UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

July 23, 2007

Reply to
Attn Of: ECL-117

Mr. Jim Brown
Department of the Navy
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101

Re: EPA Concurrence with Second Five Year Review,
Former Naval Complex, Adak, Alaska, December 13, 2006

Dear Mr. Brown:

EPA has reviewed the Second Five Year Review for the Former Naval Complex, Adak, Alaska (Adak), which was signed by the U.S. Navy (Navy) on December 13, 2006. EPA is encouraged by the progress the Navy has made in implementing the recommendations set forth in previous Five Year Reviews and acknowledges the efforts of the Federal Facility Agreement project team. This Five Year Review covers all Operable Units at Adak (OU A, OU B-1, and OU B-2).

EPA reviewed the document for technical adequacy, accuracy, and consistency with EPA guidance. The document provides a generally clear summary of the status of individual sites. It also identifies a number of actions to be taken that affect the protectiveness of the selected remedies and documents a schedule for completion of the recommended actions.

Based on EPA's review of the 2006 Second Five Year Review and other knowledge and documents regarding the site and remedies, and consistent with EPA's "Comprehensive Five Year Review Guidance, July 2001, EPA has identified some concerns in interpretation of cleanup or screening values and ARARs. These findings can be found in the attached comments and Issues Identified Table. EPA's independent Protectiveness Determination is also attached to this letter. In general EPA concurs with the Navy's determinations that the selected remedies for OU A and OU B-1 will be protective so long as the Remedial Actions are completed as planned and the follow up actions identified by the Navy and EPA are addressed in a timely manner.

EPA looks forward to working with the Navy and the Alaska Department of Environmental Conservation on implementing the recommended actions in the five year review report and in EPA's findings.

The next statutory five year review will be done no later than five years from receipt of this concurrence letter. If you have questions concerning this letter, please call me at 206 553-1855, or contact EPA's site manager for this review, Christopher Cora, at 206 553-1478 (email: cora.christopher@epa.gov).

Sincerely,

Daniel D. Opalski, Director
Office of Environmental Cleanup

Enclosures

cc: Jennifer Roberts, ADEC
Marcia Combes, Alaska Operations Office
Greg Siekaniec, USDOI

Region 10 Former Naval Complex, Adak, Alaska Second Five Year Review
Summary of EPA's Protectiveness Determinations
February 2007

OU	Protectiveness Determination	Protectiveness Statement
OU A Sites 178 Sites, 9 Sites require follow up	Will be protective	Remediation of the OU A sites is in progress and is expected to be protective of human health and the environment upon completion. Remediation and construction are being done in accordance with the requirements of the decision documents and design specifications included in the respective RD/RA work plans. In the interim, exposure pathways that could result in unacceptable risks are being controlled and reinforced with the implementation of ICs. The following sites are not complete and may require additional actions: ASR-8 Facility, SA 77 Small Drum Storage Area, NMCB Building T-1416 Expanded Area, South of Runway 18-36 Area, SWMU-17 Power Plant 3, SWMU 62 New Housing Fuel Leak, SA-88 P-70 Energy Generator UST 10578, NORPAC Hill Seep Area, SWMU 61 Tank Farm B.
OU B-1 156 Unexploded Ordnance Sites	Will be Protective	Remediation of the OU B-1 sites is in progress and is expected to be protective of human health and the environment upon completion of the Selected Remedy. Remediation and construction were done at most sites in accordance with the requirements of the decision documents and design specifications included in the respective RD/RA work plans. 16 Sites are under review. In the interim, exposure pathways that could result in unacceptable risks are being controlled and reinforced with the implementation of ICs.
OU B-2 38 Unexploded Ordnance Sites	NA - RI/FS underway	A protectiveness determination cannot be made until the RI/FS is complete and the final remedy for the OU B-2 Sites is selected. In the interim, exposure pathways that could result in unacceptable risks to humans are being controlled through voluntary ICs and Engineering Controls. Continued evaluation and improvements to IC's to prevent unauthorized access to OU B-2 is required.

Table 2 EPA's Addendum to U.S. Navy's Table 8-1
Issues Identified in the Former NAC Adak Second Five Year Review
February 2006

Issues	Affects Protectiveness (Y/N) Current	Affects Protectiveness (Y/N) Future	Recommendations/Follow-up Actions	Anticipated Completion Date	Follow-up Actions Affect Protectiveness (Y/N) Current	Follow-up Actions Affect Protectiveness (Y/N) Future
OU A						
The presence of volatile organics compounds in downtown aquifer assoc. w. SWMU 11 and 14	No	Yes	Continue annual monitoring to track concentrations of VOC in the aquifer and their concentration trend. Maintain institutional controls.	Annually until next 5 Year Review	No	Yes
Presence of groundwater contaminants other than COC's identified in ROD which exceed MCLs	No	Yes	Continue annual monitoring to determine if concentrations of non-COCs reflect an unknown source. Evaluate protectiveness of remedy for surface water and groundwater remedies.	Annually until next 5 Year Review	No	Yes
Institutional Controls, downtown dig notification program	Yes	Yes	Enhance procedures and oversight for notification and approval of subsurface activities in areas with potential subsurface contamination	2008	Yes	Yes
Sediment screening values unavailable for Alaska	Yes	Yes	When Alaska specific sediment screening values for contaminants are unavailable, use NOAA or Washington State Screening Tables	Annually until next 5 Year Review	Yes	Yes
OU B-1 and B-2						
Trespassing on Naval property contaminated with unexploded ordnance	Yes	Yes	Install and monitor additional access restrictions to prevent unauthorized access to Parcel 4	2007 (Navy has installed or repaired gates)	Yes	Yes

Table 2 EPA's Addendum to U.S. Navy's Table 8-1
Issues Identified in the Former NAC Adak Second Five Year Review
February 2006

Navy ceased remedial action at three OU B-1 sites in 2004, unexploded ordnance remains on the surface and in the subsurface.	Yes	Yes	Complete the selected remedy for the remaining sites on Mount Moffett. Institute enhanced institutional controls to prevent access to area until remedy is completed.	2010	Yes	Yes

Final
13 December 2006

Second Five-Year Review of Records of Decision

Former Adak Naval Complex
Adak, Alaska

Department of the Navy
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

EXECUTIVE SUMMARY

As lead agency for environmental cleanup of the former Adak Naval Complex, Adak Island, Alaska, the U.S. Navy has completed the second 5-year review of the remedial actions at Operable Unit A (OU A) and OU B-1 conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations Part 300). The purpose of this 5-year review is to ensure that the remedial actions selected in the Records of Decision (RODs) for OU A and OU B-1 at Adak remain protective of human health and the environment. A 5-year review is required for this site, because the remedies allow contaminants to remain in place at concentrations that do not allow unlimited site use and unrestricted exposure. This second 5-year review was prepared in accordance with *Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Statutory Five-Year Reviews*, November 2001 (Revised May 2004) and the U.S. Environmental Protection Agency's *Comprehensive Five-Year Review Guidance* (OSWER 9355.7-03B-P, June 2001). This 5-year review evaluates data collected at the site from May 2001 through September 2005.

The protectiveness of the remedies for the OU A sites is discussed in this report by grouping the sites into categories of protectiveness. Most of the 178 OU A sites fall into the categories of either "remedy is complete and protective," or "remedy is operating and is expected to be protective." Sites in these two categories are tabulated by name in Section 9.

The remedies for six of the OU A sites are concluded to be "not complete, but expected to be protective." These six sites are:

- ASR-8 Facility
- SA 77, Fuels Facility Refueling Dock, Small Drums Storage Area
- NMCB Building T-1416 Expanded Area
- South of Runway 18-36 Area
- SWMU 17, Power Plant 3
- SWMU 62, New Housing Fuel Leak

Limited soil removal is needed at two of these sites (ASR-8 Facility and SA 77, Fuels Facility Refueling Dock, Small Drums Storage Area), and implementation of the State-Adak Environmental Restoration Agreement (SAERA) final remedy is needed at the remaining four of these sites (NMCB Building T-1416 Expanded Area; South of Runway 18-36 Area; SWMU 17, Power Plant 3; and SWMU 62, New Housing Fuel Leak).

Three of the OU A sites require follow-up actions to ensure the future protectiveness of the final remedy. These three sites are:

- NORPAC Hill Seep Area
- SA 88, P-70 Energy Generator, UST 10578
- SWMU 61, Tank Farm B

The recommended follow-up actions include re-evaluating the appropriateness of the limited groundwater remedy at SA 88, P-70 Energy Generator, UST 10578 in light of the most recent data and adding visual inspection for seeps and sheens to the NORPAC Hill Seep Area and SWMU 61, Tank Farm B annual monitoring protocol for protection of surface water.

The remedy for OU B-1 is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled through interim measures, including access restrictions and ordnance awareness training programs. Completion of the OU B-1 remedy at four sites is pending regulatory concurrence on a revised remedial approach. These four sites are:

- Lake Jean Ammunition Complex, LJ-01
- Mount Moffett, MM-10F
- Mount Moffett, MM-10G
- Mount Moffett, MM-10H

In addition, completion of the OU B-1 remedy implemented at 16 sites during the 2004 field season is pending regulatory concurrence.

The future remedy for OU B-2 is expected to be protective when selected and implemented. OU B-2 is in the remedial investigation/feasibility study stage, and munitions and explosives of concern (MEC) may be present. Interim measures (including the MEC awareness training program institutional controls and engineering controls [access barriers, signs, and fences]) are in place to protect human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Adak Naval Air Station		
EPA ID *(from WasteLAN)*: 110009457097		
Region: 10	**State:** AK	**City/County:** Aleutians West

SITE STATUS	
NPL status: Final **X** Deleted Other (specify)________	
Remediation status (choose all that apply): Under Construction **X** Operating **X** Complete **X**	
Multiple OUs?* YES **X** NO	**Construction completion date:** not completed as of 12/31/05
Has site been put into reuse? YES **X** NO	

REVIEW STATUS	
Lead agency: EPA State Tribe Other Federal Agency: Navy	
Author name: Mark Wicklein	
Author title: Remedial Project Manager	**Author affiliation:** Naval Facilities Engineering Command Northwest
Review period:** June 2005 to August 2006	
Date(s) of site inspection: October 2002, October 2003, September 2004, September 2005	
Type of review: Post-SARA **X** Pre-SARA NPL-Removal only; Non-NPL Remedial Action Site NPL State/Tribe-lead; Regional Discretion	
Review number: 2 (second)	
Triggering action: Actual RA Onsite Construction at OU 1; ~~Actual RA Start at OU 1~~; Construction Completion; Previous Five-Year Review Report; Other (specify):________	
Triggering action date *(from WasteLAN)*: December 2001	
Due date *(five years after triggering action date)*: December 2006	

*["OU" refers to operable unit.]

