig. The borings were completed to a nominal depth of 22 feet bgs. Soil samples were obtained at 5-foot intervals in the borings. The two borings encountered dense gravel grading into layers of sand and silt.

Two soil samples collected from each boring were selected for laboratory analyses in support of the field investigation activities even though there was no apparent evidence of contamination.

Monitoring wells were installed in both borings immediately after drilling. The monitoring wells were installed to a nominal depth of 15 feet bgs. Groundwater was encountered between 6 and 10 feet bgs in the borings while drilling.

Static groundwater depths were measured in the one well point (WP2664-01) and two monitoring wells (NPW[2664]-MW1 and NPW[2664]-MW2) on 24 November 1998 and again on 9 December 1998. Based on water elevation data collected from the monitoring wells, groundwater flows toward the west. A public drinking water well, located south of monitoring well NPW-MW2, was identified. Information was obtained indicating that the

excavation above the sample location (2664-01SO). and the sample was collected from a darker. organic-containing soil layer. Natural organic compounds in the soil may be contributing to the DRO concentration at this location. suggesting that minimal POL impacts remain in the vicinity of sample 2664-01SO.

PAH compounds were detected in two of the four soil samples submitted for this analysis. A total of 10 PAHs were detected in sample 2664-03SO and one PAH compound was detected in sample NPW-B2-01SO (Table 6-69). The maximum detected concentration (0.36 mg/kg benzo(a)pyrene) was found in sample NPW-B2-01SO at a depth of 10 to 12 feet bgs. All other PAH detections were found in 2664-03SO at a depth of 6.5 to 7 feet bgs.

To address the potential for groundwater contamination. one well point (WP2664-01) and two monitoring wells (2664-MW1 and 2664-MW2) were installed. The well point was installed in 1997 adjacent to the foundation in the UST 2664 excavation (Figure 6-75). The well point was placed near the most visibly POL-impacted soil. The two monitoring wells were installed in 1998 in an area expected to receive groundwater flowing from the former UST 2667 and 2664 sites. Groundwater samples were collected in 1998 at depths of approximately 6 to 10 feet bgs and are representative of shallow groundwater in the area. The groundwater samples were submitted for DRO, RRO. BTEX. and PAH analysis.

DRO was detected in one of the three groundwater samples collected. Sample 2664-01WG contained DRO at a concentration of 0.37 mg/L (Table 6-70). PAHs were also detected in two of the three groundwater samples collected (samples 2664-01WG and NPW-B2-03WG). PAH compounds detected in site groundwater included fluorene (0.59 µg/L), naphthalene (0.11 µg/L and 0.65 µg/L). and phenanthrene (0.14 µg/L). Lastly. total xylenes were detected in sample 2664-01WG at a concentration of 3.7 µg/L.

6.36.6.2 UST 2664 Risk-Based Screening Results

A total of 10 soil samples and three groundwater samples collected from the UST 2664 area were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to its respective screening values. The risk-based screening

city well is under the influence of surface water (Larson Engineering 1998). See Section 2.3.3 for further information on the city wells.

6.36.6.1 UST 2664 Analytical Data Evaluation

A total of 10 soil samples were collected to characterize the UST 2664 site during the 1997 and 1998 investigations. Five soil samples were collected in 1997 to characterize the UST excavation (Figures 6-75 and 6-76). The 1997 soil sample locations included 2664-01SO, 2664-02SO, 2664-03SO, 2664-06SO and 2664-07SO. Additionally, one soil sample (2664-08SO) was also collected in 1997 from a test pit located downgradient of the excavation. The soil samples from 1997 were collected at depths ranging between 3.4 feet and 8.2 feet bgs. Figure 6-77 presents the locations of the two 1998 soil borings and associated soil samples. The 1998 soil samples are labeled NPW-B1-01SO and -02SO and NPW-B2-01SO and -02SO. Soil samples from 1998 were collected at depths ranging between 5 feet and 22 feet bgs.

Analytical results for 1997 and 1998 activities from the collected soil samples are summarized in Table 6-69. The soil samples were submitted for DRO, RRO, and either BTEX or VOC analyses. Four of the 10 soil samples (2664-03SO, 2664-07SO, NPW-B1-02SO, and NPW-B2-02SO) were submitted for PAH analyses (two samples for SVOCs and two for PAHs).

RRO was detected in three of 10 samples with concentrations ranging between 14 mg/kg and 85 mg/kg. DRO was detected in four of 10 samples with concentrations ranging between 7.7 mg/kg and 8,700 mg/kg. The maximum DRO concentration (8,700 mg/kg), located at 2664-03SO, was detected adjacent to the building foundation and pipeline that ran from the UST to the building in an area of obvious petroleum staining. The sample was collected at a depth of 7 feet bgs. Total xylenes were detected in one of the six soil samples submitted for BTEX analyses at a reported concentration of 0.222 mg/kg (sample 2664-03SO). Benzene, ethylbenzene and toluene were not detected in any of the soil samples.

A DRO concentration of 260 mg/kg was detected at location 2664-01SO. This concentration was not anticipated based on the field screening results. A wood-stave sewer pipe crossed the

commercial/industrial exposure to DRO-impacted soil via the ingestion pathway only. Although there are two soil samples that exceed the migration to groundwater soil criteria, this pathway was not evaluated further under Method 3 because groundwater data available for the site indicate that groundwater has not been impacted at levels above ADEC Table C criteria. The groundwater data were used to evaluate actual migration and resulting impacts from soils to groundwater. This approach was used because contamination in soils would have migrated to groundwater as the site has not been active since WWII. Additionally, both primary and secondary sources have been removed, eliminating future contaminant migration.

As presented in Section 5.3.4, the Method 3 risk-based ingestion value for DRO when evaluating a commercial land use scenario is 12,500 mg/kg. The maximum detected DRO concentration (8,700 mg/kg) is less than the Method 3 value. Therefore, if the maximum detected DRO concentration is brought to the surface in the future, ingestion (or inhalation) of DRO when assuming commercial exposure will not cause adverse effects to human receptors.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Cumulative carcinogenic risks were calculated for five PAH compounds. Method 2 cleanup levels were used for the PAHs. The calculated risks for the ingestion and migration to groundwater pathways at the maximum detected concentrations were 4.1×10^{-6} and 1.6×10^{-6}, respectively. The total cumulative risk was 5.7×10^{-6}, less than the limitation of 1×10^{-5}. The noncarcinogenic hazard indexes for four PAHs, total xylenes, DRO, and RRO were 0.7 for the ingestion pathway, 0.7 for the inhalation pathway, and 38 for the migration to groundwater pathway. The hazard index for the migration to groundwater pathway was due almost entirely to DRO. However, the migration to groundwater pathway should probably be eliminated from this calculation. As noted above, groundwater data are available for the site, and such data should take precedence over calculated soil concentrations designed to protect groundwater. Excluding only DRO from the migration to groundwater pathway, as discussed above, the noncarcinogenic hazard indexes for the other compounds were 0.7 for the ingestion pathway, 0.7 for the inhalation

process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions for each of the environmental media evaluated are presented below.

Soils: A total of 10 soil samples collected from the UST 2664 area were subjected to the risk-based screening process. In 1997, sample depths for soils within the UST excavation ranged between 3.4 and 8.2 feet bgs. These soil samples were collected from the bottom of the excavation after tank removal. In 1998, sample depths ranged from 5 to 22 feet bgs. These samples were collected from soil borings installed in an area expected to receive groundwater flow from the former UST 2667 and 2664 sites.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Building 2664 is located in a land use area zoned marine industrial.

Table 6-71 presents the results of the risk-based screening for soil using the maximum concentration for each detected compound. Based on the results of this screening, no maximum detected concentrations of RRO exceed the most stringent ADEC Method 2 cleanup criteria for soils. PAH compounds were detected in two of the soil samples collected from the site. None of the detected PAH concentrations exceeded ADEC Method 2 values for given constituents, where available. In addition, the detected concentration of total xylenes (0.222 mg/kg) does not exceed its most stringent ADEC Method 2 soil criteria (69 mg/kg).

For DRO, two of the 10 samples had detected concentrations exceeding the ADEC Method 2 DRO value (230 mg/kg) protective of contaminants migrating from soil to groundwater for groundwater used as drinking water. The two soil samples that exceed the ADEC Method 2 level have concentrations of 8,700 mg/kg (sample 2664-03SO) and 260 mg/kg (sample 2664-01SO). The average DRO concentration remaining at the site is 900 mg/kg. The maximum detected DRO concentration exceeds the ADEC ingestion criteria for residential use (8,250 mg/kg).

Because UST 2664 is zoned marine related industrial, not residential, completion of ADEC Method 3 was conducted for this site. ADEC Method 3 was completed assuming

for this pathway. ADEC Method 3 was completed because Building 2664 is zoned marine related industrial, not residential. The maximum detected concentration of DRO is less than the ADEC Method 3 value calculated for the ingestion pathway for a commercial/industrial user. Based on this comparison, the ingestion of DRO at the maximum concentration is not a pathway of concern when assuming a commercial/industrial land use scenario.

The total cumulative carcinogenic risk was 5.7×10^{-6}, less than the limitation of 1×10^{-5}. Cumulative noncarcinogenic hazard indexes for various exposure pathways ranged from 0.7 to 38. However, excluding DRO from the migration to groundwater pathway, which is more reliably addressed by actual groundwater data, the maximum hazard index was 0.7, less than the limitation of 1.0.

Although two soil samples exceeded the migration to groundwater soil criteria, this pathway was not evaluated further under Method 3 because groundwater data for the site are available. Therefore, the groundwater data were used to evaluate historic contaminant migration and resulting impacts from soils at this site.

Three groundwater samples were subjected to the risk-based screening process. Because groundwater may potentially be used as drinking water, the analytical results were compared to ADEC Table C drinking water standards. None of the detected concentrations in groundwater exceeded ADEC Table C values for drinking water assuming residential use. The cumulative hazard index for ingestion of groundwater was 1.0, equal to the limitation. There have been no chemicals detected in the City of Unalaska drinking water wells since 1995 (Section 2.3.3), indicating that compounds in groundwater near UST 2664 have not migrated to the city wells.

Based on these results, it can be concluded that if groundwater is ever used as drinking water at this site in the future, adverse effects are not predicted. However, because residual DRO concentrations in soils beneath the Building 2664 foundation exceed the ADEC Method 2 migration to groundwater cleanup standard, and because the cumulative groundwater ingestion hazard index is equal to the limitation of 1.0, additional groundwater monitoring should be considered at the site. Additionally, institutional controls on the future excavation

pathway, and 0. 01 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

Groundwater: Three groundwater samples were subjected to the risk-based screening process. Because groundwater may potentially be used as drinking water, the analytical results were compared to ADEC Table C drinking water standards.

Table 6-72 presents the risk-based screening results based on the maximum detected concentration for each compound. DRO was detected in one groundwater sample at a concentration of 0.37 mg/L (sample 2664-01WG). This concentration is below the ADEC Table C drinking water level for DRO of 1.5 mg/L. Total xylenes were detected at a concentration of 3.7 µg/L (sample 2664-01WG) which is below the ADEC Table C value of 1,000 µg/L. Lastly, the detected concentrations of fluorene, naphthalene, and phenanthrene are all below their corresponding Table C drinking water values. In summary, none of the detected concentrations in groundwater exceed their respective ADEC Table C drinking water values.

Only DRO, xylenes, and two noncarcinogenic PAHs were detected in groundwater. Since no carcinogenic compounds were detected in groundwater, cumulative risk was not calculated. The cumulative hazard index for ingestion of groundwater was 1, equal to the limitation. The hazard quotient for DRO was 0.25.

6.36.6.3 UST 2664 Conclusions and Recommendations

A total of 10 soil samples and three groundwater samples collected from UST 2664 were subjected to the risk-based screening process. IRA activities conducted at the site in 1997 included removal of the 680-gallon UST and approximately 290 cy of POL-impacted soil.

Based on the results of this screening, no maximum detected concentrations of RRO, total xylenes, or PAHs in soil exceeded the most stringent ADEC Method 2 soil levels. Because one of the soil samples had a detected concentration of DRO (8,700 mg/kg) that exceeded the ADEC ingestion criterion for residential use (8,250 mg/kg), ADEC Method 3 was completed

Two samples had detected concentrations exceeding the ADEC cleanup level for DRO assuming that groundwater is used as drinking water (230 mg/kg). At both of these locations, fractured bedrock was encountered prohibiting additional excavation. It should be noted that the detected DRO concentrations are less than the ADEC ingestion and inhalation standards assuming residential exposure.

To address whether groundwater has been impacted at the site, groundwater data from the monitoring wells installed as part of the UST 2664 removal, located approximately 450 feet downgradient of UST 2667, were reviewed. Analytical results from the 1998 sampling indicate that groundwater approximately 450 feet downgradient (west-southwest) of the UST 2667 site does not contain any detected concentrations exceeding the ADEC Table C values for drinking water assuming residential use. Further discussion of the analytical results and risk-based screening for these two groundwater samples is presented in Section 6.36.6. Lastly, the City of Unalaska Municipal Well analytical data have never had detected concentrations exceeding ADEC Table C values. The City wells have had no detected chemical concentrations since 1995.

Based on the removal of the primary source of contamination, the fact that the excavation was to bedrock, and analytical results of area groundwater, NFA at UST 2667 is recommended.

6.36.7.2 UST UV-1765

A total of two soil samples collected from UST 1765 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 included removal of the 300-gallon UST and approximately 22 cy of POL-impacted soil.

Based on the results of this screening, the maximum detected concentration of DRO in soil did not exceed the most stringent ADEC Method 2 cleanup criteria. No concentrations of RRO, BTEX, or PAH compounds were detected.

Based on the findings of the risk-based screening, NFA is recommended for UST 1765.

and relocation of soil from this site should be implemented because the remaining contaminant levels may not be protective of groundwater used as drinking water at all locations.

6.36.7 Conclusions and Recommendations

IRA activities conducted during the 1997 and 1998 field seasons in the Lower Unalaska Valley area included removing four USTs (UST 2667, UST 1765, UST 2060, and UST 2664), excavating and remediating POL-impacted soils, installing one well point, drilling two soil borings, and installing two monitoring wells.

A total of 31 soil samples and three groundwater samples collected from these four UST areas were subjected to the risk-based screening process. It should be noted that each UST was evaluated independent of the others. For each UST, the maximum detected concentration for each compound was compared to their respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report.

For purpose of the risk-based screening, soil samples were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. Groundwater analytical results were compared to ADEC Table C drinking water standards. All four of the Lower Unalaska Valley USTs are located in a land use area zoned marine industrial.

Recommendations and conclusions for each of the four USTs addressed are summarized below.

6.36.7.1 UST UV-2667

A total of 3 soil samples collected from UST 2667 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 included removal of the 1,000-gallon UST and approximately 160 cy of POL-impacted soil. Fractured bedrock dipping westward was encountered at the bottom of the excavation at about 7 feet bgs preventing the excavation from continuing any deeper. Groundwater was encountered at the same depth. The new DPW building has been constructed at the location of the former UST.

ADEC ingestion criterion for residential use (8,250 mg/kg). ADEC Method 3 was completed for this pathway. ADEC Method 3 was completed because Building 2664 is zoned marine related industrial, not residential. The maximum detected concentration of DRO is less than the ADEC Method 3 value calculated for the ingestion pathway for a commercial/industrial use area. Based on this comparison, the ingestion of DRO at the maximum concentration is not a pathway of concern when assuming a commercial/industrial land use scenario.

The total cumulative carcinogenic risk was 5.7×10^{-6}, less than the limitation of 1×10^{-5}. Cumulative noncarcinogenic hazard indexes for various exposure pathways ranged from 0.7 to 38. However, excluding DRO from the migration to groundwater pathway, which is more reliably addressed by actual groundwater data, the maximum hazard index was 0.7, less than the limitation of 1.0.

Three groundwater samples were subjected to the risk-based screening process. Because groundwater may potentially be used as drinking water, the analytical results were compared to ADEC Table C drinking water standards. None of the detected concentrations in groundwater exceeded ADEC Table C values for drinking water assuming residential use. The cumulative hazard index for ingestion of groundwater was 1.0, equal to the limitation. There have been no chemicals detected in the City of Unalaska drinking water wells since 1995 (Section 2.3.3), indicating that compounds in groundwater near UST 2664 have not migrated to the city wells.

However, because residual DRO concentrations in soils beneath the Building 2664 foundation exceed the ADEC Method 2 migration to groundwater cleanup standard, institutional controls limiting use of soil removed from the site area should be implemented. Additionally, a monitoring well should be installed between this site and the City of Unalaska's wells located in this vicinity. The well should be sampled when the city's wells have generated their draw-down area of influence.

6.36.7.3 UST UV-2060

A total of 16 soil samples collected from UST 2060 were subjected to the risk-based screening process. IRA activities conducted at the site in 1998 included removal of the 300-gallon UST and approximately 880 cy of POL-impacted soil. The excavation plan area was approximately 5,500 square feet, with the vertical extent averaging 4 feet to 6 feet bgs. Excavation and soil removal activities could not extend any further to the east without affecting the adjacent gravel road or pond.

Based on the results of this screening, two soil samples were found to exceed the most stringent ADEC Method 2 cleanup level for DRO. The maximum DRO concentration detected was 670 mg/kg. RRO, PAH, and VOC concentrations did not exceed the most stringent ADEC Method 2 cleanup levels. Because DRO exceeded ADEC levels in only two of 16 soil samples, a 95% UCL on the mean was calculated as the exposure point concentration. The calculation of the 95% UCL is discussed in Appendix D. The 95% UCL for DRO remaining in soils at UST 2060 is 180 mg/kg. This concentration is less than the most stringent ADEC Method 2 cleanup level. The maximum detected concentration of DRO at the site (670 mg/kg) is also less than the ADEC ingestion and inhalation criteria assuming residential use. Additionally, further soil removal activities along the eastern portion of the excavation are not practical because of potential impacts to the adjacent gravel road and small pond. Based on the results of the screening and the fact that the primary source of contamination has been removed, no further removal actions are recommended at this site.

6.36.7.4 UST UV-2664

A total of 10 soil samples and three groundwater samples collected from UST 2664 were subjected to the risk-based screening process. IRA activities conducted at the site in 1997 included removal of the 680-gallon UST and approximately 290 cy of POL-impacted soil.

Based on the results of this screening, no maximum detected concentrations of RRO, total xylenes, or PAHs in soil exceeded the most stringent ADEC Method 2 soil levels. Because one of the soil samples had a detected concentration of DRO (8,700 mg/kg) that exceeded the

Table 6-63
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2667
Amaknak and Unalaska Islands, Alaska

Sample Location:	2667-02	2667-03	2667-04
Sample Identification Number:	SW98AMA-2667-02SO	SW98AMA-2667-03SO	SW98AMA-2667-04SO
Date Sampled:	7/10/98	7/10/98	7/10/98
Sample Depth (feet):	4.8	7.5	7.1
Ethylbenzene	ND[0.094]	0.8	ND[0.14]
Xylenes	ND[0.28]	ND[0.51]	ND[0.42]
m,p-Xylene (Sum of Isomers)	ND[0.19]	ND[0.34]	ND[0.28]
o-Xylene	ND[0.094]	ND[0.17]	ND[0.14]

Table 6-63
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2667
Amaknak and Unalaska Islands, Alaska

Sample Location:	2667-02	2667-03	2667-04
Sample Identification Number:	SW98AMA-2667-02SO	SW98AMA-2667-03SO	SW98AMA-2667-04SO
Date Sampled:	7/10/98	7/10/98	7/10/98
Sample Depth (feet):	4.8	7.5	7.1
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	ND[0.028]	1.1	ND[0.04]
Acenaphthylene	ND[0.028]	ND[0.025]	ND[0.04]
Anthracene	ND[0.028]	ND[0.025]	ND[0.04]
Benzo(a)anthracene	ND[0.028]	ND[0.025]	ND[0.04]
Benzo(a)pyrene	ND[0.028]	ND[0.025]	ND[0.04]
Benzo(b)fluoranthene	ND[0.028]	ND[0.025]	ND[0.04]
Benzo(g,h,i)perylene	ND[0.028]	ND[0.025]	ND[0.04]
Benzo(k)fluoranthene	ND[0.028]	ND[0.025]	ND[0.04]
Chrysene	ND[0.028]	ND[0.025]	ND[0.04]
Dibenzo(a,h)anthracene	ND[0.028]	ND[0.025]	ND[0.04]
Fluorene	ND[0.028]	3.2	1.4
Fluoranthene	ND[0.028]	0.061	0.064
Indeno(1,2,3-cd)pyrene	ND[0.028]	ND[0.025]	ND[0.04]
2-Methylnaphthalene	ND[0.028]	10:::Z	0.13:::Z
Naphthalene	ND[0.028]	2.2	0.06
Phenanthrene	ND[0.028]	5.6:::Z	4.4:::Z
Pyrene	ND[0.028]	0.14	0.18
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	ND[7.5]	6600:::DZ	5800:::DZ
Residual Range Organics	ND[19]	ND[17]	ND[28]
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.094:::D]	ND[0.17:::D]	ND[0.14:::D]
Toluene	ND[0.094]	ND[0.17]	ND[0.14]
Chlorobenzene	ND[0.094]	ND[0.17]	ND[0.14]
1,2-Dichlorobenzene	ND[0.094]	1.3	ND[0.14]
1,3-Dichlorobenzene	ND[0.094]	0.85	0.14
1,4-Dichlorobenzene	ND[0.094]	0.57	ND[0.14]

Table 6-64
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2667
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: PAH - UNITS: MG/KG										
Acenaphthene	3	1	1.1	1.1	0.378	0.04	1.90E+02	D	none	0
Acenaphthylene	3	0			0.0155	0.04	none		none	0
Anthracene	3	0			0.0155	0.04	3.90E+03	D	none	0
Benzo(a)anthracene	3	0			0.0155	0.04	5.50E+00	D	none	0
Benzo(a)pyrene	3	0			0.0155	0.04	9.00E-01	D	none	0
Benzo(b)fluoranthene	3	0			0.0155	0.04	9.00E+00	D	none	0
Benzo(g,h,i)perylene	3	0			0.0155	0.04	none		none	0
Benzo(k)fluoranthene	3	0			0.0155	0.04	9.30E+01	D	none	0
Chrysene	3	0			0.0155	0.04	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	3	0			0.0155	0.04	9.00E-01	D	none	0
Fluorene	3	2	1.4	3.2	1.538	0.028	2.40E+02	D	none	0
Fluoranthene	3	2	0.061	0.064	0.0463	0.028	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	3	0			0.0155	0.04	9.00E+00	D	none	0
2-Methylnaphthalene	3	2	0.13::Z	10::Z	3.3813	0.028	none		none	0
Naphthalene	3	2	0.06	2.2	0.758	0.028	3.80E+01	D	none	0
Phenanthrene	3	2	4.4::Z	5.6::Z	3.338	0.028	none		none	0
Pyrene	3	2	0.14	0.18	0.1113	0.028	1.40E+03	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	3	2	5800::DZ	6600::DZ	4134.583	7.5	2.30E+02	D	none	2
Residual Range Organics	3	0			10.6667	28	8.30E+03	D	none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Benzene	3	0			0.0673	0.17	2.00E-02	D	none	0
Toluene	3	0			0.0673	0.17	4.80E+00	D	none	0
Chlorobenzene	3	0			0.0673	0.17	5.00E-01	D	none	0
1,2-Dichlorobenzene	3	1	1.3	1.3	0.4723	0.14	6.00E+00	D	none	0
1,3-Dichlorobenzene	3	2	0.14	0.85	0.3457	0.094	7.00E+00	D	none	0
1,4-Dichlorobenzene	3	1	0.57	0.57	0.229	0.14	7.00E-01	D	none	0
Ethylbenzene	3	1	0.8	0.8	0.3057	0.14	5.00E+00	D	none	0
Xylenes	3	0			0.2017	0.51	6.90E+01	D	none	0
m,p-Xylene (Sum of Isomers)	3	0			0.135	0.34	none		none	0
o-Xylene	3	0			0.0673	0.17	none		none	0

Table 6-63
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2667
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Risk based concentration.
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-65
Analytical Data Summary, Soil
Lower Unalaska Valley UST 1765
Amaknak and Unalaska Islands, Alaska

Sample Location:	1765-01	1765-02
Sample Identification Number:	SW98AMA-1765-01SO	SW98AMA-1765-02SO
Date Sampled:	7/24/98	7/24/98
Sample Depth (feet):	6	3.2-3.3
TEST GROUP: PAH - UNITS: MG/KG		
Acenaphthene	ND[0.0057]	NA
Acenaphthylene	ND[0.0057]	NA
Anthracene	ND[0.0057]	NA
Benzo(a)anthracene	ND[0.0057]	NA
Benzo(a)pyrene	ND[0.0057]	NA
Benzo(b)fluoranthene	ND[0.0057]	NA
Benzo(g,h,i)perylene	ND[0.0057]	NA
Benzo(k)fluoranthene	ND[0.0057]	NA
Chrysene	ND[0.0057]	NA
Dibenzo(a,h)anthracene	ND[0.0057]	NA
Fluorene	ND[0.0057]	NA
Fluoranthene	ND[0.0057]	NA
Indeno(1,2,3-cd)pyrene	ND[0.0057]	NA
2-Methylnaphthalene	ND[0.0057]	NA
Naphthalene	ND[0.0057]	NA
Phenanthrene	ND[0.0057]	NA
Pyrene	ND[0.0057]	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG		
Diesel Range Organics	23	ND[4.6]
Residual Range Organics	ND[11]	ND[11]
TEST GROUP: VOLATILES - UNITS: MG/KG		
Benzene	ND[0.05:::D]	ND[0.05:::D]
Toluene	ND[0.05]	ND[0.05]
Chlorobenzene	ND[0.05]	ND[0.05]
Ethylbenzene	ND[0.05]	ND[0.05]
m,p-Xylene (Sum of Isomers)	ND[0.1]	ND[0.1]
o-Xylene	ND[0.05]	ND[0.05]

Table 6-64
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2667
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-66
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 1765
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: PAH - UNITS: MG/KG										
Acenaphthene	1	0			0.0029	0.0057	1.90E+02	D	none	0
Acenaphthylene	1	0			0.0029	0.0057	none		none	0
Anthracene	1	0			0.0029	0.0057	3.90E+03	D	none	0
Benzo(a)anthracene	1	0			0.0029	0.0057	5.50E+00	D	none	0
Benzo(a)pyrene	1	0			0.0029	0.0057	9.00E-01	D	none	0
Benzo(b)fluoranthene	1	0			0.0029	0.0057	9.00E+00	D	none	0
Benzo(g,h,i)perylene	1	0			0.0029	0.0057	none		none	0
Benzo(k)fluoranthene	1	0			0.0029	0.0057	9.30E+01	D	none	0
Chrysene	1	0			0.0029	0.0057	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	1	0			0.0029	0.0057	9.00E-01	D	none	0
Fluorene	1	0			0.0029	0.0057	2.40E+02	D	none	0
Fluoranthene	1	0			0.0029	0.0057	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	1	0			0.0029	0.0057	9.00E+00	D	none	0
2-Methylnaphthalene	1	0			0.0029	0.0057	none		none	0
Naphthalene	1	0			0.0029	0.0057	3.80E+01	D	none	0
Phenanthrene	1	0			0.0029	0.0057	none		none	0
Pyrene	1	0			0.0029	0.0057	1.40E+03	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	2	1	23	23	12.65	4.6	2.30E+02	D	none	0
Residual Range Organics	2	0			5.5	11	8.30E+03	D	none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Benzene	2	0			0.025	0.05	2.00E-02	D	none	0
Toluene	2	0			0.025	0.05	4.80E+00	D	none	0
Chlorobenzene	2	0			0.025	0.05	5.00E-01	D	none	0
Ethylbenzene	2	0			0.025	0.05	5.00E+00	D	none	0
m,p-Xylene (Sum of Isomers)	2	0			0.05	0.1	none		none	0
o-Xylene	2	0			0.025	0.05	none		none	0

Table 6-65
Analytical Data Summary, Soil
Lower Unalaska Valley UST 1765
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Risk based concentration.
VOLATILES	Volatile organic compounds

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-01	2060-02	2060-03
Sample Identification Number:	SW98AMA-2060-01SO	SW98AMA-2060-02SO	SW98AMA-2060-03SO
Date Sampled:	8/27/98	8/27/98	8/27/98
Sample Depth (feet):	1.5-1.6	3.0-3.1	0
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA
Fluorene	NA	NA	NA
Fluoranthene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA
Naphthalene	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	ND[4.6]	150	28
Residual Range Organics	ND[11]	190	32
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.057:::D]	ND[0.11:::D]	ND[0.058:::D]
Toluene	ND[0.057]	ND[0.11]	ND[0.058]
Chlorobenzene	ND[0.057]	ND[0.11]	ND[0.058]
1,2-Dichlorobenzene	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA

Table 6-66
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 1765
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
VOLATILES	Volatile organic compounds

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-04	2060-05	2060-08
Sample Identification Number:	SW98AMA-2060-04SO	SW98AMA-2060-05SO	SW98AMA-2060-08SO
Date Sampled:	8/27/98	8/28/98	8/28/98
Sample Depth (feet):	2.0-2.1	3.0-3.1	3.0-3.1
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA
Fluorene	NA	NA	NA
Fluoranthene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA
Naphthalene	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	ND[4.4]	670:::DZ	ND[4.4]
Residual Range Organics	ND[11]	40	ND[11]
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.055:::D]	ND[0.059:::D]	ND[0.055:::D]
Toluene	ND[0.055]	ND[0.059]	ND[0.055]
Chlorobenzene	ND[0.055]	ND[0.059]	ND[0.055]
1,2-Dichlorobenzene	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-01	2060-02	2060-03
Sample Identification Number:	SW98AMA-2060-01SO	SW98AMA-2060-02SO	SW98AMA-2060-03SO
Date Sampled:	8/27/98	8/27/98	8/27/98
Sample Depth (feet):	1.5-1.6	3.0-3.1	0
Ethylbenzene	ND[0.057]	ND[0.11]	ND[0.058]
Xylenes	NA	NA	NA
m,p-Xylene (Sum of Isomers)	ND[0.11]	ND[0.22]	ND[0.12]
o-Xylene	ND[0.057]	ND[0.11]	ND[0.058]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-09	2060-10	2060-11
Sample Identification Number:	SW98AMA-2060-09SO	SW98AMA-2060-10SO	SW98AMA-2060-11SO
Date Sampled:	8/28/98	8/28/98	8/28/98
Sample Depth (feet):	3.1-3.2	4.0-4.1	4.0-4.1
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA
Fluorene	NA	NA	NA
Fluoranthene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA
Naphthalene	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	41	89	48
Residual Range Organics	27	84	35
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.059:::D]	ND[0.1:::D]	ND[0.077:::D]
Toluene	ND[0.059]	ND[0.1]	ND[0.077]
Chlorobenzene	ND[0.059]	ND[0.1]	ND[0.077]
1,2-Dichlorobenzene	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	**2060-04**	**2060-05**	**2060-08**
Sample Identification Number:	**SW98AMA-2060-04SO**	**SW98AMA-2060-05SO**	**SW98AMA-2060-08SO**
Date Sampled:	**8/27/98**	**8/28/98**	**8/28/98**
Sample Depth (feet):	**2.0-2.1**	**3.0-3.1**	**3.0-3.1**
Ethylbenzene	ND[0.055]	ND[0.059]	ND[0.055]
Xylenes	NA	NA	NA
m,p-Xylene (Sum of Isomers)	ND[0.11]	ND[0.12]	ND[0.11]
o-Xylene	ND[0.055]	ND[0.059]	ND[0.055]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-12	2060-13	2060-19
Sample Identification Number:	SW98AMA-2060-12SO	SW98AMA-2060-13SO	SW98AMA-2060-19SO
Date Sampled:	8/30/98	8/30/98	9/10/98
Sample Depth (feet):	4.5-4.6	1.5-1.6	1.5-1.6
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA
Fluorene	NA	NA	NA
Fluoranthene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA
Naphthalene	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	ND[6.9]	94	360:::DZ
Residual Range Organics	ND[17]	41	63
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.086:::D]	ND[0.14:::D]	ND[0.057:::D]
Toluene	ND[0.086]	ND[0.14]	ND[0.057]
Chlorobenzene	ND[0.086]	ND[0.14]	ND[0.057]
1,2-Dichlorobenzene	NA	NA	ND[0.057]
1,3-Dichlorobenzene	NA	NA	ND[0.057]
1,4-Dichlorobenzene	NA	NA	ND[0.057]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-09	2060-10	2060-11
Sample Identification Number:	SW98AMA-2060-09SO	SW98AMA-2060-10SO	SW98AMA-2060-11SO
Date Sampled:	8/28/98	8/28/98	8/28/98
Sample Depth (feet):	3.1-3.2	4.0-4.1	4.0-4.1
Ethylbenzene	ND[0.059]	ND[0.1]	ND[0.077]
Xylenes	NA	NA	NA
m,p-Xylene (Sum of Isomers)	ND[0.12]	ND[0.2]	ND[0.15]
o-Xylene	ND[0.059]	ND[0.1]	ND[0.077]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-20	2060-21	2060-22
Sample Identification Number:	SW98AMA-2060-20SO	SW98AMA-2060-21SO	SW98AMA-2060-22SO
Date Sampled:	9/10/98	9/10/98	9/10/98
Sample Depth (feet):	1.8-1.9	1.0-1.5	1.4-1.6
TEST GROUP: PAH - UNITS: MG/KG			
Acenaphthene	NA	ND[0.01]	NA
Acenaphthylene	NA	ND[0.01]	NA
Anthracene	NA	ND[0.01]	NA
Benzo(a)anthracene	NA	ND[0.01]	NA
Benzo(a)pyrene	NA	0.14	NA
Benzo(b)fluoranthene	NA	ND[0.01]	NA
Benzo(g,h,i)perylene	NA	ND[0.01]	NA
Benzo(k)fluoranthene	NA	ND[0.01]	NA
Chrysene	NA	ND[0.01]	NA
Dibenzo(a,h)anthracene	NA	ND[0.01]	NA
Fluorene	NA	ND[0.01]	NA
Fluoranthene	NA	ND[0.01]	NA
Indeno(1,2,3-cd)pyrene	NA	ND[0.01]	NA
2-Methylnaphthalene	NA	ND[0.01]	NA
Naphthalene	NA	ND[0.01]	NA
Phenanthrene	NA	ND[0.01]	NA
Pyrene	NA	ND[0.01]	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG			
Diesel Range Organics	61	73	13
Residual Range Organics	ND[120]	70	ND[22]
TEST GROUP: VOLATILES - UNITS: MG/KG			
Benzene	ND[0.059:::D]	ND[0.1:::D]	ND[0.11:::D]
Toluene	ND[0.059]	ND[0.1]	ND[0.11]
Chlorobenzene	ND[0.059]	ND[0.1]	ND[0.11]
1,2-Dichlorobenzene	ND[0.059]	ND[0.1]	ND[0.11]
1,3-Dichlorobenzene	ND[0.059]	ND[0.1]	ND[0.11]
1,4-Dichlorobenzene	ND[0.059]	ND[0.1]	ND[0.11]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-12	2060-13	2060-19
Sample Identification Number:	SW98AMA-2060-12SO	SW98AMA-2060-13SO	SW98AMA-2060-19SO
Date Sampled:	8/30/98	8/30/98	9/10/98
Sample Depth (feet):	4.5-4.6	1.5-1.6	1.5-1.6
Ethylbenzene	ND[0.086]	ND[0.14]	ND[0.057]
Xylenes	NA	NA	ND[0.17]
m,p-Xylene (Sum of Isomers)	ND[0.17]	ND[0.29]	ND[0.11]
o-Xylene	ND[0.086]	ND[0.14]	ND[0.057]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-23
Sample Identification Number:	SW98AMA-2060-23SO
Date Sampled:	9/10/98
Sample Depth (feet):	3.5-3.6
TEST GROUP: PAH - UNITS: MG/KG	
Acenaphthene	ND[0.01]
Acenaphthylene	ND[0.01]
Anthracene	ND[0.01]
Benzo(a)anthracene	ND[0.01]
Benzo(a)pyrene	0.062
Benzo(b)fluoranthene	ND[0.01]
Benzo(g,h,i)perylene	ND[0.01]
Benzo(k)fluoranthene	ND[0.01]
Chrysene	ND[0.01]
Dibenzo(a,h)anthracene	ND[0.01]
Fluorene	ND[0.01]
Fluoranthene	ND[0.01]
Indeno(1,2,3-cd)pyrene	ND[0.01]
2-Methylnaphthalene	ND[0.01]
Naphthalene	0.0071
Phenanthrene	ND[0.01]
Pyrene	ND[0.01]
TEST GROUP: PETROLEUM - UNITS: MG/KG	
Diesel Range Organics	ND[8.3]
Residual Range Organics	ND[21]
TEST GROUP: VOLATILES - UNITS: MG/KG	
Benzene	ND[0.1:::D]
Toluene	ND[0.1]
Chlorobenzene	ND[0.1]
1,2-Dichlorobenzene	ND[0.1]
1,3-Dichlorobenzene	ND[0.1]
1,4-Dichlorobenzene	ND[0.1]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	2060-20	2060-21	2060-22
Sample Identification Number:	SW98AMA-2060-20SO	SW98AMA-2060-21SO	SW98AMA-2060-22SO
Date Sampled:	9/10/98	9/10/98	9/10/98
Sample Depth (feet):	1.8-1.9	1.0-1.5	1.4-1.6
Ethylbenzene	ND[0.059]	ND[0.1]	ND[0.11]
Xylenes	ND[0.18]	ND[0.3]	ND[0.33]
m,p-Xylene (Sum of Isomers)	ND[0.12]	ND[0.2]	ND[0.22]
o-Xylene	ND[0.059]	ND[0.1]	ND[0.11]

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Risk based concentration.
VOLATILES	Volatile organic compounds

Table 6-67
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

Sample Location:	**2060-23**
Sample Identification Number:	**SW98AMA-2060-23SO**
Date Sampled:	**9/10/98**
Sample Depth (feet):	**3.5-3.6**
Ethylbenzene	ND[0.1]
Xylenes	ND[0.31]
m,p-Xylene (Sum of Isomers)	ND[0.21]
o-Xylene	ND[0.1]

Table 6-68
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
VOLATILES	Volatile organic compounds

Table 6-68
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2060
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: PAH - UNITS: MG/KG										
Acenaphthene	2	0			0.005	0.01	1.90E+02	D	none	0
Acenaphthylene	2	0			0.005	0.01	none		none	0
Anthracene	2	0			0.005	0.01	3.90E+03	D	none	0
Benzo(a)anthracene	2	0			0.005	0.01	5.50E+00	D	none	0
Benzo(a)pyrene	2	2	0.062	0.14	0.101	**	9.00E-01	D	none	0
Benzo(b)fluoranthene	2	0			0.005	0.01	9.00E+00	D	none	0
Benzo(g,h,i)perylene	2	0			0.005	0.01	none		none	0
Benzo(k)fluoranthene	2	0			0.005	0.01	9.30E+01	D	none	0
Chrysene	2	0			0.005	0.01	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	2	0			0.005	0.01	9.00E-01	D	none	0
Fluorene	2	0			0.005	0.01	2.40E+02	D	none	0
Fluoranthene	2	0			0.005	0.01	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	2	0			0.005	0.01	9.00E+00	D	none	0
2-Methylnaphthalene	2	0			0.005	0.01	none		none	0
Naphthalene	2	1	0.0071	0.0071	0.006	0.01	3.80E+01	D	none	0
Phenanthrene	2	0			0.005	0.01	none		none	0
Pyrene	2	0			0.005	0.01	1.40E+03	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	16	11	13	670 DZ	102.5812	8.3	2.30E+02	D	none	2
Residual Range Organics	16	9	27	190	43.0313	120	8.30E+03	D	none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Benzene	16	0			0.0401	0.14	2.00E-02	D	none	0
Toluene	16	0			0.0401	0.14	4.80E+00	D	none	0
Chlorobenzene	16	0			0.0401	0.14	5.00E-01	D	none	0
1,2-Dichlorobenzene	5	0			0.0426	0.11	6.00E+00	D	none	0
1,3-Dichlorobenzene	5	0			0.0426	0.11	7.00E+00	D	none	0
1,4-Dichlorobenzene	5	0			0.0426	0.11	7.00E-01	D	none	0
Ethylbenzene	16	0			0.0401	0.14	5.00E+00	D	none	0
Xylenes	5	0			0.129	0.33	6.90E+01	D	none	0
m,p-Xylene (Sum of Isomers)	16	0			0.0806	0.29	none		none	0
o-Xylene	16	0			0.0401	0.14	none		none	0

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-01	2664-02	2664-03	2664-06
Sample Identification Number:	97AMA-2664-01SO	97AMA-2664-02SO	97AMA-2664-03SO	97AMA-2664-06SO
Date Sampled:	9/20/97	9/20/97	9/20/97	9/20/97
Sample Depth (feet):	3.4	7.5	6.5-7.0	7.0-7.2
Acenaphthylene	NA	NA	0.049:::Z	NA
Anthracene	NA	NA	0.29	NA
Benzo(a)anthracene	NA	NA	0.045	NA
Benzo(a)pyrene	NA	NA	0.0084	NA
Benzo(b)fluoranthene	NA	NA	0.01	NA
Benzo(g,h,i)perylene	NA	NA	ND[0.031]	NA
Benzo(k)fluoranthene	NA	NA	0.0095	NA
Chrysene	NA	NA	0.046	NA
Dibenzo(a,h)anthracene	NA	NA	ND[0.031]	NA
Fluorene	NA	NA	ND[0.031]	NA
Fluoranthene	NA	NA	0.053	NA
Indeno(1,2,3-cd)pyrene	NA	NA	ND[0.031]	NA
2-Methylnaphthalene	NA	NA	ND[0.031]	NA
Naphthalene	NA	NA	0.041	NA
Phenanthrene	NA	NA	ND[0.031]	NA
Pyrene	NA	NA	0.12	NA
TEST GROUP: VOLATILES - UNITS: MG/KG				
Benzene	NA	NA	NA	NA
Toluene	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA
m,p-Xylene (Sum of Isomers)	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-01	2664-02	2664-03	2664-06
Sample Identification Number:	97AMA-2664-01SO	97AMA-2664-02SO	97AMA-2664-03SO	97AMA-2664-06SO
Date Sampled:	9/20/97	9/20/97	9/20/97	9/20/97
Sample Depth (feet):	3.4	7.5	6.5-7.0	7.0-7.2
TEST GROUP: AROMATICS - UNITS: MG/KG				
Benzene	ND[0.0128]	ND[0.0115]	ND[0.0625:::D]	ND[0.0192]
Toluene	ND[0.0128]	ND[0.0115]	ND[0.0625]	ND[0.0192]
Ethylbenzene	ND[0.0128]	ND[0.0115]	ND[0.0625]	ND[0.0192]
Xylenes	ND[0.0385]	ND[0.0345]	0.222	ND[0.0577]
TEST GROUP: PAH - UNITS: MG/KG				
Acenaphthene	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG				
Diesel Range Organics	260:::DZ	29	8700:::DZ	ND[7.7]
Residual Range Organics	85	14	ND[250]	ND[19]
TEST GROUP: SEMI-VOA - UNITS: MG/KG				
Acenaphthene	NA	NA	ND[0.031]	NA