**[Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (Cont'd)

Issues:

- The endpoint criteria being used to evaluate sediment concentrations at Solid Waste Management Unit (SWMU) 11, Palisades Landfill, are likely unnecessarily restrictive and should be revised to more closely reflect potential health risks from sediment exposures at SWMU 11.
- The Operable Unit A (OU A) Record of Decision (ROD) remedy is not complete at the ASR-8 Facility and Source Area (SA) 77, Fuels Facility Refueling Dock, Small Drums Storage Area sites.
- The OU B-1 ROD remedy is not complete at sites in the Mount Moffett area, and the regulatory agencies have not concurred with the remedial actions implemented during 2004.
- The ordnance awareness training program is not fully functioning as intended by the Record of Decision.
- Land use controls are not fully functioning at the OU B sites.
- Issues related to communication with stakeholders were raised by the interviewees during this 5-year review and by interviewees during the 2005 institutional controls (ICs) inspections.
- The Alaska Department of Transportation and Public Facilities (ADOT&PF) noted a need for written excavation procedures for the airport.
- Free product found in one surface water protection well at the NORPAC Hill Seep Area site in 2005 could indicate a threat to surface water.
- The final remedy for site SA 88, P-70 Energy Generator is unlikely to function as anticipated, based on the free-product thicknesses measured in wells at the site during 2005.
- Gasoline-range organics and benzene levels in groundwater samples from surface water protection wells at SWMU 61, Tank Farm B, could indicate a threat to surface water.

Recommendations and Follow-Up Actions:

- Revise endpoint criteria used to evaluate sediment concentrations at SWMU 11, Palisades Landfill, to more closely reflect potential health risks from sediment exposures at SWMU 11.
- Complete limited soil removal component of OU A remedy at the ASR-8 Facility and SA 77, Fuels Facility Refueling Dock, Small Drums Storage Area sites.
- Evaluate, select, and implement additional land use controls to protect human health at OU B-1 and OU B-2 sites, where the selected remedy is not complete, while a remedy is selected (OU B-2) and a revised remedy is evaluated (OU B-1). Incorporate the selected land use controls in the next revision of the Institutional Control Management Plan (ICMP).
- Resolve with regulators the munitions and explosives of concern (MEC) clearance approach for Mount Moffett sites and the issues related to the 2004 After Action Report for OU B-1 remedy implementation.
- Continue to improve the ordnance awareness training programs.
- Provide a sufficient supply of ordnance awareness hiking maps at the Refuge.
- Address communication issues raised by stakeholders:
  - Ensure that ordnance discoveries and disposition are fully communicated to regulators.
  - Ensure that key project documents are distributed to all stakeholders.
  - Strive for improved dissemination of information to the public. Refer to public interview responses for specific suggestions, such as report summaries presented in lay terms.

Five-Year Review Summary Form (Cont'd)

Recommendations and Follow-Up Actions (Continued):

  - Increase information provided to the public regarding issues raised during the interview process (such as the Palisades and Metals Landfills).
  - Increase public awareness of the fishing advisory through improved dissemination of information.

- Work with ADOT&PF to resolve their concern regarding written excavation procedures for the airport.
- Because of the free product measured in the surface water protection well at the NORPAC Hill Seep Area site in 2005, add visual inspections for seeps and sheens to the annual monitoring protocol starting in 2006.
- Re-evaluate the selected final remedy for site SA 88, P-70 Energy Generator, considering the free product measured in wells at this site in 2005.
- Visual inspection of the shoreline and surface water for petroleum seeps and sheens is recommended at SWMU 61 in the vicinity of wells 14-113 and 14-210.
- Implement repairs and improvements recommended as a result of the 2005 IC inspections at SWMUs 2, 4, 13, 25 and 29.

Protectiveness Statement(s):

The protectiveness of the remedies for the OU A sites is discussed in this report by grouping the sites into categories of protectiveness. Most of the 178 OU A sites fall into the categories of either "remedy is complete and protective," or "remedy is operating and is expected to be protective." The remedies for six of the OU A sites (ASR-8 Facility; SA 77, Fuels Facility Refueling Dock, Small Drums Storage Area; NMCB Building T-1416 Expanded Area; South of Runway 18-36 Area; SWMU 17, Power Plant 3; and SWMU 62, New Housing Fuel Leak) are concluded to be "not complete, but expected to be protective." Limited soil removal is needed at two of these sites (ASR-8 Facility and SA 77, Fuels Facility Refueling Dock, Small Drums Storage Area), and implementation of the final remedy is needed at the remaining four of these sites (NMCB Building T-1416 Expanded Area; South of Runway 18-36 Area; SWMU 17, Power Plant 3; and SWMU 62, New Housing Fuel Leak). Three of the OU A sites (NORPAC Hill Seep Area , SA 88, P-70 Energy Generator, and SWMU 61, Tank Farm B) require follow-up actions to ensure the future protectiveness of the final remedy. The recommended follow-up actions include re-evaluating the appropriateness of the limited groundwater remedy at SA 88, P-70 Energy Generator, in light of the most recent data, and adding visual inspection for seeps and sheens to the NORPAC Hill Seep Area and SWMU 61 annual monitoring protocol for protection of surface water.

The remedy for OU B-1 is expected to be protective of human health and the environment upon completion. In the interim, additional measures are needed to control exposure pathways that could result in unacceptable risks. As recommended in Section 8, the Navy should maintain an ongoing improvement effort for the ordnance awareness training program. The Navy should also evaluate, select, and implement additional land use controls to protect human health at OU B-1 sites where the selected remedy is not complete. The Navy should incorporate the selected land use controls in the next revision of the ICMP.

Completion of the OU B-1 remedy is pending stakeholder concurrence on a revised remedial approach for the Mount Moffett sites and resolution of issues regarding the 2004 after action report. The remedy, once completed, is expected to be protective.

The remedy for OU B-2, when selected in the future ROD, is expected to be protective. In the interim, additional measures are needed to control exposure pathways that could result in unacceptable risks. As recommended in Section 8, the Navy should maintain an ongoing improvement effort for the ordnance awareness training program. The Navy should also evaluate, select, and implement additional land use controls to protect human health at OU B-2 sites. The Navy should incorporate the selected land use controls in the next revision of the ICMP.

Five-Year Review Summary Form (Cont'd)

Other Comments:

The Navy is in the process of completing a Remedial Action Completion Report for soil, sediment, and fresh surface water related to the Comprehensive Environmental Response, Compensation, and Liability Act sites at OU A and soils in OU B-1. This report will be used by U.S. Environmental Protection Agency as the main documentation necessary to remove large portions of OU A by media and the majority of OU B-1 from the National Priorities List (NPL). Deletion from the NPL indicates that cleanup actions are complete and that remediation goals have been met. Therefore, the portions of the site that have been deleted from the NPL are available for reuse. Groundwater and marine surface water are not being proposed for deletion at this time.

Signature sheet for the former Adak Naval Complex, Adak Island, Alaska second five-year review of Records of Decision for Operable Unit A and Operable Unit B-1 report.

Theodore P. Jones, P.E.
Adak Base Environmental Coordinator
U.S. Navy

12/13/06
Date

CONTENTS

EXECUTIVE SUMMARY i

ABBREVIATIONS AND ACRONYMS xv

1.0 INTRODUCTION 1-1

2.0 SITE CHRONOLOGY 2-1

3.0 BACKGROUND 3-1
- 3.1 OPERABLE UNIT A 3-2
  - 3.1.1 CERCLA and RCRA Sites 3-2
  - 3.1.2 Petroleum Sites 3-23
- 3.2 OPERABLE UNIT B 3-76
  - 3.2.1 Operable Unit B-1 3-77
  - 3.2.2 Operable Unit B-2 3-78
- 3.3 OTHER ENVIRONMENTAL CONCERNS 3-78

4.0 REMEDIAL ACTIONS 4-1
- 4.1 OU A 4-1
  - 4.1.1 OU A Remedial Action Objectives 4-1
  - 4.1.2 OU A Remedy Selection 4-3
  - 4.1.3 OU A Remedy Implementation 4-5
  - 4.1.4 OU A Operation, Maintenance, and Monitoring 4-7
- 4.2 OU B-1 4-8
  - 4.2.1 OU B-1 Remedial Action Objectives 4-8
  - 4.2.2 OU B-1 Remedy Selection 4-9
  - 4.2.3 OU B-1 Remedy Implementation 4-10
  - 4.2.4 OU B-1 Operation, Maintenance, and Monitoring 4-10

5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW 5-1

6.0 FIVE-YEAR REVIEW PROCESS 6-1
- 6.1 FIVE-YEAR REVIEW TEAM 6-1
- 6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT 6-1
  - 6.2.1 History of Community Involvement 6-1
  - 6.2.2 Community Friendly Sign Development 6-5
  - 6.2.3 Ordnance Awareness Training 6-5
  - 6.2.4 Information Packages for Public Officials 6-7

CONTENTS (Continued)

6.2.5 Community Involvement During the Five-Year Review........................ 6-7
6.3 DOCUMENT REVIEW 6-8
6.4 DATA REVIEW.. 6-8
6.4.1 Natural Attenuation.. 6-9
6.4.2 Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4................. 6-10
6.4.3 Former Power Plant, Building T-1451.. 6-11
6.4.4 GCI Compound, UST GCI-1 6-12
6.4.5 Housing Area (Arctic Acres) 6-14
6.4.6 NMCB Building Area, T-1416 Expanded Area 6-15
6.4.7 NORPAC Hill Seep Area... 6-18
6.4.8 ROICC Contractor's Area, UST ROICC-7 6-20
6.4.9 Runway 5-23 Avgas Valve Pit.. 6-21
6.4.10 SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs.. 6-22
6.4.11 SA 79, Main Road Pipeline, South End... 6-24
6.4.12 SA 80, Steam Plant 4, USTs 27089 and 27090 6-26
6.4.13 SA 82, P-80/P-81 Buildings, UST 10587 and AST 10333.................. 6-27
6.4.14 SA 88, P-70 Energy Generator, UST 10578.................................... 6-29
6.4.15 South of Runway 18-36 Area 6-31
6.4.16 SWMU 14, Old Pesticide Disposal Area... 6-33
6.4.17 SWMU 15, Future Jobs/DRMO 6-36
6.4.18 SWMU 17, Power Plant 3... 6-37
6.4.19 SWMU 55, Public Works Transportation Department Waste Storage Area... 6-41
6.4.20 SWMU 58/SA 73, Heating Plant 6.. 6-42
6.4.21 SWMU 60, Tank Farm A... 6-44
6.4.22 SWMU 61, Tank Farm B... 6-46
6.4.23 SWMU 62, New Housing Fuel Leak.. 6-48
6.4.24 Tanker Shed, UST 42494.. 6-51
6.4.25 Yakutat Hangar, UST T-2039-A... 6-54
6.4.26 SWMU 11, Palisades Landfill 6-55
6.4.27 SWMU 13, Metals Landfill 6-58
6.4.28 SWMUs 18/19, White Alice Landfill 6-59
6.4.29 SWMU 25, Roberts Landfill... 6-60
6.5 RESULTS OF SITE INSPECTION 6-62
6.5.1 Results of 2002 Institutional Controls Inspections 6-63
6.5.2 Results of 2003 Institutional Controls Inspections 6-66
6.5.3 Results of 2004 Institutional Controls Inspections 6-69

CONTENTS (Continued)

6.5.4 Results of 2005 Institutional Controls Inspections 6-72
6.6 RESULTS OF INTERVIEWS 6-74
6.6.1 Navy Personnel 6-74
6.6.2 Land Owners 6-75
6.6.3 Agency Personnel 6-75
6.6.4 Community 6-77

7.0 TECHNICAL ASSESSMENT 7-1
7.1 FUNCTIONALITY OF REMEDY 7-1
7.1.1 Functionality of Remedy for Operable Unit A 7-1
7.1.2 Functionality of Remedy for Operable Unit B-1 7-2
7.1.3 Operation and Maintenance Costs 7-4
7.2 CONTINUED VALIDITY OF ROD ASSUMPTIONS 7-5
7.2.1 Review of Applicable or Relevant and Appropriate Requirements 7-5
7.2.2 Review of Risk Assessment Assumptions 7-13
7.3 NEW INFORMATION 7-17
7.4 TECHNICAL ASSESSMENT SUMMARY 7-17
7.5 ISSUES 7-18

8.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS 8-1

9.0 CERTIFICATION OF PROTECTIVENESS 9-1
9.1 PROTECTIVENESS OF OU A REMEDIES 9-1
9.1.1 OU A Sites Where the Remedy Is Complete and Protective 9-1
9.1.2 OU A Sites Where the Remedy Is Not Complete, but Expected to Be Protective 9-2
9.1.3 OU A Sites Where the Remedy Is Operating and Expected to Be Protective 9-2
9.1.4 OU A Sites Requiring Follow-Up Actions to Ensure Future Protectiveness 9-2
9.2 PROTECTIVENESS OF OU B-1 REMEDY 9-3
9.3 PROTECTIVENESS OF OU B-2 REMEDY 9-3

10.0 NEXT REVIEW 10-1

11.0 REFERENCES 11-1

CONTENTS (Continued)

APPENDICES [Included on CD attached to back cover]

A Site Catalog
B Agency Comments and Responses to Comments
C Analytical Data Results
D Interview Responses

CONTENTS (Continued)

FIGURES

1-1 Adak Island Location Map........ 1-3
2-1 Summary of CERCLA Site Process at Former Adak Naval Complex........ 2-5
2-2 Summary of Petroleum Site Process of Former Adak Naval Complex........ 2-7
2-3 Operable Unit A CERCLA Sites That Require Further Action, Adak Island, Alaska........ 2-9
2-4 Operable Unit A Petroleum Sites That Require Further Action, Adak Island, Alaska........ 2-11
3-1 Summary of OU B-1 Site Process at Former Adak Naval Complex........ 3-80
3-2 Operable Unit B-1 Sites........ 3-81
3-3 Operable Unit B-2 Sites........ 3-83
6-1 AdakUpdate.com Home Page........ 6-79
6-2 Community-Friendly Icons........ 6-81
6-3 Example of Ordnance Awareness Poster........ 6-83
6-4 Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4........ 6-85
6-5 Former Power Plant, Building T-1451........ 6-86
6-6 GCI Compound, UST GCI-1........ 6-87
6-7 Housing Area (Arctic Acres)........ 6-88
6-8 NMCB Building Area, T-1416 Expanded Area........ 6-89
6-9 NORPAC Hill Seep Area........ 6-91
6-10 ROICC Contractor’s Area, UST ROICC-7........ 6-92
6-11 Runway 5-23 Avgas Valve Pit........ 6-93
6-12 SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs........ 6-94
6-13 SA 79, Main Road Pipeline, South End........ 6-95
6-14 SA 80, Steam Plant 4, USTs 27089 and 27090........ 6-96
6-15 SA 82, P-80/P-81 Buildings........ 6-97
6-16 SA 88, P-70 Energy Generator, UST 10578........ 6-98
6-17 South of Runway 18-36 Area........ 6-99
6-18 SWMU 14, Old Pesticide Disposal Area........ 6-100
6-19 SWMU 15, Future Jobs/Defense Reutilization Marketing Office........ 6-101
6-20 SWMU 17, Power Plant 3........ 6-102
6-21 SWMU 55, Public Works Transportation Department Waste Storage Area........ 6-103
6-22 SWMU 58/SA 73, Heating Plant 6........ 6-104
6-23 SWMU 60, Tank Farm A........ 6-105
6-24 SWMU 61, Tank Farm B........ 6-106
6-25 SWMU 62, New Housing Fuel Leak, Eagle Bay Housing Area........ 6-107
6-26 SWMU 62, Housing Fuel Leak, Sandy Cove Housing Area........ 6-109

CONTENTS (Continued)

FIGURES (Continued)

6-27 Tanker Shed, UST 42494 6-111
6-28 Yakutat Hangar, UST T-2039-A 6-112
6-29 SWMU 11, Palisades Landfill 6-113
6-30 SWMU 13, Metals Landfill 6-114
6-31 SWMUs 18/19, White Alice Landfill 6-115
6-32 SWMU 25, Roberts Landfill 6-116

TABLES

2-1 Chronology of Site Events 2-13
2-2 CERCLA and Petroleum Sites Listed or Evaluated on Adak Island 2-14
2-3 OU A No Further Action CERCLA Sites 2-21
2-4 OU A No Further Action Petroleum Sites 2-23
3-1 OU B-1 Sites 3-84
3-2 Background on OU B-1 Sites Requiring Further Action Under the ROD 3-87
3-3 OU B-2 Sites 3-109
4-1 Remedial Action Objectives for the Petroleum Sites 4-12
4-2 Selected Remedy and Implementation for CERCLA Sites 4-14
4-3 Institutional Controls, Engineering Controls, and Operations and Maintenance for OU A Sites 4-18
4-4 Selected Remedial Actions and Implementation for Petroleum Sites 4-23
4-5 Location-Specific Summary of Comprehensive Monitoring Program Since 2001 4-30
4-6 Free-Product Monitoring and Recovery Activities Performed Between January 2001 and December 2005 4-50
4-7 Selected Remedial Actions and Implementation for OU B-1 Sites 4-51
5-1 Issues from the First Five-Year Review 5-3
6-1 Educational Awareness Results 6-117
7-1 Endpoint Criteria for Groundwater at CERCLA Sites 7-19
7-2 Endpoint Criteria for Fresh Surface Water at SWMUs 11, 18/19, and 25 7-20
7-3 Endpoint Criteria for Freshwater/Marine Sediments for SWMU 11 7-22
7-4 Soil and Groundwater Remediation Goals for Petroleum Sites 7-23
7-5 Soil Cleanup Level for Ordnance Compounds, OU B-1 ROD 7-24
7-6 Issues 7-25
8-1 Recommendations and Follow-Up Actions 8-2
9-1 OU A Sites Where the Remedy Is Complete 9-4
9-2 OU A Sites Where the Remedy Is Operating and Expected to Be Protective 9-9

ABBREVIATIONS AND ACRONYMS

AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADOT&PF	Alaska Department of Transportation and Public Facilities
A/PIA	Aleutian/Pribilof Island Association
ARAR	applicable or relevant and appropriate requirement
ARC	Adak Reuse Corporation
AST	aboveground storage tanks
avgas	aviation gasoline
BEQ	bachelor enlisted quarters
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMP	Comprehensive Monitoring Plan
COC	chemical of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbons
CRP	Community Relations Plan
DCE	dichloroethene
DEC	Department of Environmental Conservation (State of Alaska)
DEM	downgradient exposure medium
DIN	dissolved inorganics
DRMO	Defense Reutilization Marketing Office
DRO	diesel-range organics
EC	engineering control
EPA	U.S. Environmental Protection Agency
ERL	effects range low
ERM	effects range medium
ESHA	explosives safety hazard assessment
FCT	field-constructed tank
FFA	Federal Facility Agreement
FFCA	Federal Facilities Compliance Agreement
FR	Federal Register
FS	feasibility study
GRO	gasoline-range organics
HI	hazard index
HWSF	Hazardous Waste Container Storage Facility
IC	institutional control