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	NPW-B2-02
Sample Identification Number:	NPW-B2-02S
Date Sampled:	11/5/98
Sample Depth (feet):	20.0-22.0
Acenaphthylene	NA
Anthracene	NA
Benzo(a)anthracene	NA
Benzo(a)pyrene	NA
Benzo(b)fluoranthene	NA
Benzo(g,h,i)perylene	NA
Benzo(k)fluoranthene	NA
Chrysene	NA
Dibenzo(a,h)anthracene	NA
Fluorene	NA
Fluoranthene	NA
Indeno(1,2,3-cd)pyrene	NA
2-Methylnaphthalene	NA
Naphthalene	NA
Phenanthrene	NA
Pyrene	NA
TEST GROUP: VOLATILES - UNITS: MG/KG	
Benzene	ND[0.058:::D]
Toluene	ND[0.058]
Chlorobenzene	ND[0.058]
1,2-Dichlorobenzene	ND[0.058]
1,3-Dichlorobenzene	ND[0.058]
1,4-Dichlorobenzene	ND[0.058]
Ethylbenzene	ND[0.058]
Xylenes	ND[0.17]
m,p-Xylene (Sum of Isomers)	ND[0.12]
o-Xylene	ND[0.058]

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	NPW-B2-02
Sample Identification Number:	NPW-B2-02S
Date Sampled:	11/5/98
Sample Depth (feet):	20.0-22.0
TEST GROUP: AROMATICS - UNITS: MG/KG	
Benzene	NA
Toluene	NA
Ethylbenzene	NA
Xylenes	NA
TEST GROUP: PAH - UNITS: MG/KG	
Acenaphthene	NA
Acenaphthylene	NA
Anthracene	NA
Benzo(a)anthracene	NA
Benzo(a)pyrene	NA
Benzo(b)fluoranthene	NA
Benzo(g,h,i)perylene	NA
Benzo(k)fluoranthene	NA
Chrysene	NA
Dibenzo(a,h)anthracene	NA
Fluorene	NA
Fluoranthene	NA
Indeno(1,2,3-cd)pyrene	NA
2-Methylnaphthalene	NA
Naphthalene	NA
Phenanthrene	NA
Pyrene	NA
TEST GROUP: PETROLEUM - UNITS: MG/KG	
Diesel Range Organics	ND[4.7]
Residual Range Organics	ND[12]
TEST GROUP: SEMI-VOA - UNITS: MG/KG	
Acenaphthene	NA

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-07	2664-08	NPW-B1-01	NPW-B1-02	NPW-B2-01
Sample Identification Number:	97AMA-2664-07SO	97AMA-2664-08SO	NPW-B1-01S	NPW-B1-02S	NPW-B2-01S
Date Sampled:	9/20/97	9/20/97	11/5/98	11/5/98	11/5/98
Sample Depth (feet):	8.0-8.2	8	5.0-7.0	10.0-12.0	10.0-12.0
Acenaphthylene	ND[0.0093]	NA	NA	NA	NA
Anthracene	ND[0.0093]	NA	NA	NA	NA
Benzo(a)anthracene	ND[0.0093]	NA	NA	NA	NA
Benzo(a)pyrene	ND[0.0093]	NA	NA	NA	NA
Benzo(b)fluoranthene	ND[0.0093]	NA	NA	NA	NA
Benzo(g,h,i)perylene	ND[0.0093]	NA	NA	NA	NA
Benzo(k)fluoranthene	ND[0.0093]	NA	NA	NA	NA
Chrysene	ND[0.0093]	NA	NA	NA	NA
Dibenzo(a,h)anthracene	ND[0.0093]	NA	NA	NA	NA
Fluorene	ND[0.0093]	NA	NA	NA	NA
Fluoranthene	ND[0.0093]	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	ND[0.0093]	NA	NA	NA	NA
2-Methylnaphthalene	ND[0.0093]	NA	NA	NA	NA
Naphthalene	ND[0.0093]	NA	NA	NA	NA
Phenanthrene	ND[0.0093]	NA	NA	NA	NA
Pyrene	ND[0.0093]	NA	NA	NA	NA
TEST GROUP: VOLATILES - UNITS: MG/KG					
Benzene	NA	NA	ND[0.062:::D]	ND[0.081:::D]	ND[0.083:::D]
Toluene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
Chlorobenzene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
1,2-Dichlorobenzene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
1,3-Dichlorobenzene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
1,4-Dichlorobenzene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
Ethylbenzene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]
Xylenes	NA	NA	ND[0.19]	ND[0.24]	ND[0.25]
m,p-Xylene (Sum of Isomers)	NA	NA	ND[0.12]	ND[0.16]	ND[0.17]
o-Xylene	NA	NA	ND[0.062]	ND[0.081]	ND[0.083]

Table 6-70
Analytical Data Summary, Groundwater
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-01	NPW-B1-06	NPW-B2-03
Sample Identification Number:	2664-01WG	NPW-B1-06WG	NPW-B2-03WG
Date Sampled:	12/9/98	11/23/98	11/25/98
TEST GROUP: PAH - UNITS: UG/L			
Acenaphthene	ND[0.05]	ND[0.05]	ND[0.05]
Acenaphthylene	ND[0.05]	ND[0.05]	ND[0.05]
Anthracene	ND[0.05]	ND[0.05]	ND[0.05]
Benzo(a)anthracene	ND[0.05]	ND[0.05]	ND[0.05]
Benzo(a)pyrene	ND[0.05]	ND[0.05]	ND[0.05]
Benzo(b)fluoranthene	ND[0.05]	ND[0.05]	ND[0.05]
Benzo(g,h,i)perylene	ND[0.05]	ND[0.05]	ND[0.05]
Benzo(k)fluoranthene	ND[0.05]	ND[0.05]	ND[0.05]
Chrysene	ND[0.05]	ND[0.05]	ND[0.05]
Dibenzo(a,h)anthracene	ND[0.05]	ND[0.05]	ND[0.05]
Fluorene	0.59	ND[0.05]	ND[0.05]
Fluoranthene	ND[0.05]	ND[0.05]	ND[0.05]
Indeno(1,2,3-cd)pyrene	ND[0.05]	ND[0.05]	ND[0.05]
Naphthalene	0.11	ND[0.05]	0.065
Phenanthrene	0.14:::Z	ND[0.05]	ND[0.05]
Pyrene	ND[0.05]	ND[0.05]	ND[0.05]
TEST GROUP: PETROLEUM - UNITS: MG/L			
Diesel Range Organics	0.37	ND[0.1]	ND[0.1]
Residual Range Organics	ND[0.2]	ND[0.25]	ND[0.25]
TEST GROUP: VOLATILES - UNITS: UG/L			
Benzene	ND[1]	ND[1]	ND[1]
Toluene	ND[1]	ND[1]	ND[1]
Chlorobenzene	ND[1]	ND[1]	ND[1]
1,2-Dichlorobenzene	ND[1]	ND[1]	ND[1]
1,3-Dichlorobenzene	ND[1]	ND[1]	ND[1]
1,4-Dichlorobenzene	ND[1]	ND[1]	ND[1]
Ethylbenzene	ND[1]	ND[1]	ND[1]
Xylenes	3.7	ND[3]	ND[3]

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-07	2664-08	NPW-B1-01	NPW-B1-02	NPW-B2-01
Sample Identification Number:	97AMA-2664-07SO	97AMA-2664-08SO	NPW-B1-01S	NPW-B1-02S	NPW-B2-01S
Date Sampled:	9/20/97	9/20/97	11/5/98	11/5/98	11/5/98
Sample Depth (feet):	8.0-8.2	8	5.0-7.0	10.0-12.0	10.0-12.0
TEST GROUP: AROMATICS - UNITS: MG/KG					
Benzene	ND[0.0185]	ND[0.0112]	NA	NA	NA
Toluene	ND[0.0185]	ND[0.0112]	NA	NA	NA
Ethylbenzene	ND[0.0185]	ND[0.0112]	NA	NA	NA
Xylenes	ND[0.0556]	ND[0.0337]	NA	NA	NA
TEST GROUP: PAH - UNITS: MG/KG					
Acenaphthene	NA	NA	NA	ND[0.0081]	ND[0.083]
Acenaphthylene	NA	NA	NA	ND[0.0081]	ND[0.083]
Anthracene	NA	NA	NA	ND[0.0081]	ND[0.083]
Benzo(a)anthracene	NA	NA	NA	ND[0.0081]	ND[0.083]
Benzo(a)pyrene	NA	NA	NA	ND[0.0081]	0.36
Benzo(b)fluoranthene	NA	NA	NA	ND[0.0081]	ND[0.083]
Benzo(g,h,i)perylene	NA	NA	NA	ND[0.0081]	ND[0.083]
Benzo(k)fluoranthene	NA	NA	NA	ND[0.0081]	ND[0.083]
Chrysene	NA	NA	NA	ND[0.0081]	ND[0.083]
Dibenzo(a,h)anthracene	NA	NA	NA	ND[0.0081]	ND[0.083]
Fluorene	NA	NA	NA	ND[0.0081]	ND[0.083]
Fluoranthene	NA	NA	NA	ND[0.0081]	ND[0.083]
Indeno(1,2,3-cd)pyrene	NA	NA	NA	ND[0.0081]	ND[0.083]
2-Methylnaphthalene	NA	NA	NA	ND[0.0081]	ND[0.083]
Naphthalene	NA	NA	NA	ND[0.0081]	ND[0.083]
Phenanthrene	NA	NA	NA	ND[0.0081]	ND[0.083]
Pyrene	NA	NA	NA	ND[0.0081]	ND[0.083]
TEST GROUP: PETROLEUM - UNITS: MG/KG					
Diesel Range Organics	ND[7.4]	ND[4.5]	ND[4.9]	ND[6.5]	7.7
Residual Range Organics	ND[19]	ND[11]	ND[12]	ND[16]	40
TEST GROUP: SEMI-VOA - UNITS: MG/KG					
Acenaphthene	ND[0.0093]	NA	NA	NA	NA

Table 6-70
Analytical Data Summary, Groundwater
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
MG/L	Milligrams per liter
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Risk based concentration.
UG/L	Micrograms per liter
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-69
Analytical Data Summary, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Risk based concentration.
SEMI-VOA	Semivolatile organic compounds
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-71
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
Naphthalene	2	1	0.041	0.041	0.0228	0.0093	3.80E+01	D	none	0
Phenanthrene	2	0			0.0101	0.031	none		none	0
Pyrene	2	1	0.12	0.12	0.0623	0.0093	1.40E+03	D	none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Benzene	4	0			0.0355	0.083	2.00E-02	D	none	0
Toluene	4	0			0.0355	0.083	4.80E+00	D	none	0
Chlorobenzene	4	0			0.0355	0.083	5.00E-01	D	none	0
1,2-Dichlorobenzene	4	0			0.0355	0.083	6.00E+00	D	none	0
1,3-Dichlorobenzene	4	0			0.0355	0.083	7.00E+00	D	none	0
1,4-Dichlorobenzene	4	0			0.0355	0.083	7.00E-01	D	none	0
Ethylbenzene	4	0			0.0355	0.083	5.00E+00	D	none	0
Xylenes	4	0			0.1063	0.25	6.90E+01	D	none	0
m,p-Xylene (Sum of Isomers)	4	0			0.0712	0.17	none		none	0
o-Xylene	4	0			0.0355	0.083	none		none	0

Table 6-70
Analytical Data Summary, Groundwater
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

Sample Location:	2664-01	NPW-B1-06	NPW-B2-03
Sample Identification Number:	2664-01WG	NPW-B1-06WG	NPW-B2-03WG
Date Sampled:	12/9/98	11/23/98	11/25/98
m,p-Xylene (Sum of Isomers)	3.7:::Z	ND[2]	ND[2]
o-Xylene	ND[1]	ND[1]	ND[1]

Table 6-71
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AROMATICS - UNITS: MG/KG										
Benzene	6	0			0.0113	0.0625	2.00E-02	D	none	0
Toluene	6	0			0.0113	0.0625	4.80E+00	D	none	0
Ethylbenzene	6	0			0.0113	0.0625	5.00E+00	D	none	0
Xylenes	6	1	0.222	0.222	0.0553	0.0577	6.90E+01	D	none	0
TEST GROUP: PAH - UNITS: MG/KG										
Acenaphthene	2	0			0.0228	0.083	1.90E+02	D	none	0
Acenaphthylene	2	0			0.0228	0.083	none		none	0
Anthracene	2	0			0.0228	0.083	3.90E+03	D	none	0
Benzo(a)anthracene	2	0			0.0228	0.083	5.50E+00	D	none	0
Benzo(a)pyrene	2	1	0.36	0.36	0.182	0.0081	9.00E-01	D	none	0
Benzo(b)fluoranthene	2	0			0.0228	0.083	9.00E+00	D	none	0
Benzo(g,h,i)perylene	2	0			0.0228	0.083	none		none	0
Benzo(k)fluoranthene	2	0			0.0228	0.083	9.30E+01	D	none	0
Chrysene	2	0			0.0228	0.083	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	2	0			0.0228	0.083	9.00E-01	D	none	0
Fluorene	2	0			0.0228	0.083	2.40E+02	D	none	0
Fluoranthene	2	0			0.0228	0.083	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	2	0			0.0228	0.083	9.00E+00	D	none	0
2-Methylnaphthalene	2	0			0.0228	0.083	none		none	0
Naphthalene	2	0			0.0228	0.083	3.80E+01	D	none	0
Phenanthrene	2	0			0.0228	0.083	none		none	0
Pyrene	2	0			0.0228	0.083	1.40E+03	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	10	4	7.7	8700 DZ	901.455	7.7	2.30E+02	D	none	2
Residual Range Organics	10	3	14	85	30.85	250	8.30E+03	D	none	0
TEST GROUP: SEMI-VOA - UNITS: MG/KG										
Acenaphthene	2	0			0.0101	0.031	1.90E+02	D	none	0
Acenaphthylene	2	1	0.049 Z	0.049 Z	0.0268	0.0093	none		none	0
Anthracene	2	1	0.29	0.29	0.1473	0.0093	3.90E+03	D	none	0
Benzo(a)anthracene	2	1	0.045	0.045	0.0248	0.0093	5.50E+00	D	none	0
Benzo(a)pyrene	2	1	0.0084	0.0084	0.0065	0.0093	9.00E-01	D	none	0
Benzo(b)fluoranthene	2	1	0.01	0.01	0.0073	0.0093	9.00E+00	D	none	0
Benzo(g,h,i)perylene	2	0			0.0101	0.031	none		none	0
Benzo(k)fluoranthene	2	1	0.0095	0.0095	0.0071	0.0093	9.30E+01	D	none	0
Chrysene	2	1	0.046	0.046	0.0253	0.0093	5.50E+02	D	none	0
Dibenzo(a,h)anthracene	2	0			0.0101	0.031	9.00E-01	D	none	0
Fluorene	2	0			0.0101	0.031	2.40E+02	D	none	0
Fluoranthene	2	1	0.053	0.053	0.0288	0.0093	1.90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	2	0			0.0101	0.031	9.00E+00	D	none	0
2-Methylnaphthalene	2	0			0.0101	0.031	none		none	0