ABBREVIATIONS AND ACRONYMS (Continued)

ICMP	Institutional Control Management Plan
IRIS	Integrated Risk information System
JP-5	jet petroleum No. 5
loran	long-range navigation
LPAH	low-molecular-weight polycyclic aromatic hydrocarbons
MAUW	Modified Advanced Underwater Weapons
MCL	maximum contaminant level
MEC	munitions and explosives of concern
µg/kg	microgram per kilogram
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MLLW	mean lower low water
mogas	motor gasoline
msl	mean sea level
MW	monitoring well
NAF	Naval Air Facility
NAP	natural attenuation parameter
NAVFAC NW	Naval Facilities Engineering Command Northwest
Navy	U.S. Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEX	Navy Exchange Building
NFA	No Further Action (abbreviation used in OU A ROD)
NFRAP	No Further Remedial Action Planned
NMCB	Naval Marine Construction Battalion
NOFA	No Further Action (abbreviation used in the OU B-1 ROD)
NPL	National Priorities List
NSGA	Naval Security Group Activity
NUWC	Naval Undersea Warfare Center
OE	ordnance and explosives
O&M	operation and maintenance
OMM	operation, maintenance, and monitoring
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
POL	petroleum, oil, and lubricant

ABBREVIATIONS AND ACRONYMS (Continued)

PQL	practical quantitation limit
PRG	preliminary remediation goal
PSE	preliminary source evaluation
RAB	Restoration Advisory Board
RAO	remedial action objective
RBSC	risk-based screening concentration
RCRA	Resource Conservation and Recovery Act
Refuge	Alaska Maritime National Wildlife Refuge
RG	remediation goal
RI	remedial investigation
ROD	Record of Decision
ROICC	resident officer in charge of construction
RRO	residual-range organics
SA	source area
SAERA	State-Adak Environmental Restoration Agreement
SARA	Superfund Amendments and Reauthorization Act
SDSA	Small Drum Storage Area
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAC	The Aleut Corporation
TCDD	tetrachlorodibenzo-p-dioxin
TCE	trichloroethene
TDS	total dissolved solids
TIN	total inorganics
TOC	total organic carbon
TPH	total petroleum hydrocarbons
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance
UST	underground storage tank
VOC	volatile organic compound
WQP	water quality parameter

1.0 INTRODUCTION

This report presents the results of the second 5-year review performed for the former Adak Naval Complex, Adak Island, Alaska National Priorities List (NPL) site (Figure 1-1). The purpose of a 5-year review is to determine whether the remedies selected for implementation in the Record of Decision (ROD) for a site are protective of human health and the environment. The methods, findings, and conclusions of 5-year reviews are documented in 5-year review reports, which identify any issues found during the review and provide recommendations to address them.

The U.S. Navy (Navy), the lead agency for Adak, is preparing this 5-year review report pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 Code of Federal Regulations [CFR] Part 300). CERCLA Section 121 states the following:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

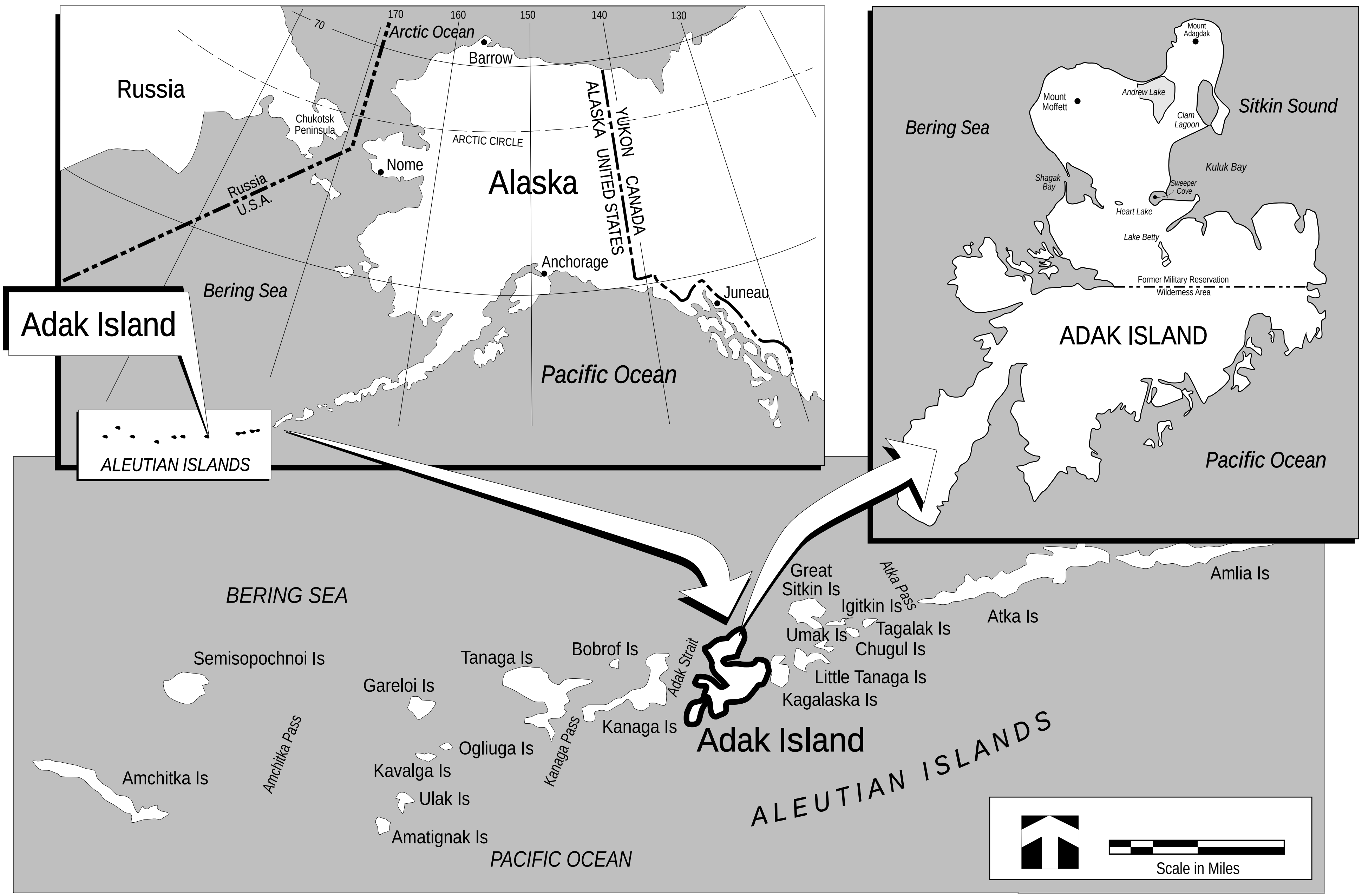
The Naval Facilities Engineering Command Northwest has conducted this 5-year review of the remedial actions implemented at Adak. This review was conducted from June 2005 through August 2006, and this report documents the results of the review. In addition, this 5-year review evaluates data collected at the site from May 2001 through September 2005.

While the former Adak Naval Complex is listed on the NPL as a single listing, the former Adak Naval Complex includes multiple CERCLA- and NCP-regulated sites, which are referred to as solid waste management units (SWMUs), source areas (SAs), or as individual areas of investigation. This report covers the remedies selected for each of these sites in the signed RODs for Operable Unit A (OU A) and OU B-1 (U.S. Navy, USEPA, and Alaska DEC 1995, 2000, and 2001). Progress towards remedy selection for OU B-2 sites is also summarized.

This is the second 5-year review for Adak. The triggering action for this review was the completion of the first 5-year review in December 2001 and that contaminants have been left at Adak above levels that allow for unlimited use and unrestricted exposure.

The RODs documenting the remedies implemented at Adak OU A and OU B-1 were signed after October 17, 1986 (the effective date of the Superfund Amendments and Reauthorization Act [SARA]). Therefore, this is considered a statutory, rather than a policy, review. In general, reviews of RODs signed after the effective date of SARA are termed “statutory reviews,” while reviews of RODs signed before the effective date of SARA (or when certain other conditions apply) are termed “policy reviews.”

This report was prepared as part of the CERCLA 5-year review process, using Navy and U.S. Environmental Protection Agency (EPA) guidance (U.S. Navy 2004a and USEPA 2001).



U.S.NAVY	Figure 1-1 Adak Island Location Map	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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2.0 SITE CHRONOLOGY

This section provides a narrative chronology of site events related to environmental investigation and remediation, with a tabulated summary provided in Table 2-1. The chronology of land transfer activities is summarized in Section 3.

In 1986, an initial assessment study was conducted on Adak as the first phase of the Navy Assessment and Control of Installation Pollutants Program. Thirty-two sites were examined during the initial assessment study. In 1989, a site inspection was completed in which 19 sites were evaluated. In 1990, a Resource Conservation and Recovery Act (RCRA) remedial facility assessment was completed by EPA, which identified and gathered information on potentially contaminated sites. A total of 68 sites, which includes the 19 sites identified in the site inspection, were identified in the remedial facility assessment. EPA issued a Federal Facility Compliance Agreement in November 1990. Adak was proposed for the NPL in October 1992 (57 FR 47204) and formally listed in May 1994 (59 FR 27989).

In 1993 the Navy, EPA, and Alaska Department of Environmental Conservation (DEC) signed the Adak Federal Facility Agreement (FFA), which incorporates the EPA's cleanup process under CERCLA, as amended by SARA. The CERCLA exclusion of petroleum as a hazardous substance required that cleanup of petroleum-related chemicals would follow State of Alaska regulations. Therefore, the FFA stated that petroleum-contaminated sites, such as those containing underground storage tanks (USTs) and leaking underground fuel lines, would be evaluated under a separate two-party agreement between the Navy and the state of Alaska. This agreement, the State-Adak Environmental Restoration Agreement (SAERA), was signed in April 1994.