Table 6-72
Compounds of Potential Concern, Groundwater
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: PAH - UNITS: UG/L										
Acenaphthene	3	0			0.025	0.05	2.20E+03	D	none	0
Acenaphthylene	3	0			0.025	0.05	none		none	0
Anthracene	3	0			0.025	0.05	1.10E+04	D	none	0
Benzo(a)anthracene	3	0			0.025	0.05	1.00E+00	D	none	0
Benzo(a)pyrene	3	0			0.025	0.05	2.00E-01	D	none	0
Benzo(b)fluoranthene	3	0			0.025	0.05	1.00E+00	D	none	0
Benzo(g,h,i)perylene	3	0			0.025	0.05	none		none	0
Benzo(k)fluoranthene	3	0			0.025	0.05	1.00E+01	D	none	0
Chrysene	3	0			0.025	0.05	1.00E+02	D	none	0
Dibenzo(a,h)anthracene	3	0			0.025	0.05	1.00E-01	D	none	0
Fluorene	3	1	0.59	0.59	0.2133	0.05	1.46E+03	D	none	0
Fluoranthene	3	0			0.025	0.05	1.46E+03	D	none	0
Indeno(1,2,3-cd)pyrene	3	0			0.025	0.05	1.00E+00	D	none	0
Naphthalene	3	2	0.065	0.11	0.0667	0.05	1.46E+03	D	none	0
Phenanthrene	3	1	0.14:::Z	0.14:::Z	0.0633	0.05	none		none	0
Pyrene	3	0			0.025	0.05	1.10E+03	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/L										
Diesel Range Organics	3	1	0.37	0.37	0.1567	0.1	1.50E+00	D	none	0
Residual Range Organics	3	0			0.1167	0.25	1.10E+00	D	none	0
TEST GROUP: VOLATILES - UNITS: UG/L										
Benzene	3	0			0.5	1	5.00E+00	D	none	0
Toluene	3	0			0.5	1	1.00E+03	D	none	0
Chlorobenzene	3	0			0.5	1	1.00E+02	D	none	0
1,2-Dichlorobenzene	3	0			0.5	1	6.00E+02	D	none	0
1,3-Dichlorobenzene	3	0			0.5	1	none		none	0
1,4-Dichlorobenzene	3	0			0.5	1	7.50E+01	D	none	0
Ethylbenzene	3	0			0.5	1	7.00E+02	D	none	0
Xylenes	3	1	3.7	3.7	2.2333	3	1.00E+04	D	none	0
m,p-Xylene (Sum of Isomers)	3	1	3.7:::Z	3.7:::Z	1.9	2	none		none	0
o-Xylene	3	0			0.5	1	none		none	0

Table 6-71
Compounds of Potential Concern, Soil
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
DZ	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. There is no respective background concentration for this compound. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SEMI-VOA	Semivolatile organic compounds
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-72
Compounds of Potential Concern, Groundwater
Lower Unalaska Valley UST 2664
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
MG/L	Milligrams per liter
PAH	Polynuclear Aromatic Hydrocarbons
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
UG/L	Micrograms per liter
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

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6.45 UPPER PYRAMID VALLEY DRUMS

Pyramid Valley is located southeast of Captains Bay, approximately 2 miles southwest of the City of Unalaska on Unalaska Island (Figure 3-7). The Upper Pyramid Valley Drums (UPVD) site is located about midway up Icy Creek, on the southwest flank of Pyramid Peak (Figure 6-108). At the UPVD site, SI/IRA activities conducted during the 1998 field season included site reconnaissance, sampling and characterization of site soils, and removal and disposal of drums.

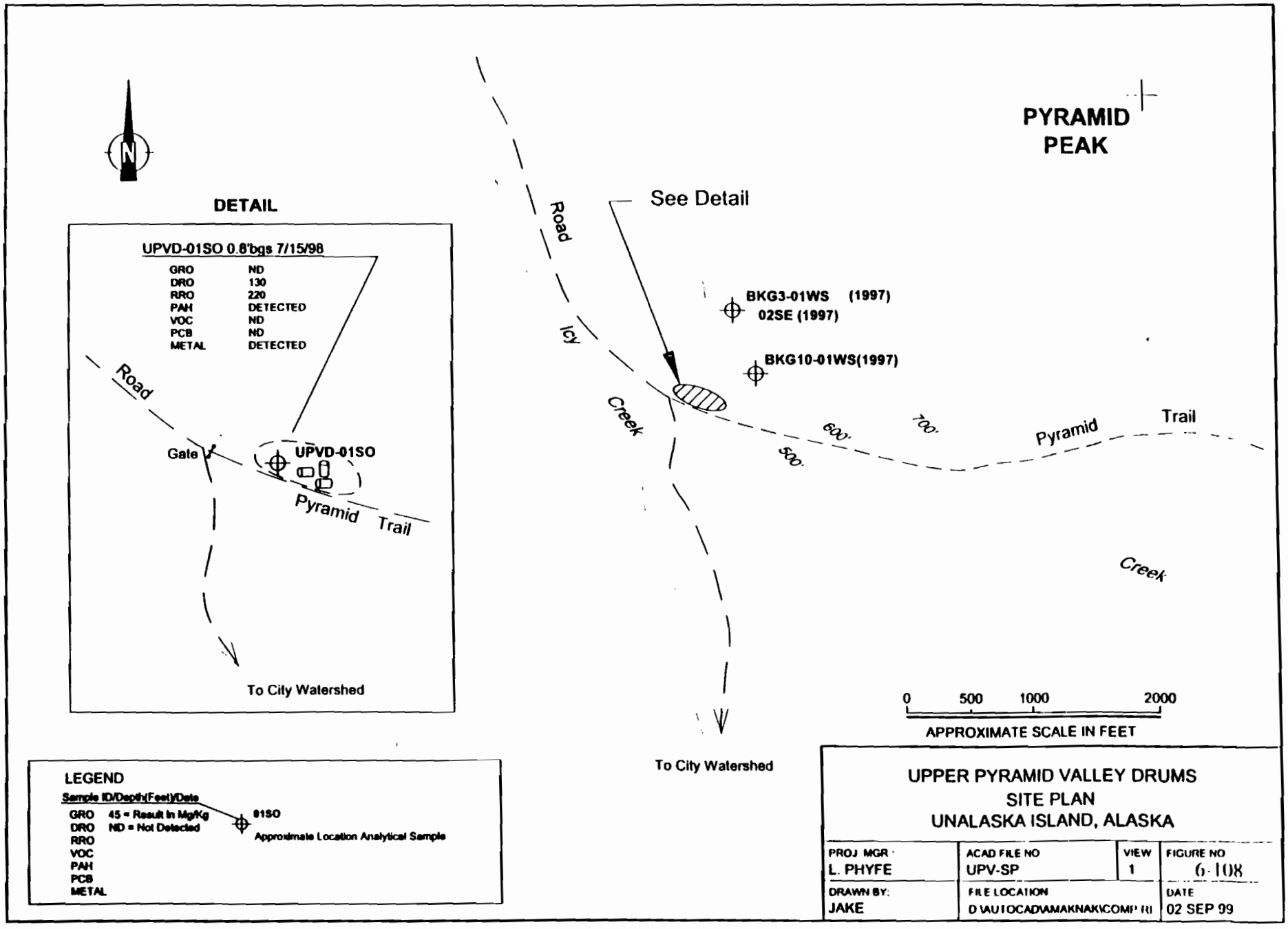
6.45.1 Site Description

The drum site is likely a remnant of the U.S. Army's Unalaska Garrison, which was established in the Pyramid Valley after the June 1942 bombing of Amaknak Island. The drums were marked with "U.S.QMC" indicating military origin. This drum site is similar to but smaller than the Port Levashef drums site discussed in Section 6.44 (USAED 1998e).

The UPVD site is located near the fork at the end of the Pyramid Valley Road. The site is situated approximately 100 yards past the locked gate limiting access to the east road, "Pyramid Trail," at the fork. The south turn at the fork leads to the City of Unalaska's Icy Creek Watershed fresh drinking water retention dam. Approximately 14 steel bung-top drums were visible in a shallow depression, partially buried and hidden by native grasses and plants. The site is in peat wetlands with water flowing through and around the drums. Rust coloration and a biogenic sheen were present at this location. The drums were mostly empty or contained limited quantities of residual rust, water, and soil (USAED 1998e).

6.45.2 Previous Investigations

There are no known previous investigations specifically established to characterize this site. The actual UPVD site was discovered during 1997 field season activities in the upper portion of the Pyramid Valley. A background surface water and sediment sample was collected a few hundred yards upslope of the drums in 1997 (USAED 1999e).


N
DETAIL
UPVD-01SO 0.8'bgs 7/15/98
GRO ND
DRO 130
RRO 220
PAH DETECTED
VOC ND
PCB ND
METAL DETECTED
Road
Gate
UPVD-01SO
Pyramid Trail
To City Watershed
PYRAMID PEAK
See Detail
Road
Icy Creek
BKG3-01WS (1997)
02SE (1997)
BKG10-01WS(1997)
600'
700'
500'
Pyramid Trail
Creek
To City Watershed
0 500 1000 2000
APPROXIMATE SCALE IN FEET
LEGEND
Sample ID/Depth(Feet)/Date
GRO 45 = Result In Mg/Kg
DRO ND = Not Detected
RRO
VOC
PAH
PCB
METAL
01SO
Approximate Location Analytical Sample
UPPER PYRAMID VALLEY DRUMS
SITE PLAN
UNALASKA ISLAND, ALASKA
PROJ MGR: L. PHYFE
ACAD FILE NO: UPV-SP
VIEW: 1
FIGURE NO: 6-108
DRAWN BY: JAKE
FILE LOCATION: D:\AUTOCAD\AMAKNAK\COMP.RI
DATE: 02 SEP 99

SI activities were conducted on 15 July 1998, and IRA activities were conducted on 24 August 1998. The SI work consisted of site reconnaissance and analytical sampling of soils underlying the drums. The purpose of the site reconnaissance was to estimate the number and contents of drums encountered, and to determine waste streams that may have required characterization. IRA field activities included removing the empty drums.

Based on site conditions and lack of visual, olfactory, or PID evidence of impact, one sample (UPVD-01SO) was collected to characterize site conditions before removal of the 14 drums. After receipt of the analytical results, the 14 drums were carried to the road, crushed, and hauled to the landfill. No soil was excavated from the wetland beneath the drums.

6.45.3 Analytical Data Evaluation

One soil sample (UPVD-01SO) was collected from the furthest downgradient location adjacent to the drum pile (Figure 6-108). The sample was collected from a depth of 0.8 feet bgs and consisted of a wet, dark brown sandy peat. Field screening at the location of the sample did not indicate the presence of contamination. The sample was submitted for GRO, DRO, RRO, VOCs, PAHs, PCBs, and select metals (As, Cd, Cr and Pb) analyses.

DRO and RRO were detected in the soil sample at a concentration of 130 mg/kg and 220 mg/kg, respectively (Table 6-104). GRO, VOCs amd PCBs were not detected. One PAH compound (benzo(g,h,i)perylene) was reported at a concentration of 0.014 mg/kg. No other PAHs were detected. Arsenic and cadmium were not detected. Chromium (total) was detected at a concentration of 4.7 mg/kg and lead was detected at a concentration of 7.0 mg/kg.

6.45.4 Risk-Based Screening Results

The one soil sample (UPVD-01SO) collected from the drum site was subjected to the risk-based screening process. The detected concentration for each compound was compared to its respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions are presented below.

For purposes of the risk-based screening, the soil sample was compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. The Upper Pyramid Valley Drum Site is located in an area zoned as a holding zone. However, because the site is located in an area with the potential for residential development, the site was evaluated under a residential land use scenario.

Table 6-105 presents the results of the risk-based screening. GRO, VOCs and PCBs were not detected in the collected sample.

DRO and RRO were detected at concentrations below the most stringent ADEC Method 2 cleanup level for soils. The only detected PAH (benzo(g,h,i)perylene) does not have an established ADEC Method 2 cleanup level. Because no other PAHs were detected and because none of the other detected compounds exceed the most stringent ADEC Method 2 levels, benzo(g,h,i)perylene was not retained for further evaluation at the site. Total chromium and lead were detected at concentrations less than their respective background value and the most stringent ADEC Method 2 cleanup level for soils.

As required by 18 AAC 75.325(g), an assessment of cumulative risks and hazards was also conducted according to procedures described in Section 5. The calculations of cumulative risk and hazard are detailed in Appendix C. Because no carcinogenic compounds were detected, the total cumulative risk was not calculated. The hazard index for the detected compounds of DRO, RRO, and 2 metals was 0.07 for the ingestion pathway, 0.04 for the inhalation pathway, and 0.8 for the migration to groundwater pathway. Each of these values is less than the limitation of 1.0.

6.45.5 Conclusions and Recommendations

A total of 14 drums were removed during IRA activities at this site. No visual, olfactory or PID evidence of impact were noted during reconnaissance at the site. One soil sample was collected before removal of the drums to represent a worst case scenario. The sample was submitted for GRO, DRO, RRO, VOCs, PAHs, PCBs, and select metals (arsenic, cadmium, chromium and lead) analyses.

GRO, VOCs and PCBs were not detected in the collected sample. DRO and RRO were detected at concentrations below the most stringent ADEC Method 2 cleanup level for soils. The only detected PAH (benzo(g,h,i)perylene) does not have an established ADEC Method 2 cleanup level. Because no other PAHs were detected and because none of the other detected compounds exceed the most stringent ADEC Method 2 levels, benzo(g,h,i)perylene was not retained for further evaluation at the site. Total chromium and lead were detected at concentrations less than their respective background value and the most stringent ADEC Method 2 cleanup level for soils. Cumulative hazard indexes for each exposure pathway was less than the limitation of 1.0. Based on these findings, NFA is recommended for this site.