For technical and administrative purposes, Adak was divided into two OUs in 1998, OU A and OU B, through an amendment to the FFA. In May 1997, the Navy and Alaska DEC agreed to integrate the cleanup decision process for petroleum sites with the cleanup decision process being conducted for hazardous-substance-release sites under CERCLA. As a result, the ROD for OU A was prepared for both the petroleum-contaminated sites and the hazardous-substance-release sites. The interim action ROD for SWMUs 11 and 13 and the final ROD for OU A were signed in March 1995 and April 2000, respectively.

A listing of the sites included in the OU A ROD is included in Table 2-2. A total of 180 sites were evaluated for OU A. Two of these sites were deferred to OU B (SWMU 8 and SA 93). Of the remaining 178 sites, 121 sites were petroleum sites, 50 sites were investigated under CERCLA, 5 were investigated under both CERCLA and SAERA, and two were investigated under both RCRA and SAERA. Figure 2-1 presents an overview of the process used to evaluate

OU A CERCLA sites, and Figure 2-2 presents an overview of the process used to evaluate OU A petroleum sites.

The original number of sites began with the FFA, which listed 84 SWMUs and SAs that needed to be evaluated within OU A. Twenty-six of the original 84 sites were petroleum-only sites administered under the SAERA agreement. Two of the remaining 58 sites were deferred to OU B-2 (SWMU 8 and SA 93); the CERCLA portion of 1 combined CERCLA and SAERA site was deferred to the OU B process, but remained a SAERA site (SWMU 1); the minefield portion of 1 CERCLA site was deferred to the OU B process, but the landfill portion remained as a CERCLA site (SWMU 2); SWMUs 53 and 59 were combined with SWMU 52; and one site was deferred to the SAERA process (SWMU 12). This left a total of 52 CERCLA sites, including 3 state-permitted landfills, 5 combined CERCLA and petroleum sites (SWMUs 14, 15, 17, 55, and 74), and 2 combined RCRA and petroleum sites (SWMU 24 and SA 77). An additional 93 petroleum sites were included in OU A between 1994 and 1997 (U.S. Navy, USEPA, and Alaska DEC 2000). The five water bodies that could be impacted by site contamination were not originally part of the FFA, but were added to the OU A site list around the time of the remedial investigation (RI). These water bodies were evaluated under CERCLA and include Sweeper Cove, South Sweeper Creek, Clam Lagoon, Andrew Lake, and Kuluk Bay.

The OU A ROD selected final or interim remedies for each of 128 petroleum-contaminated sites, counting the NMCB Building Area T-1416 Expanded Area and NMCB Building (UST T-1416-A) as separate sites. This includes 121 petroleum-only sites, five combined CERCLA and petroleum sites (SWMUs 14, 15, 17, 55, and 74), and two combined RCRA and petroleum sites (SWMU 24 and SA 77). The interim remedy, free-product recovery, was selected for 14 sites that contained measurable quantities of free-phase petroleum product ("14 sites" is arrived at by counting NMCB Building Area T-1416 Expanded Area and NMCB Building [UST T-1416-A] as one combined site, and not two separate sites). In addition, the OU A ROD specified that these 14 sites would require future final remedy selection pursuant to the two-party SAERA. To clarify regulatory authority, the OU A ROD was amended in 2003 to remove these 14 petroleum sites and 47 others from CERCLA authority (see also Section 2). Therefore, final remedies for the 14 petroleum-contaminated sites were to be selected in accordance with Alaska State regulation 18 Alaska Administrative Code (AAC) 75.325 through 75.390, which provides the regulatory procedures and requirements for petroleum cleanup decisions.

The OU A ROD concluded that no further action was required for 114 sites (31 CERCLA sites, which include 2 water bodies, one combined CERCLA and petroleum site [SWMU 74], one combined RCRA and SAERA site [SWMU 24], the RCRA portion of one combined RCRA and SAERA site [SA 77], the SAERA portion of one combined CERCLA and SAERA site [SWMU 55], and 79 petroleum sites) (U.S. Navy, USEPA, and Alaska DEC 2000). These NFA sites are listed in Tables 2-3 and 2-4. Petroleum sites for which no further action was required under the OU A ROD were also considered to have met all requirements of the SAERA agreement. In addition, those petroleum sites for which a final remedy was selected in the OU A ROD, and which met the OU A ROD remediation goals, were considered to have met all requirements of the SAERA agreement (U.S. Navy, USEPA, and Alaska DEC 2003).

There were 66 OU A sites (19 CERCLA sites [includes 3 water bodies and 3 state-permitted landfills], 3 combined CERCLA and petroleum sites [SWMUs 14, 15, and 17], the CERCLA portion of 1 combined CERCLA and petroleum site [SWMU 55], the SAERA portion of 1 combined RCRA and petroleum site [SA 77], and 42 petroleum sites [including the NMCB Building Area T-1416 Expanded Area and NMCB Building (UST T-1416-A) as separate sites]) that required remedial action. (Note that SA 77 is included as a no further action site under RCRA and as a remedial action site under SAERA. In addition, SWMU 55 is included as a no further action site under SAERA and as a remedial action site under CERCLA. Because of this double counting of SWMU 55 and SA 77, 114 no further action sites plus 66 remedial action sites equals 180 sites, and not 178 sites.) Of these sites, Figure 2-3 shows the locations of the chemical-release sites administered under CERCLA and RCRA retained for further action. Figure 2-4 shows the locations of the petroleum sites administered under SAERA retained for further action.

Removal actions and interim remedial actions at some CERCLA sites were completed prior to the completion of the OU A ROD. Removal actions were also completed at some of the 128 petroleum sites. Most of the physical remedy construction was completed at the last OU A site in 2003 (except for those transferred to SAERA) with the closure of Roberts Landfill. The remedy construction will be completed after soil is removed in 2008 as planned from ASR-8 Facility, UST 42007-B and SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area. The Institutional Control Management Plan (ICMP), a component of the remedy for many of the OU A sites, was written in 2000, revised by the Navy in 2001, and again updated in 2004.

In 2001, OU B was further divided into OU B-1 and OU B-2 to accommodate land transfer under the base realignment and closure program to a combination of private and public entities. The OU B-1 ROD and the first 5-year review were both signed in December 2001. The remedies selected in the OU B-1 ROD began in 2001, with many remedial actions completed during the 2004 field season. Additional munitions and explosives of concern (MEC) items will need to be assessed and potentially removed and decommissioned once a final remedial approach is cooperatively developed among the Navy, EPA, and Alaska DEC.

In March of 2002, the FFA and SAERA were amended to administratively move 62 petroleum sites included in OU A, out of OU A (and out of the FFA). From the date of this amendment forward, all future decisions regarding the moved sites were to be made based on State of Alaska regulations (under SAERA), rather than Federal regulations (U.S. Navy, USEPA, and Alaska DEC 2002). This change was subsequently reflected in an OU A ROD amendment signed October 10, 2003 (U.S. Navy, USEPA, and Alaska DEC 2003). Fourteen petroleum sites removed from the OU A ROD potentially required further action under SAERA. The selected remedy for these 14 sites under the OU A ROD was free-product recovery. A decision document memorializing final remedies at 10 of these sites was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a), and a decision document memorializing the final remedy for the NMCB Building T-1416 Expanded Area was signed on March 22, 2006 (U.S. Navy and Alaska DEC 2006).

During this review period, "No Further Action" (NFA) or "No Further Remedial Action Planned" (NFRAP) status was granted by Alaska DEC for 19 sites (Alaska DEC 2005b). No further action closure is used for sites at which all media meet the most stringent levels of remediation (Method 2 for soil, Table C for groundwater). No further remedial action planned is a conditional closure. This status is used when a site has met the remedial action objectives of protection of human health and the environment but has not yet met final closure standards.

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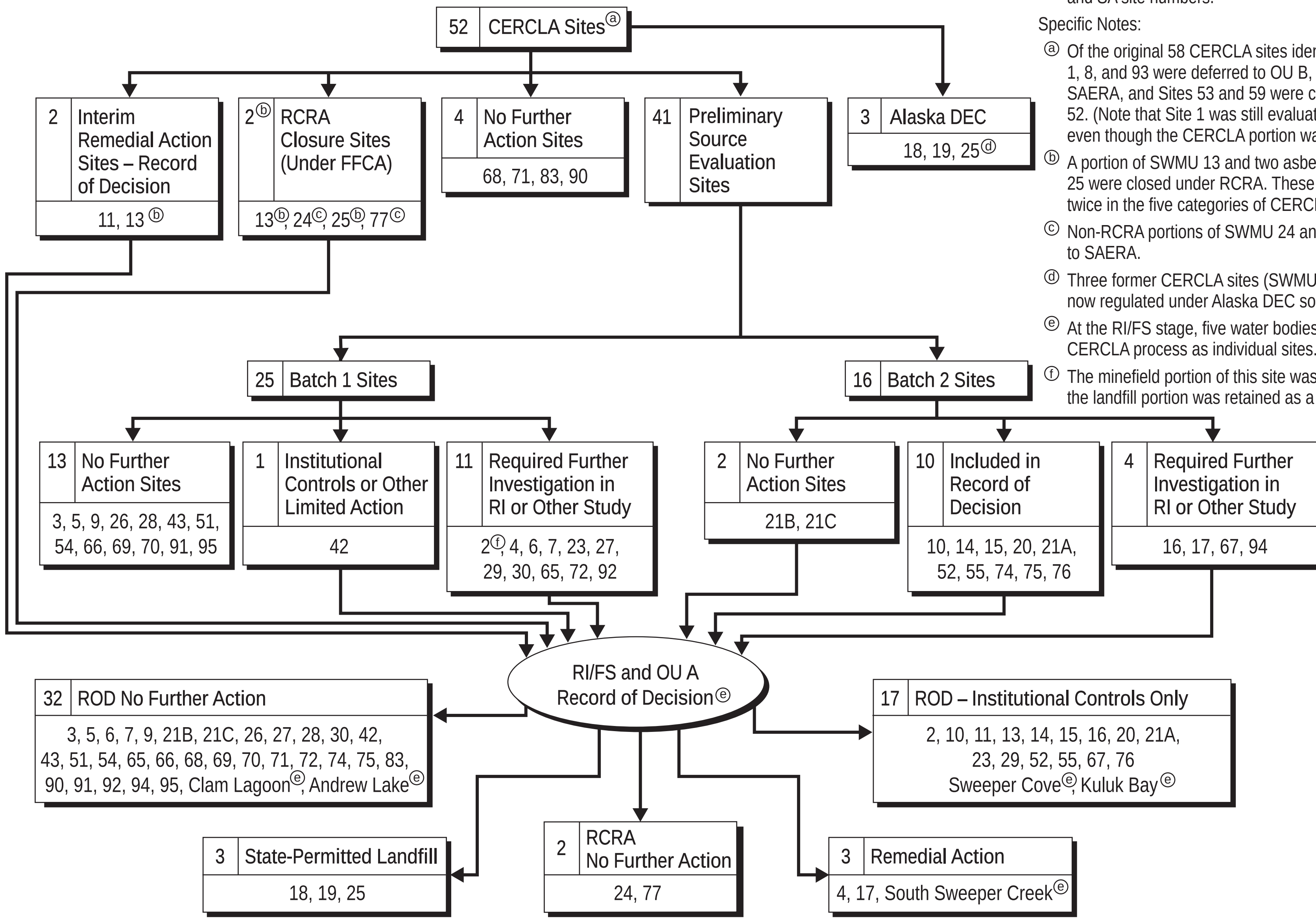


General Note:

The site numbers on this figure correspond to the SWMU and SA site numbers.

Specific Notes:

ⓐ Of the original 58 CERCLA sites identified in the FFA, Sites 1, 8, and 93 were deferred to OU B, Site 12 was deferred to SAERA, and Sites 53 and 59 were consolidated into Site 52. (Note that Site 1 was still evaluated as a petroleum site, even though the CERCLA portion was deferred to OU B.)

ⓑ A portion of SWMU 13 and two asbestos bunkers in SWMU 25 were closed under RCRA. These sites, therefore, appear twice in the five categories of CERCLA sites.

ⓒ Non-RCRA portions of SWMU 24 and SA 77 were deferred to SAERA.

ⓓ Three former CERCLA sites (SWMUs 18, 19, and 25) are now regulated under Alaska DEC solid waste rules.

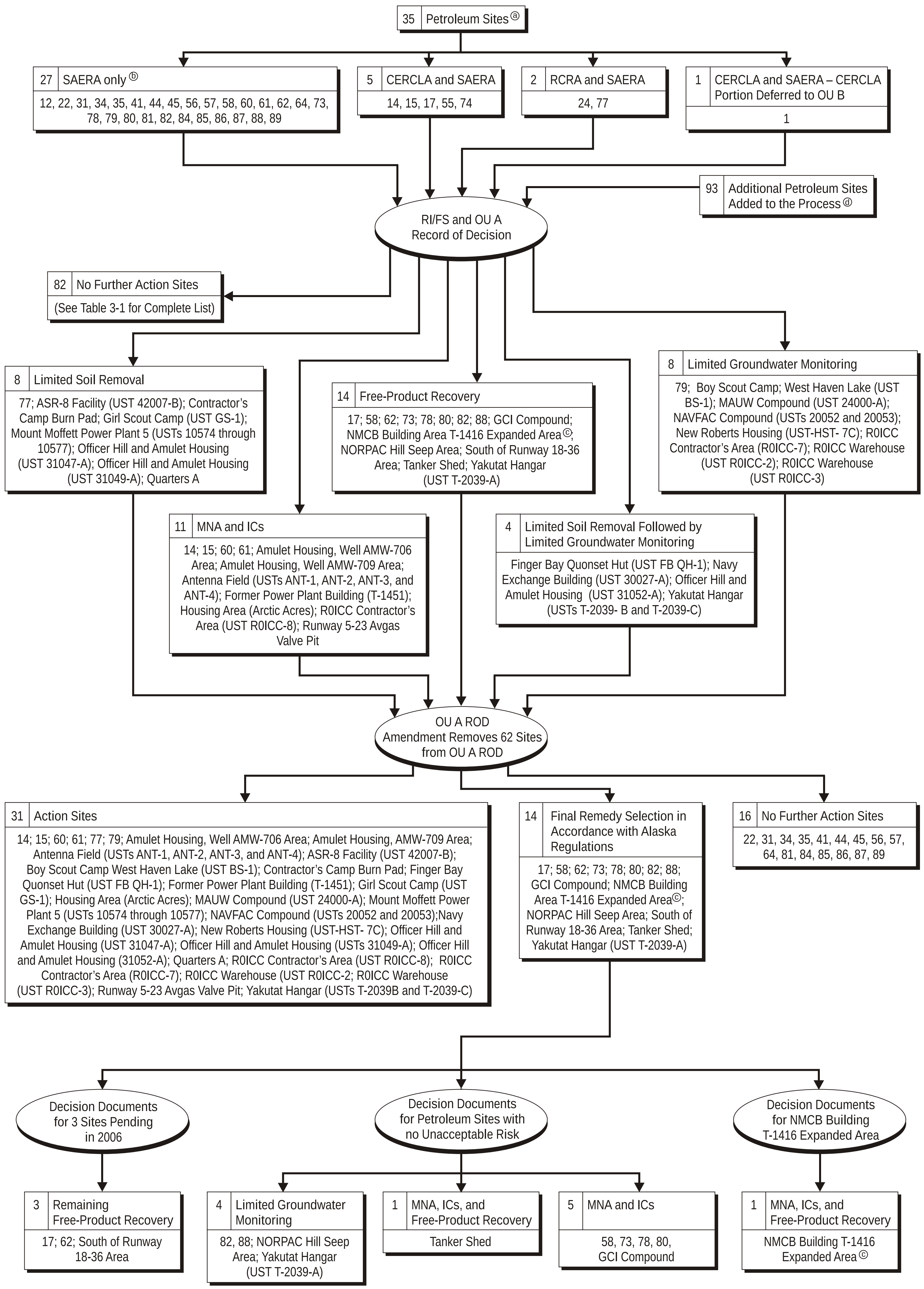
ⓔ At the RI/FS stage, five water bodies were added to the CERCLA process as individual sites.

ⓕ The minefield portion of this site was deferred to OU B, but the landfill portion was retained as a CERCLA site.

U.S.NAVY

Figure 2-1
Summary of CERCLA Site Process at Former Adak Naval Complex

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT



General Note:

The site numbers on this figure correspond to the SWMU and SA site numbers.

Specific Notes:

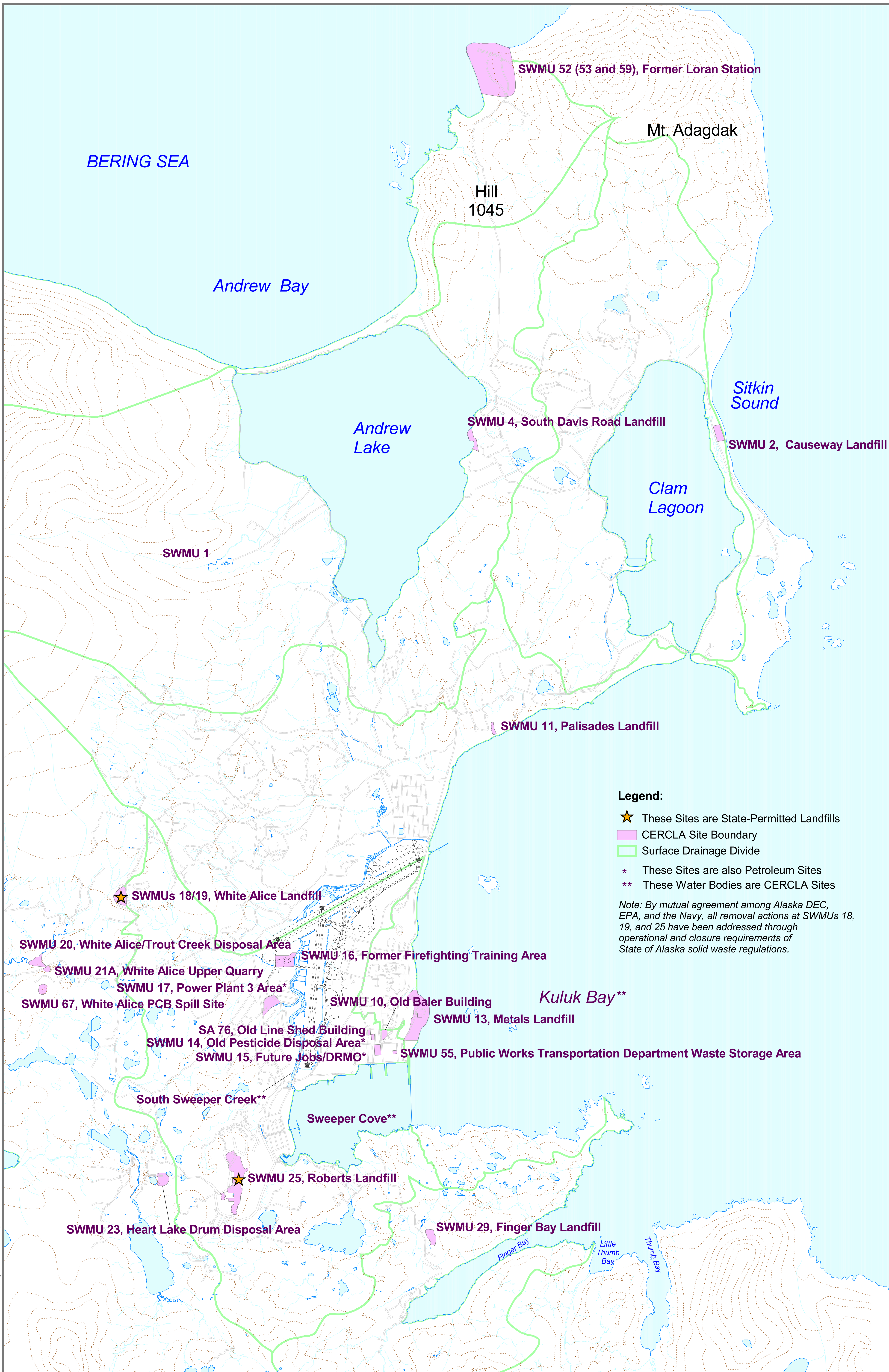
ⓐ Original number of petroleum sites from FFA.