Table 6-104
Analytical Data Summary, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

Sample Location:	UPVD-01
Sample Identification Number:	SW98AMA-UPVD-01SO
Date Sampled:	7/15/98
Sample Depth (feet):	0.8
TEST GROUP: AA METALS - UNITS: MG/KG	
Arsenic	ND[1.7544]
Cadmium	ND[0.18]
Chromium	4.7
Lead	7
TEST GROUP: PAH - UNITS: MG/KG	
Acenaphthene	ND[0.0077]
Acenaphthylene	ND[0.0077]
Anthracene	ND[0.0077]
Benzo(a)anthracene	ND[0.0077]
Benzo(a)pyrene	ND[0.0077]
Benzo(b)fluoranthene	ND[0.0077]
Benzo(g,h,i)perylene	0.014:::Z
Benzo(k)fluoranthene	ND[0.0077]
Chrysene	ND[0.0077]
Dibenzo(a,h)anthracene	ND[0.0077]
Fluorene	ND[0.0077]
Fluoranthene	ND[0.0077]
Indeno(1,2,3-cd)pyrene	ND[0.0077]
2-Methylnaphthalene	ND[0.0077]
Naphthalene	ND[0.0077]
Phenanthrene	ND[0.0077]
Pyrene	ND[0.0077]
TEST GROUP: PCB - UNITS: MG/KG	
PCBs, Total	ND[1.1:::D]
TEST GROUP: PETROLEUM - UNITS: MG/KG	
Diesel Range Organics	130
Gasoline Range Organics	ND[8.9]

Table 6-104
Analytical Data Summary, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

Sample Location:	**UPVD-01**
Sample Identification Number:	**SW98AMA-UPVD-01SO**
Date Sampled:	**7/15/98**
Sample Depth (feet):	**0.8**
Residual Range Organics	220
TEST GROUP: VOLATILES - UNITS: MG/KG	
Acetone	ND[1.8]
Bromodichloromethane	ND[0.45:::D]
Bromobenzene	ND[0.45]
Bromochloromethane	ND[0.45]
Bromomethane	ND[0.89]
n-Butylbenzene	ND[0.45]
sec-Butylbenzene	ND[0.45]
tert-Butylbenzene	ND[0.45]
Benzene	ND[0.45:::D]
Toluene	ND[0.45]
Carbon disulfide	ND[0.45]
2-Chloroethyl vinyl ether	ND[1.8]
Chlorobenzene	ND[0.45]
2-Chlorotoluene	ND[0.45]
4-Chlorotoluene	ND[0.45]
Chloroethane	ND[0.89]
1-Chlorohexane	ND[0.45]
Chloromethane	ND[0.89]
Carbon tetrachloride	ND[0.45:::D]
4-Isopropyltoluene	ND[0.45]
Dibromochloromethane	ND[0.45]
1,2-Dibromo-3-chloropropane	ND[0.89]
Dibromomethane	ND[0.45]
1,1-Dichloroethane	ND[0.45]
1,2-Dichloroethane	ND[0.45:::D]
1,2-Dichlorobenzene	ND[0.45]

Table 6-104
Analytical Data Summary, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

Sample Location:	**UPVD-01**
Sample Identification Number:	**SW98AMA-UPVD-01SO**
Date Sampled:	**7/15/98**
Sample Depth (feet):	**0.8**
1,3-Dichlorobenzene	ND[0.45]
1,4-Dichlorobenzene	ND[0.45]
1,1-Dichloroethene	ND[0.45]
cis-1,2-Dichloroethene	ND[0.22]
trans-1,2-Dichloroethene	ND[0.22]
1,1-Dichloropropene	ND[0.45]
1,3-Dichloropropene (Total)	ND[0.45:::D]
1,2-Dichloropropane	ND[0.45:::D]
1,3-Dichloropropane	ND[0.45]
2,2-Dichloropropane	ND[1.8]
Ethylbenzene	ND[0.45]
1,2-Dibromoethane	ND[0.45]
Trichlorofluoromethane	ND[0.89]
1,1,2-trichloro-1,2,2-trifluoroethane	ND[0.45]
Dichlorodifluoromethane	ND[0.89]
Hexachlorobutadiene	ND[0.45]
2-Hexanone	ND[1.8]
Isopropylbenzene	ND[0.45]
2-Butanone	ND[1.8]
4-Methyl-2-pentanone	ND[1.8]
Methylene chloride	ND[0.45:::D]
Naphthalene	ND[0.45]
n-Propylbenzene	ND[0.45]
1,1,2,2-Tetrachloroethane	ND[0.45:::D]
Tetrachloroethene	ND[0.45]
Styrene	ND[0.45]
Bromoform	ND[0.45:::D]
1,1,1,2-Tetrachloroethane	ND[0.45]

Table 6-104
Analytical Data Summary, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

Sample Location:	UPVD-01
Sample Identification Number:	SW98AMA-UPVD-01SO
Date Sampled:	7/15/98
Sample Depth (feet):	0.8
1,1,1-Trichloroethane	ND[0.45]
1,1,2-Trichloroethane	ND[0.45:::D]
1,2,3-Trichlorobenzene	ND[0.45]
1,2,4-Trichlorobenzene	ND[0.45]
Trichloroethene	ND[0.45]
Chloroform	ND[0.45:::D]
1,2,3-Trichloropropane	ND[0.45]
1,2,4-Trimethylbenzene	ND[0.45]
1,3,5-Trimethylbenzene	ND[0.45]
Vinyl acetate	ND[0.89]
Vinyl chloride	ND[0.89:::D]
Xylenes	ND[0.45]
m,p-Xylene (Sum of Isomers)	ND[0.22]
o-Xylene	ND[0.22]

Table 6-104
Analytical Data Summary, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AA METALS	Metals analyzed by atomic absorption or cold vapor method
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated biphenyls
RBC	Risk based concentration.
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

Table 6-105
Compounds of Potential Concern, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
TEST GROUP: AA METALS - UNITS: MG/KG										
Arsenic	1	0			0 8772	1 7544	1 80E+00	D	9 85E+00	0
Cadmium	1	0			0 09	0 18	4 50E+00	D	9 72E-01	0
Chromium	1	1	4 7	4 7	4 7	**	2 30E+01	D	9 41E+00	0
Lead	1	1	7	7	7	**	4 00E+02	D	8 50E+00	0
TEST GROUP: PAH - UNITS: MG/KG										
Acenaphthene	1	0			0 0038	0 0077	1 90E+02	D	none	0
Acenaphthylene	1	0			0 0038	0 0077	none		none	0
Anthracene	1	0			0 0038	0 0077	3 90E+03	D	none	0
Benzo(a)anthracene	1	0			0 0038	0 0077	5 50E+00	D	none	0
Benzo(a)pyrene	1	0			0 0038	0 0077	9 00E-01	D	none	0
Benzo(b)fluoranthene	1	0			0 0038	0 0077	9 00E+00	D	none	0
Benzo(g,h,i)perylene	1	1	0 014 J	0 014 J	0 014	**	none		none	0
Benzo(k)fluoranthene	1	0			0 0038	0 0077	9 30E+01	D	none	0
Chrysene	1	0			0 0038	0 0077	5 50E+02	D	none	0
Dibenzo(a,h)anthracene	1	0			0 0038	0 0077	9 00E-01	D	none	0
Fluorene	1	0			0 0038	0 0077	2 40E+02	D	none	0
Fluoranthene	1	0			0 0038	0 0077	1 90E+03	D	none	0
Indeno(1,2,3-cd)pyrene	1	0			0 0038	0 0077	9 00E+00	D	none	0
2-Methylnaphthalene	1	0			0 0038	0 0077	none		none	0
Naphthalene	1	0			0 0038	0 0077	3 80E+01	D	none	0
Phenanthrene	1	0			0 0038	0 0077	none		none	0
Pyrene	1	0			0 0038	0 0077	1 40E+03	D	none	0
TEST GROUP: PCB - UNITS: MG/KG										
PCBs, Total	1	0			0 55	1 1	1 00E+00	D	none	0
TEST GROUP: PETROLEUM - UNITS: MG/KG										
Diesel Range Organics	1	1	130	130	130	**	2 30E+02	D	none	0
Gasoline Range Organics	1	0			4 45	8 9	2 60E+02	D	none	0
Residual Range Organics	1	1	220	220	220	**	8 30E+03	D	none	0
TEST GROUP: VOLATILES - UNITS: MG/KG										
Acetone	1	0			0 9	1 8	9 00E+00	D	none	0
Bromodichloromethane	1	0			0 225	0 45	3 00E-01	D	none	0
Bromobenzene	1	0			0 225	0 45	none		none	0
Bromochloromethane	1	0			0 225	0 45	none		none	0
Bromomethane	1	0			0 445	0 89	none		none	0
n-Butylbenzene	1	0			0 225	0 45	7 80E+02	D	none	0
sec-Butylbenzene	1	0			0 225	0 45	7 80E+02	D	none	0
tert-Butylbenzene	1	0			0 225	0 45	none		none	0
Benzene	1	0			0 225	0 45	2 00E-02	D	none	0
Toluene	1	0			0 225	0 45	4 80E+00	D	none	0
Carbon disulfide	1	0			0 225	0 45	1 60E+01	D	none	0

Table 6-105
Compounds of Potential Concern, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
2-Chloroethyl vinyl ether	1	0			0 9	1 8	none		none	0
Chlorobenzene	1	0			0 225	0 45	5 00E-01	D	none	0
2-Chlorotoluene	1	0			0 225	0 45	none		none	0
4-Chlorotoluene	1	0			0 225	0 45	none		none	0
Chloroethane	1	0			0 445	0 89	none		none	0
1-Chlorohexane	1	0			0 225	0 45	none		none	0
Chloromethane	1	0			0 445	0 89	none		none	0
Carbon tetrachloride	1	0			0 225	0 45	3 00E-02	D	none	0
4-Isopropyltoluene	1	0			0 225	0 45	none		none	0
Dibromochloromethane	1	0			0 225	0 45	none		none	0
1,2-Dibromo-3-chloropropane	1	0			0 445	0 89	none		none	0
Dibromomethane	1	0			0 225	0 45	none		none	0
1,1-Dichloroethane	1	0			0 225	0 45	1 10E+01	D	none	0
1,2-Dichloroethane	1	0			0 225	0 45	1 00E-02	D	none	0
1,2-Dichlorobenzene	1	0			0 225	0 45	6 00E+00	D	none	0
1,3-Dichlorobenzene	1	0			0 225	0 45	7 00E+00	D	none	0
1,4-Dichlorobenzene	1	0			0 225	0 45	7 00E-01	D	none	0
1,1-Dichloroethene	1	0			0 225	0 45	none		none	0
cis-1,2-Dichloroethene	1	0			0 11	0 22	none		none	0
trans-1,2-Dichloroethene	1	0			0 11	0 22	none		none	0
1,1-Dichloropropene	1	0			0 225	0 45	none		none	0
1,3-Dichloropropene (Total)	1	0			0 225	0 45	2 00E-02	D	none	0
1,2-Dichloropropane	1	0			0 225	0 45	1 50E-02	D	none	0
1,3-Dichloropropane	1	0			0 225	0 45	none		none	0
2,2-Dichloropropane	1	0			0 9	1 8	none		none	0
Ethylbenzene	1	0			0 225	0 45	5 00E+00	D	none	0
1,2-Dibromoethane	1	0			0 225	0 45	none		none	0
Trichlorofluoromethane	1	0			0 445	0 89	none		none	0
1,1,2-trichloro-1,2,2-trifluoroethane	1	0			0 225	0 45	none		none	0
Dichlorodifluoromethane	1	0			0 445	0 89	none		none	0
Hexachlorobutadiene	1	0			0 225	0 45	7 00E+00	D	none	0
2-Hexanone	1	0			0 9	1 8	none		none	0
Isopropylbenzene	1	0			0 225	0 45	none		none	0
2-Butanone	1	0			0 9	1 8	4 70E+04	D	none	0
4-Methyl-2-pentanone	1	0			0 9	1 8	none		none	0
Methylene chloride	1	0			0 225	0 45	1 00E-02	D	none	0
Naphthalene	1	0			0 225	0 45	3 80E+01	D	none	0
n-Propylbenzene	1	0			0 225	0 45	none		none	0
1,1,2,2-Tetrachloroethane	1	0			0 225	0 45	1 00E-02	D	none	0
Tetrachloroethene	1	0			0 225	0 45	none		none	0
Styrene	1	0			0 225	0 45	1 20E+00	D	none	0

Table 6-105
Compounds of Potential Concern, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
Bromoform	1	0			0 225	0 45	3 40E-01	D	none	0
1,1,1,2-Tetrachloroethane	1	0			0 225	0 45	none		none	0
1,1,1-Trichloroethane	1	0			0 225	0 45	9 00E-01	D	none	0
1,1,2-Trichloroethane	1	0			0 225	0 45	1 50E-02	D	none	0
1,2,3-Trichlorobenzene	1	0			0 225	0 45	none		none	0
1,2,4-Trichlorobenzene	1	0			0 225	0 45	1 70E+00	D	none	0
Trichloroethene	1	0			0 225	0 45	none		none	0
Chloroform	1	0			0 225	0 45	3 00E-01	D	none	0
1,2,3-Trichloropropane	1	0			0 225	0 45	none		none	0
1,2,4-Trimethylbenzene	1	0			0 225	0 45	none		none	0
1,3,5-Trimethylbenzene	1	0			0 225	0 45	none		none	0
Vinyl acetate	1	0			0 445	0 89	none		none	0
Vinyl chloride	1	0			0 445	0 89	8 00E-03	D	none	0
Xylenes	1	0			0 225	0 45	6 90E+01	D	none	0
m,p-Xylene (Sum of Isomers)	1	0			0 11	0 22	none		none	0
o-Xylene	1	0			0 11	0 22	none		none	0

Table 6-105
Compounds of Potential Concern, Soil
Upper Pyramid Valley Drums
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AA METALS	Metals analyzed by atomic absorption or cold vapor method
D	Concentration exceeds corresponding RBC value based on the level that is protective of groundwater used as drinking water. OR The sample quantitation limit for a non-detected compound exceeds its corresponding RBC value based on the level that is protective of groundwater used as drinking water. The respective background concentration was not exceeded. Only metals were compared to background concentrations.
MG/KG	Milligrams per kilogram
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated biphenyls
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.
VOLATILES	Volatile organic compounds
Z	Compound flagged because neither a background level nor a corresponding RBC is available for this detected compound.