ⓑ SWMU 12 was originally listed as a CERCLA site in the FFA. It was transferred to the SAERA process.

ⓒ NMCB Building (UST T-1416-A) was combined with this site.

ⓓ A complete listing of these sites is provided in Table 2-1 of the OU A ROD and includes SA 96 and SA 97 and all the sites without a SWMU or SA number, except does not include the five water bodies (Sweeper Cove, South Sweeper Creek, Clam Lagoon, Andrew Lake, and Kuluk Bay).

U.S.NAVY	Figure 2-2 Summary of Petroleum Site Process at Former Adak Naval Complex	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT



U.S. NAVY	N 0 2000 4000 Feet 1:50000	**Figure 2-3** **Operable Unit A CERCLA Sites That Require Further Action** **Adak Island, Alaska**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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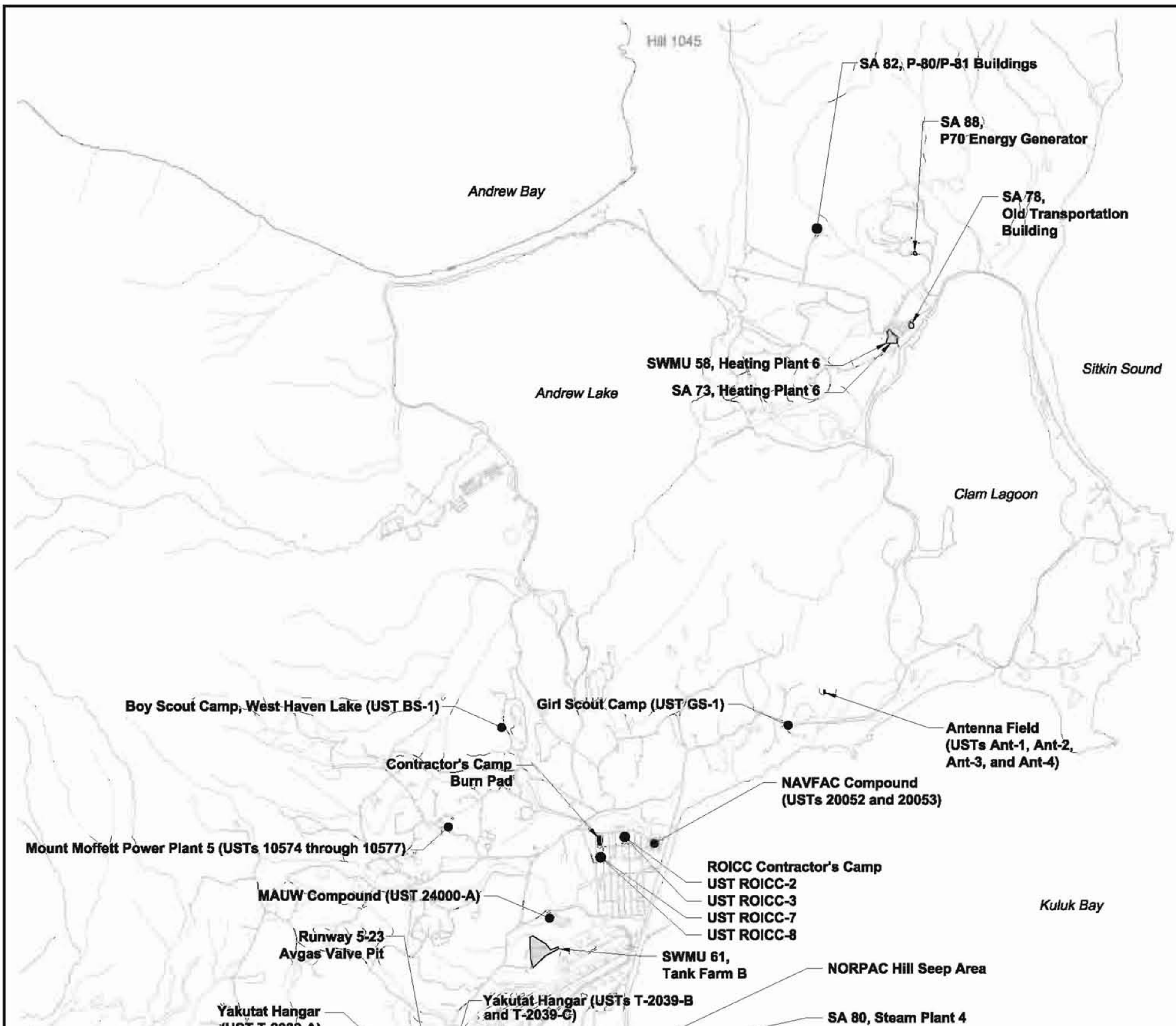

Notes:
1. SWMUs 14, 15, and 17 are also CERCLA Sites.
2. SA 77 is also a RCRA Site, but no further actions required under RCRA.

U.S. NAVY

Figure 2-4
Operable Unit A Petroleum Sites
That Require Further Action
Adak Island, Alaska

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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Table 2-1
Chronology of Site Events

Event	Date
Initial assessment study performed	1986
Site inspection	1989
RCRA remedial facility assessment	1990
Federal Facility Compliance Agreement under RCRA signed by EPA	November 20, 1990
Adak proposed for listing to the National Priorities List	October 1992
Formal National Priorities List listing	May 1994
FFA signed	1993
Two-party agreement (SAERA) regarding petroleum sites signed	April 1994
ROD for interim remedial action signed for Sites 11 and 13	March 1995
SAERA amended	August 1996
Operational closure of Adak Naval Air Station	March 1997
FFA amended to designate OU B	1998
ROD for OU A signed	April 2000
Institutional Control Management Plan implemented	2000
OU B divided into OU B-1 and OU B-2	2001
OU B-1 ROD signed	December 2001
First 5-year review signed	December 2001
FFA and SAERA amended to move petroleum sites from OU A to SAERA	March 2002
OU A remedy construction complete at all non-SAERA sites	2003
OU A ROD amended to move all petroleum sites with further action from OU A to SAERA	October 2003
Land transfer from DOI and the Navy to TAC completed	March 2004
Decision document for final remedy at 10 OU A SAERA sites	May 2005
Final remedy for 10 OU A SAERA sites implemented	2005
Decision document for final remedy at NMCB Building Expanded Area	January 2006
OU B-1 remedy construction complete at all sites	Pending
OU A remedy construction complete at all sites	Pending – expected 2008
Final remedy construction complete for four OU A SAERA sites	Pending – 2007

Notes:
EPA - U.S. Environmental Protection Agency
DOI - U.S. Department of the Interior
FFA - Federal Facilities Agreement
OU - operable unit
RCRA - Resource Conservation and Recovery Act
ROD - Record of Decision
SAERA - State-Adak Environmental Restoration Agreement
SWMUs - solid waste management unit
TAC - The Aleut Corporation