6.56 UNALASKA VALLEY GAS STATION

The Unalaska Valley Gas Station site is located in Unalaska Valley, approximately one mile southeast of the City of Unalaska on Unalaska Island. This area includes structures associated with the Unalaska Army Garrison.

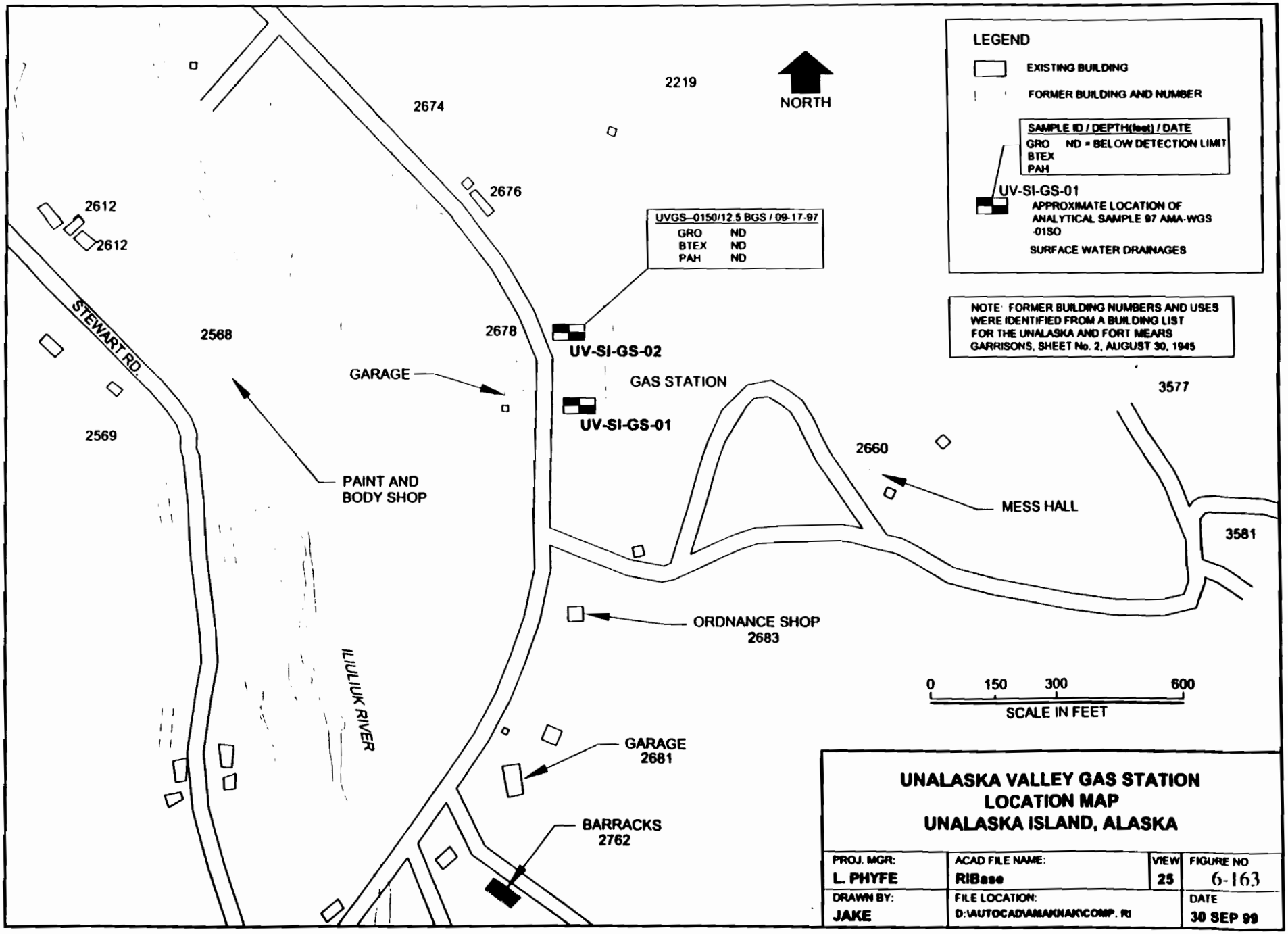
Activities conducted during the 1997 field season at the Unalaska Valley Gas Station included the excavation of two test pits downgradient of a former UST area. Detailed information regarding these activities was initially presented in the 1997 IRA/SI/RI Report (USAED 1999e).

6.56.1 Site Description

The Iliuliuk River flows through the valley into Unalaska Lake. The valley is primarily residential with some light industry in the lower portions. Most new residential development in the City of Unalaska occurs in Unalaska Valley. A review of the 1980, 1985, and 1994 aerial photographs shows development occurring in the northeast side of the valley. Remnants of numerous military structures, foundations, and debris exist throughout the valley.

The military gas station was located in Unalaska Valley on the eastern side of Broadway Avenue north of Overland Drive (Figure 6-163). The foundation of the former garage, Building 2678, is located directly across Broadway Avenue to the west of the gas station. Mr. Frank Arriaga was involved with removing the gas station USTs and regrading the site in 1984. Mr. Arriaga recalled removing four 5,000-gallon USTs (about eight feet in diameter) and returning the excavated soil to the hole. He stated that no soil samples were collected in 1984, but a gasoline odor was noted during excavation.

As part of the 1997 activities, two test pits were excavated on 17 September 1997. Because the USTs were removed in 1984, the 1997 investigation objectives focused on identifying the presence of past releases associated with the former USTs. Hence, the test pits were located


LEGEND
EXISTING BUILDING
FORMER BUILDING AND NUMBER
SAMPLE ID / DEPTH(feet) / DATE
GRO ND = BELOW DETECTION LIMIT
BTEX
PAH
UV-SI-GS-01
APPROXIMATE LOCATION OF ANALYTICAL SAMPLE 97 AMA-WGS -01SO
SURFACE WATER DRAINAGES
NORTH
2219
2674
2676
2612
2612
UVGS--0150/12.5 BGS / 09-17-97
GRO ND
BTEX ND
PAH ND
STEWART RD.
2568
2678
UV-SI-GS-02
GARAGE
GAS STATION
UV-SI-GS-01
3577
2569
2660
PAINT AND BODY SHOP
MESS HALL
3581
NOTE: FORMER BUILDING NUMBERS AND USES WERE IDENTIFIED FROM A BUILDING LIST FOR THE UNALASKA AND FORT MEARS GARRISONS, SHEET No. 2, AUGUST 30, 1945
ORDNANCE SHOP
2683
ILIULIUK RIVER
0 150 300 600
SCALE IN FEET
GARAGE
2681
BARRACKS
2762
UNALASKA VALLEY GAS STATION
LOCATION MAP
UNALASKA ISLAND, ALASKA
PROJ. MGR: L. PHYFE
ACAD FILE NAME: RIBase
VIEW 25
FIGURE NO 6-163
DRAWN BY: JAKE
FILE LOCATION: D:\AUTOCAD\AMAKNAK\COMP. RI
DATE 30 SEP 99

slightly downgradient of where the tanks had been, in an attempt to determine if any POL contamination may have migrated based on Mr. Arriaga's recollections and the topography of the site. The southernmost test pit (UV-SI-GS-01) was excavated to a depth of 15 feet bgs through roughly eight feet of coarse fill material. No evidence of POL contamination was found in the soil. Test Pit UV-SI-GS-02 was located north and west of the estimated tank locations, in the direction groundwater would likely flow, based on the surrounding topography and other surface water features. Water rapidly entered the test pit near the contact between coarse rocky fill and an old, organic, silty soil horizon. Excavation continued to a depth of 12.5 feet bgs, with the last three feet being a typical volcanic silt and sand soil horizon. No evidence of POL staining was noted in the second test pit. Soil sample UVGS-01SO was collected from the bottom of Test Pit 2 and submitted for laboratory analysis.

6.56.2 Analytical Data Evaluation

One sample was collected from the second of two test pits excavated at the former Unalaska Valley Gas Station (Figure 6-163). Sample UVGS-01SO was collected from the bottom of Test Pit 2 at a depth of 12.5 feet bgs. The sample was submitted for GRO, BTEX, and PAH analyses.

As shown in Table 6-148, no constituents were detected in the one sample submitted for laboratory analysis. No GRO, BTEX, or PAH compounds were detected above laboratory reporting limits.

6.56.3 Risk-Based Screening Results

Analytical results from the sample collected at the former Unalaska Valley Gas Station were subjected to the risk-based screening process. The maximum detected concentration for each compound was compared to the respective screening values. The risk-based screening process is described in detail in Section 5.0 of this report. Analytical data and risk-based assumptions for the environmental media evaluated are presented below.

For the purpose of the risk-based screening, soil sample results were compared to ADEC Method 2 cleanup criteria assuming that groundwater is used as drinking water at this site. The Unalaska Valley Gas Station is located in a land use area zoned marine-related industrial.

Table 6-149 presents the results of the risk-based screening. As shown in Table 6-150, no GRO, PAH, or BTEX compounds were detected above laboratory reporting limits. No ADEC Method 2 cleanup levels were exceeded.

Cumulative risk was not evaluated as none of the analyzed constituents were at detectable levels.

6.56.4 Conclusions and Recommendations

As part of the 1997 activities, two test pits were excavated at the Unalaska Valley Gas Station site. The test pits were located slightly downgradient of where four former 5,000 gallon USTs were thought to have been located. Based on field screening, there were no indications of contamination in either of the test pits. The four USTs were removed in 1984.

One soil sample was collected from the Unalaska Valley Gas Station. No concentrations of GRO, BTEX, or PAH compounds were detected above the laboratory reporting limits. Therefore, the laboratory reporting limits were compared to the most stringent ADEC Method 2 cleanup levels. None of these criteria were exceeded.

Based on the findings of the risk-based screening, NFA is recommended for the Unalaska Valley Gas Station site.

Table 6-148
Analytical Data Summary, Soil
Unalaska Valley Gas Station
Amaknak and Unalaska Islands, Alaska

Sample Location:	UVGS-01
Sample Identification Number:	97AMA-UVGS-01SO
Date Sampled:	9/17/97
Sample Depth (feet):	12.5
TEST GROUP: AROMATICS - UNITS: MG/KG	
Benzene	ND[0.0196]
Toluene	ND[0.0196]
Ethylbenzene	ND[0.0196]
Xylenes	ND[0.0588]
TEST GROUP: PETROLEUM - UNITS: MG/KG	
Gasoline Range Organics	ND[9.8]
TEST GROUP: SEMI-VOA - UNITS: MG/KG	
Acenaphthene	ND[0.0098]
Acenaphthylene	ND[0.0098]
Anthracene	ND[0.0098]
Benzo(a)anthracene	ND[0.0098]
Benzo(a)pyrene	ND[0.0098]
Benzo(b)fluoranthene	ND[0.0098]
Benzo(g,h,i)perylene	ND[0.0098]
Benzo(k)fluoranthene	ND[0.0098]
Chrysene	ND[0.0098]
Dibenzo(a,h)anthracene	ND[0.0098]
Fluorene	ND[0.0098]
Fluoranthene	ND[0.0098]
Indeno(1,2,3-cd)pyrene	ND[0.0098]
2-Methylnaphthalene	ND[0.0098]
Naphthalene	ND[0.0098]
Phenanthrene	ND[0.0098]
Pyrene	ND[0.0098]

Table 6-148
Analytical Data Summary, Soil
Unalaska Valley Gas Station
Amaknak and Unalaska Islands, Alaska

:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
<	Compound was not detected in this sample. Value indicates sample quantitation limit for this sample. If no numeric value is present then a sample quantitation limit has not been determined for this total (sum) of isomers
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
MG/KG	Milligrams per kilogram
NA	Not analyzed.
ND[#]	The compound was not detected at the laboratory reporting limit (#).
RBC	Risk based concentration.
SEMI-VOA	Semivolatile organic compounds

Table 6-149
Compounds of Potential Concern, Soil
Unalaska Valley Gas Station
Amaknak and Unalaska Islands, Alaska

TEST GROUP: PETROLEUM - UNITS: MG/KG	Total Number of Samples	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	SQL Maximum Value	RBC		Background Level	Number of RBC Exceedances
Diesel Range Organics	2	2	128	223	175 5	**	2.30E+02	D	none	0

Table 6-149
Compounds of Potential Concern, Soil
Unalaska Valley Gas Station
Amaknak and Unalaska Islands, Alaska

**	Indicates this compound was detected in all samples for which it was analyzed.
:	A single colon separates analytical results from validation qualifiers. An example of a result using colon separators is as follows: ND[12:B::] This should be interpreted as [analytical value : validation qualifier :: risk-based qualifier]. The information contained within the brackets represents a laboratory reporting limit of 12 followed by a validation qualifier (B) and no risk qualifier. In order to fully assess the impact of the 'B' qualifier, refer to Section 4 of this report.
:::	A triple colon separates analytical results from risk-based qualifiers.
AROMATICS	Aromatic volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, and may include chlorobenzene and dichlorobenzenes)
MG/KG	Milligrams per kilogram
RBC	Minumum risk based concentration for this compound applicable to these samples.
RBC D	The minimum risk based concentration for this compound is based on the level that is protective of groundwater used as drinking water.
SEMI-VOA	Semivolatile organic compounds
SQL Maximum Value	Maximum sample quantitation limit of this compound for all non-detected samples.

APPENDIX B

RESPONSIVENESS SUMMARY

CLOSED SITES
AMAKNAK and UNALASKA ISLANDS

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands
DOCUMENT: Proposed Plan No. 1 – Closed Sites
MEETING LOCATION/DATE: Unalaska Senior Center – 4 April 2001

ITEM NO.	COMMENT PROVIDED BY	COMMENT	RESPONSE
1	John Adams	Can we leave poster boards in the library for public viewing?	Gary Kiger (Jacobs Engineering) stated that the poster boards can be left with John and he would set them up in the library.
2	Patricia Mekanoff Gregory	They just received Proposed Plan No. 1 and may not be able to review it and comment by 26 April. Can we have until May 2001 to review the Document?	Suzanne Beauchamp indicated that the public review period can be extended two weeks until 10 May.
3	George Pletnikoff	Will there be consultation with the Tribe prior to the signing of the document.	Suzanne Beauchamp indicated that the public comment period offers the Tribe the opportunity to comment on the proposed closure actions and make their concerns know to both the USAED and ADEC.
4	John Adams (comment)	The Tribe can get comments into USAED on time.	
5	George Pletnikoff	Public comment period is not government to government consultation. Concerned that no consultation with the Tribe has been performed.	Suzanne Beauchamp restated that the public comment period offers the Tribe the opportunity to comment on the proposed closure actions and make their concerns know to both the USAED and ADEC. The USAED is feeling their way in dealing with closing sites on native-owned lands. These first 15 sites are the first chance for the USAED and local communities to work out how the process will work. Suzanne indicated that she welcomes any suggestions how she can help in the future.
6	Patricia Mekanoff Gregory	How will you answer questions posed at public meetings, ones that could not be answered.	Suzanne Beauchamp indicated that comments from the public, both from these meetings and received in writing, and the responses will be summarized and

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands
DOCUMENT: Proposed Plan No. 1 – Closed Sites
MEETING LOCATION/DATE: Unalaska Senior Center – 4 April 2001

ITEM NO.	COMMENT PROVIDED BY	COMMENT	RESPONSE
			included in the Responsiveness Summary section of the Decision Document.
7 .	Walter Tallman	Transformer on pole at site at the head of the Valley. Look into transformer; see if it needs to be removed. Have we sent out answers to questions before? If so, where are the responses?	John Halverson indicated that all known transformer locations have been investigated, but would like to know of any transformer locations that may have been missed. There have not been any formal answers from past meetings distributed to the public. Since this meeting is a formal part of the decision-making process leading to closure of sites, comments and responses from this meeting will be included in the final Decision Document. Further research by the USAED has developed information that the single pole-mounted transformer on Broadway was connected to the city system, and therefore, is not FUDS eligible.

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands

DOCUMENT: Proposed Plan No 1 – Closed Sites

DATE: 10 May 2001 **REVIEWER: Qawalangin Tribe of Unalaska**		**Action taken on comment by: G. Kiger, Jacobs Engineering**	
ITEM NO.	**COMMENT PROVIDED BY**	**COMMENT**	**RESPONSE**
1	Qawalangin Tribe of Unalaska	**UST 2060:** The tank removal and soil decontamination at this former mess hall location seem problematic. The calculation of "confidence levels" using the mean of all sample results ignores certain common sense inferences that should have been drawn from the data. The highest DRO level detected was 670 at the southeast corner of the work area – immediately opposite the small pond across the gravel driveway. The decision to halt soil removal along the eastern border of the work area to prevent "potential impacts to the adjacent gravel road and small pond" (*Proposed Plan No. 1: Closed Sites*, p. 6) would have made sense if the pond itself (and soil below it) had been tested and shown to be uncontaminated. If the pond's groundwater was contaminated then the Pond Water Diversion Trench (shown in figure 6-73 on p. 6-415 of the May 2000 *Comprehensive Remedial Investigation Report*) only served to move contamination to the northwest end of the site where it could flow into the stream that passes through the Qawalangin Heights housing development and feeds Unalaska Lake. Visual inspection of the site on 23 April disclosed an orange discoloration and sheen on the stream. The distribution of DRO detected in the samples suggests that this surmise may have merit. The crew working this job also suspected that the contamination had not been removed by the excavation and treatment that was carried out. Current Qawalangin Tribe staff member Chris Price worked on this job as an Anderson Alaska employee in 1998. He recalls that the supervisor also suspected that the contamination was not being contained by the diversion channel but refused to 'chase the contamination all the way down	The small pond is only about 6-inches in deep, and sits at a slightly higher elevation than ground level of the site. Therefore, it is unlikely that any contamination from the UST migrated up to the pond or the underlying sediments, and investigation of the pond is not warranted. During soil excavation work, a pipe was encountered along the west part of the excavation. This pipe appeared to be abandoned and did not seem to be related to the UST. Therefore, it was not identified for investigation. In addition, confirmation samples collected from the western portion of the excavation revealed DRO concentrations below the ADEC Method 2 level. There has been no additional information developed that warrants investigation of this pipe. Additional investigations will be

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands

DOCUMENT: Proposed Plan No 1 – Closed Sites

DATE: 10 May 2001 **REVIEWER: Qawalangin Tribe of Unalaska**		**Action taken on comment by: G. Kiger, Jacobs Engineering**	
ITEM NO.	**COMMENT PROVIDED BY**	**COMMENT**	**RESPONSE**
		the stream. Since the diversion channel does not reroute runoff away from the location of the heaviest DRO concentration, it seems likely that the contamination continues to flow behind tribe members' homes and into the lake. Another discovery was made during the course of the work that does not appear in the *Comprehensive Remedial Investigation Report*: a sludge filled pipe was uncovered on the western edge of the job site. It did not seem to be related to the UST. The crew was directed to rebury the pipe. As-built drawings (File No.N-54F-11, Drawing No. UI-001-7) show that military housing was erected on the western hill above the site. The Qawalangin Tribe recommends further investigation and remediation of this site consistent with the above remarks, especially testing of the pond and the soil under the pond.	performed to evaluate the presence of contamination in the discolored area adjacent to, and downstream of, the former UST location. The results of this investigation will be evaluated to determine of removal of this site from Decision Document No. 1 is warranted.
2	Qawalangin Tribe of Unalaska	**UST 3265:** The Qawalangin Tribe concurs with the proposed closure, providing that the UST-3260 clean-up includes the contaminated soil found during the UST-3265 investigation. If the 3265 sampling reveals a different chemical composition, it should not be permissible to refuse 3260 clean-up on the basis of site closure.	The closure of UST 3265 is based on a lack of evidence pointing to significant soil contamination originating from this UST. The elevated DRO concentration will be addressed during future activities for UST 3260.

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands

DOCUMENT: Proposed Plan No 1 – Closed Sites

DATE: 10 May 2001 **REVIEWER: Qawalangin Tribe of Unalaska**		**Action taken on comment by: G. Kiger, Jacobs Engineering**	
ITEM NO.	**COMMENT PROVIDED BY**	**COMMENT**	**RESPONSE**
3	Qawalangin Tribe of Unalaska	**Morris Cove:** The July 22, 1998 investigation carried out at the Morris Cove/Mancil Lake section (Army Garrison #6) of former Fort Brumback did not dispose of the probability that underground storage tanks were left behind or that contamination was present. The 1994 Dames & Moore Site Prioritization Report states that 1984 DERP restoration work consisted of removing 75 Quonset huts and 20 wood frame structures. (p. 32) There is no mention of UST removals. The presence of a mess hall at Garrison #6 about the same size as the building 2060 mess hall that used a 300-gallon UST suggested that further investigation was warranted. QT's John Adams and Nick Tutiakoff visited the site on May 4, 2001 for a visual inspection. The low grass at this time of year made the search easier than it must have been for the party that checked over the same ground in July 1998. One area of potential concern was discovered about 40 yards downstream from the creekside pumphouse station. A small channel lined with the orange discoloration seen at the UST 2060 site led to a rectangular depression about 15 yards from the creek. The spot was marked with a hand-held GPS unit that located the position at N53°55'04.2" W166°25"01.6". No stream fed into this depression. Returning on May 9, 2001 with a Schonstedt Heli-Flux Magnetic Locator (Model GA-52B), a strong signal was detected in the runoff stream leading to the creek.	During previous investigation activities, potential UST locations were identified based on available information and a magnetometer was used to survey the areas around building foundations, but no potential USTs were detected. To address the subject comments, the referenced locations will be physically probed, and any USTs found will be removed and sampled. The results of this investigation will be evaluated to determine of removal of this site from Decision Document No. 1 is warranted.

REVIEW COMMENTS

PROJECT: Amaknak/Unalaska Islands

DOCUMENT: Proposed Plan No 1 – Closed Sites

DATE: 10 May 2001 **REVIEWER: Qawalangin Tribe of Unalaska**		**Action taken on comment by: G. Kiger, Jacobs Engineering**	
ITEM NO.	**COMMENT PROVIDED BY**	**COMMENT**	**RESPONSE**
		The metal detector also suggested the presence of a large metal object underground at the south end of what is probably the old mess hall location. (N53°55'05.1" W166°25'09.3") A piece of galvanized pipe protruded from the ground at an angle there. A smaller object was detected at the north end of the mess hall location. Another magnetic anomaly was found in the NE corner of what may be the old recreation hall location: N53°55'06.1" W166°25'12.9". There may be another UST there. The Qawalangin Tribe strongly recommends that the Garrison #6 area of former Fort Brumback not be placed in closed status. Further investigation and remediation should be carried out there.	

APPENDIX C

Response to Comments

REVIEW COMMENTS **PROJECT: Amaknak/Unalaska Islands FUDS**
DOCUMENT: Draft Part I Declaration of Decision No. 1 – Closed Sites and Decision Document No. 1 – Closed Sites, dated Aug. 2001

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 9/17/01 REVIEWER: J. Halverson, ADEC PHONE: (907) 269-7545	Action taken on comment by: Jacobs Engineering Group

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1	Declaration of Decision, pg. 1	Under "Site Name and Locations" the specific sites being closed should be identified. Just stating "closed sites, Amaknak and Unalaska Islands" doesn't provide enough information on what the sites are and where they're located.	A	This section has been expanded to include the names of the closed sites listed in this document.	
2	Declaration of Decision, Pg. 1	Under the Statement of Basis, the first sentence in the second paragraph is unclear what "closed sites were characterized by contained waste such as underground storage tanks (USTs). . ." means. It would be better to state something like, "Most of the sites in this decision document were identified as areas of concern due to the presence of underground storage tanks or abandoned drums." Under the Statement of Basis, the last sentence in the second paragraph should be changed to state, " . . . 2) no contaminants were identified at concentrations above Alaska Department of Environmental conservation (ADEC) method two soil cleanup levels in 18 AAC 75.341 and no groundwater contamination was identified." Under the Statement of Basis, the third paragraph should state, "Data collected during investigation and cleanup activities. . ."	A	The text has been changed as requested. The text has been changed as requested. The text has been changed as requested.	
3	Declaration of Decision, pg. 2	The first sentence should be clarified by stating, ". . . has completed all activities required for the selected remedy at the fifteen sites addressed in this decision document."	A	The text has been changed as requested.	

REVIEW COMMENTS **PROJECT: Amaknak/Unalaska Islands FUDS**
DOCUMENT: Draft Part I Declaration of Decision No. 1 – Closed Sites and Decision Document No. 1 – Closed Sites, dated Aug. 2001

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Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
4	Declaration of Decision, pg. 2	The State of Alaska concurrence section should be revised to state: "The Alaska Department of Environmental Conservation (ADEC) concurs that prior releases of oil and other hazardous substances related to military activities at these sites have been adequately characterized and cleaned up in accordance with 18 AAC 75, Article Three. ADEC concurs that no further investigation or cleanup are necessary and that these sites are considered "closed". This decision may be reviewed and modified in the future if new information becomes available indicating the presence of previously undiscovered contamination or unacceptable risk to human health, safety, welfare or the environment." Also, "Jennifer Roberts, Dept. of Defense Oversight Section Manager, Contaminated Sites Program" should be listed as the DEC signatory.	A	The text has been changed as requested. The text has been changed; Jennifer Roberts is now listed as the DEC signatory.	
5	Pg. 5, Sec. 2.0	The second bullet item should be clarified by stating "Document the concentration of any contaminants remaining in soil at each of the sites by collecting and analyzing soil samples." The last bullet states that one objective was to identify PRPs. I don't recall that being an issue on any of these sites.	A	The second bullet has been changed as requested. The last bullet has been removed as requested.	
6	Pg. 6, Sec. 2.0	The fourth paragraph should be revised by deleting the second and third sentences. The last sentence should state something like, "Post removal samples indicated that contamination had been successfully removed from these sites, thus they were recommended for closure in Proposed Plan #1."	A	The paragraph has been edited to reflect the requested changes.	

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7	Sec 5.0	A legal description should be included for each site to better define their locations.		To date, all site investigative and removal technical data reports have identified site locations with a series of detailed maps and descriptive text. Proposed Plan No. 1 identifies site locations in the same manner. This approach has been considered satisfactory in the past to defining site locations. The text will be revised to add more details as the location of each site. In addition, GPS and USGS coordinates will be obtained for each site and included in the document. If available, legal descriptions of each site will also be added.	
8	Pg. 12, Sec 5.1.1	It is unclear why UST 1765 and 2060 are combined in one section rather than listing them as separately.	A	These sites, UST 1765 and UST 2060, will be separated. Please note, as described in response to Comment No. 10 below, UST 2060 will be removed from Decision Document No. 1 because of the request for additional sampling.	
9	Pg. 12, Sec 5.1.1	For UST 1765, recommend rewording to state: "A 300 gallon UST was emptied and removed and approximately 22 cubic yards of petroleum contaminated soil were excavated and thermally treated. Confirmation samples collected from soil at the limits of the excavation did not contain contaminants above the Method Two soil cleanup levels for petroleum. No further investigation or cleanup are necessary. The site is considered closed."	A	The text has been worded as requested.	
10	Pg. 12, Sec 5.1.1	For UST 2060, recommend rewording to state: "A 300 gallon UST was emptied and removed and approximately 880 cubic yards of petroleum contaminated soil were excavated and thermally treated. Confirmation samples collected from soil at the limits of the excavation did not contain contaminants above the Method Two soil cleanup levels for petroleum. No further investigation or cleanup		UST 2060 will be removed from Decision Document No. 1 because additional sampling will be performed to address public comments received for Proposed Plan No. 1. This site will be included in a future decision document based on analysis of the sampling results.	

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		are necessary. The site is considered closed."			
11	Pg. 13, Sec 5.1.2	Recommend stating: "A 300 gallon UST was emptied and removed and approximately 6 cubic yards of petroleum contaminated soil were excavated and thermally treated. Confirmation samples collected from soil at the limits of the excavation did not contain contaminants above the Method Two soil cleanup levels for petroleum. No further investigation or cleanup are necessary. The site is considered closed."	A	The text has been worded as requested.	
12	Remainder of Sec 5	Similar changes should be made as noted above. Since this is a decision document, it should state what has been done and what decisions are being made about any future work. It should not include recommendations or statements such as "site closure is being sought".	A	The text "site closure is being sought" has been replaced with "the site is considered closed" throughout this section.	
13	Pg 15, Sec 5.4.2	It should also state that after thermal treatment the stockpiled soil was sampled and met the applicable cleanup levels.	A	This information has been added to the text.	
	Pg 16, Sec 7.0	The last sentence should be changed to state that these fifteen sites are considered closed, rather than stating that closure is being sought.	A	The text has been changed has requested.	
	Pg 17, Table 2	The column titled "Recommend" should be changed to "Status".	A	The column title has been changed as requested.	