Table 2-2
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
1	Andrew Lake Waste Ordnance Demolition Range[c] (a.k.a. Andrew Lake OB/OD and Range)	CERCLA and SAERA	NA	OU A ROD
2	Causeway Landfill and Minefield[c]	CERCLA	NA	OU A ROD
3	Clam Lagoon Landfill	CERCLA	NA	OU A ROD
4	South Davis Road Landfill	CERCLA	NA	OU A ROD
5	North Davis Road Landfill	CERCLA	NA	OU A ROD
6	Andrew Lake Drum Disposal Area 1	CERCLA	NA	OU A ROD
7	Andrew Lake Drum Disposal Area 2	CERCLA	NA	OU A ROD
8	Andrew Lake Landfill and Shoreline[c]	CERCLA	Deferred to OU B	Deferred to OU B
9	Black Powder Club	CERCLA	NA	OU A ROD
10	Old Baler Building	CERCLA	NA	OU A ROD
11	Palisades Landfill	CERCLA	1995 ROD	OU A ROD
12	Quartermaster Road Debris Disposal Area (a.k.a. Quartermaster Site)	SAERA	NA	OU A ROD
13	Metals Landfill	CERCLA and RCRA	1995 ROD	OU A ROD
14	Old Pesticide Disposal Area (a.k.a. Old Pesticide Storage and Disposal Area)	CERCLA and SAERA	NA	OU A ROD
15	Future Jobs/DRMO (Former Hazardous Waste Storage)	CERCLA and SAERA	NA	OU A ROD
16	Former Firefighting Training Area (including SWMUs 32 and 33)	CERCLA	NA	OU A ROD
17	Power Plant 3 Area (including SWMUs 36–40 and 63) (a.k.a. Power Plant 3)	CERCLA and SAERA	OU A ROD, as amended	Decision Document Pending
18	South Sector Drum Disposal Area (now part of White Alice Landfill)	DEC-SW and CERCLA	NA	OU A ROD
19	Quarry Metal Disposal Area (now White Alice Landfill)	DEC-SW and CERCLA	NA	OU A ROD
20	White Alice/Trout Creek Disposal Area	CERCLA	NA	OU A ROD
21A	White Alice Upper Quarry	CERCLA	NA	OU A ROD
21B	White Alice Lower Quarry	CERCLA	NA	OU A ROD
21C	White Alice East Disposal Area	CERCLA	NA	OU A ROD
22	Avgas Drum Storage Area South of Tank Farm A (a.k.a. Avgas Drum Storage Area South of Tank Farm A)	SAERA	NA	OU A ROD
23	Heart Lake Drum Disposal Area	CERCLA	NA	OU A ROD
24	Hazardous Waste Container Storage Facility (a.k.a. Hazardous Waste Storage Facility)	RCRA and SAERA	NA	OU A ROD
25	Roberts Landfill	DEC-SW and CERCLA	NA	OU A ROD
26	Mitt Lake Drum Disposal Area	CERCLA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
27	Lake Leone Drum Disposal Area	CERCLA	NA	OU A ROD
28	Lake Betty Drum Disposal Area	CERCLA	NA	OU A ROD
29	Finger Bay Landfill	CERCLA	NA	OU A ROD
30	Magazine 4 Landfill	CERCLA	NA	OU A ROD
31	Runway 18-36 Aviation Gas Drum Disposal	SAERA	NA	OU A ROD
34	Steam Plant 4 Used Oil Storage Area (a.k.a. Steam Plant 4 Used Oil AST)	SAERA	NA	OU A ROD
35	GSE Used Oil Tank (a.k.a. Ground Support Equipment Building)	SAERA	NA	OU A ROD
41	Ground Support Equipment (GSE) Used Oil Storage Area	SAERA	NA	OU A ROD
42	GSE Steam Clean Oil/Water Separator	CERCLA	NA	OU A ROD
43	AIMD Acid Battery Storage Area	CERCLA	NA	OU A ROD
44	AIMD Used Oil Storage Area	SAERA	NA	OU A ROD
45	Sewage Treatment Plant (including SWMUs 46, 47, 48, 49, and 50) (a.k.a. Sewage Treatment Plant Petroleum Contamination)	SAERA	NA	OU A ROD
51	NSGA Transportation Bldg. 10354 Waste Storage Area	CERCLA	NA	OU A ROD
52	Former Loran Station (including SWMUs 53 and 59)	CERCLA	NA	OU A ROD
54	NMCB Battery Storage	CERCLA	NA	OU A ROD
55	Public Works Transportation Department Waste Storage Area	CERCLA and SAERA	NA	OU A ROD
56	Public Works Transportation Department Storage Tank	SAERA	NA	OU A ROD
57	Refueling Dock Oil/Water Separator (a.k.a. Fuels Facility Refueling Dock)	SAERA	NA	OU A ROD
58	NSGA 10348 JP-5 Tank (a.k.a. Heating Plant 6)	SAERA	OU A ROD, as amended	2005 Decision Document
60	Tank Farm A	SAERA	NA	OU A ROD
61	Tank Farm B	SAERA	NA	OU A ROD
62	Housing Area Fuel Leak (a.k.a. New Housing Fuel Leak)	SAERA	OU A ROD, as amended	Decision Document Pending ADEC approval in 2006
64	Tank Farm D	SAERA	NA	OU A ROD
65	Contractor's Camp Fire/Demolition Site	CERCLA	NA	OU A ROD
66	Palisades Lake PCB Spill	CERCLA	NA	OU A ROD
67	White Alice PCB Spill Site	CERCLA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
68	New Pesticide Storage Area (no evaluation done)	CERCLA	NA	OU A ROD
69	Ski Lodge Waste Pile	CERCLA	NA	OU A ROD
70	Davis Road Asphalt Drums	CERCLA	NA	OU A ROD
71	NSGA Fueling Facility	CERCLA	NA	OU A ROD
72	NSGA Transportation Building 10354	CERCLA	NA	OU A ROD
73	NSGA Oil/Water Separator (a.k.a. Heating Plant 6)	SAERA	OU A ROD, as amended	2005 Decision Document
74	Old Batch Facility	CERCLA and SAERA	NA	OU A ROD
75	Asphalt Storage Area	CERCLA	NA	OU A ROD
76	Old Line Shed Building	CERCLA	NA	OU A ROD
77	Fuel Division Area Drum Storage (a.k.a. Fuels Facility Refueling Dock, Small Drum Storage Area)	RCRA and SAERA	NA	OU A ROD
78	NSGA Building USTs (a.k.a. Old Transportation Building)	SAERA	OU A ROD, as amended	2005 Decision Document
79	Main Road Pipeline (a.k.a. Main Road Pipeline, North End [MRP-MW15] and South End)	SAERA	NA	OU A ROD
80	Steam Plant 4 USTs (a.k.a. Steam Plant 4)	SAERA	OU A ROD, as amended	2005 Decision Document
81	NSGA Gun Turret Hill USTs (a.k.a. Gun Turret Hill)	SAERA	NA	OU A ROD
82	NSGA P80, P81 USTs (a.k.a. P-80/P-81 Buildings)	SAERA	OU A ROD, as amended	2005 Decision Document
83	Former Chiefs Club Station (no evaluation done)	CERCLA	NA	OU A ROD
84	Sand Shed	SAERA	NA	OU A ROD
85	New Baler Building	SAERA	NA	OU A ROD
86	Old Happy Valley Child Care Center	SAERA	NA	OU A ROD
87	Old Zeto Point Wizard Station	SAERA	NA	OU A ROD
88	NSGA P70 Energy Generator (a.k.a. P-70 Energy Generator)	SAERA	OU A ROD, as amended	2005 Decision Document
89	Tank Farm C	SAERA	NA	OU A ROD
90	Husky Road Landfill (no evaluation done)	CERCLA	NA	OU A ROD
91	Airplane Crash Sites	CERCLA	NA	OU A ROD
92	Waste Ordnance Pile (Fin Field)	CERCLA	NA	OU A ROD
93	World War II Mortar Impact Area[c]	CERCLA	Deferred to OU B	Deferred to OU B
94	Chemical Weapons Disposal Area	CERCLA	NA	OU A ROD
95	Transformer Disposal Area	CERCLA	NA	OU A ROD
96	NORPAC Hill Debris Site	SAERA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
97	Generator Debris Site	SAERA	NA	OU A ROD
None[d]	Sweeper Cove	CERCLA	NA	OU A ROD
	South Sweeper Creek	CERCLA	NA	OU A ROD
	Clam Lagoon	CERCLA	NA	OU A ROD
	Andrew Lake	CERCLA	NA	OU A ROD
	Kuluk Bay	CERCLA	NA	OU A ROD
	Administration Building (UST 30004-A)	SAERA	NA	OU A ROD
	Amulet Housing, Well AMW-706 Area	SAERA	NA	OU A ROD
	Amulet Housing, Well AMW-709 Area	SAERA	NA	OU A ROD
	Antenna Field (USTs ANT-1, ANT-2, ANT-3, and ANT-4)	SAERA	NA	OU A ROD
	Armory (UST 10311-A)	SAERA	NA	OU A ROD
	Artillery Battalion (USTs ART-1 and ART-2)	SAERA	NA	OU A ROD
	ASR-8 Facility (UST 42007-B)	SAERA	NA	OU A ROD
	Bering Chapel (UST 42090-A)	SAERA	NA	OU A ROD
	Boy Scout Camp, South Haven Lake (UST BS-2)	SAERA	NA	OU A ROD
	Boy Scout Camp, West Haven Lake (UST BS-1)	SAERA	NA	OU A ROD
	CDAA Complex (USTs 10580 and 10654)	SAERA	NA	OU A ROD
	Clam Road Truck Fill Stand	SAERA	NA	OU A ROD
	Cold Storage Facility (AST T-1440)	SAERA	NA	OU A ROD
	Contractor’s Camp Burn Pad	SAERA	NA	OU A ROD
	Contractor’s Pad UST T-1706 (Navy Pad)	SAERA	NA	OU A ROD
	Drum Disposal Area at Tank Farm D	SAERA	NA	OU A ROD
	Elementary School (UST 42017-A)	SAERA	NA	OU A ROD
	Finger Bay Quonset Hut (UST FBQH-1)	SAERA	NA	OU A ROD
	Former Power Plant Building (T-1451)	SAERA	NA	OU A ROD
	GCI Compound (UST GCI-1)	SAERA	OU A ROD, as amended	2005 Decision Document
	Girl Scout Camp (UST GS-1)	SAERA	NA	OU A ROD
	Housing Area (Arctic Acres)	SAERA	NA	OU A ROD
	Housing Outfall Area (Sandy Cove)	SAERA	NA	OU A ROD
	Kuluk Housing (UST HST-6C)	SAERA	NA	OU A ROD
	Kuluk Recreation Center (UST 30034)	SAERA	NA	OU A ROD
	Line Crew Building (USTs 2776, 2776-B, and 2776-C)	SAERA	NA	OU A ROD
	Loran Station (USTs V149A, V149B, and V149C)	SAERA	NA	OU A ROD
	MAUW Compound (UST 24000-A)	SAERA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
	MAUW Compound (UST 24032-B)	SAERA	NA	OU A ROD
	McDonalds UST	SAERA	NA	OU A ROD
	Medical Center (UST 27088)	SAERA	NA	OU A ROD
	Mount Moffett Power Plant 5 (Used Oil AST)	SAERA	NA	OU A ROD
	Mount Moffett Power Plant 5 (Used Oil Pit)	SAERA	NA	OU A ROD
	Mount Moffett Power Plant 5 (USTs 10574 through 10577)	SAERA	NA	OU A ROD
	Mount Moffett Tower (Mogas AST and Used Oil AST)	SAERA	NA	OU A ROD
	NAVFAC Compound (USTs 20052 and 20053)	SAERA	NA	OU A ROD
	Navy Exchange Building (UST 30026)	SAERA	NA	OU A ROD
	Navy Exchange Building (UST 30027-A)	SAERA	NA	OU A ROD
	Navy Exchange Building (UST 30033)	SAERA	NA	OU A ROD
	New Roberts Housing (UST HST-7C)	SAERA	NA	OU A ROD
	New Transportation Building (O/W 10644)	SAERA	NA	OU A ROD
	New Transportation Building (UST 10590)	SAERA	NA	OU A ROD
	New Transportation Building (UST 10591)	SAERA	NA	OU A ROD
	NMCB Building Area, T-1416 Expanded Area	SAERA	OU A ROD, as amended	Decision Document Pending ADEC approval in 2006
	NMCB Building (UST T-1416-A)	SAERA	OU A ROD, as amended	Decision Document Pending ADEC approval in 2006
	NORPAC Hill Seep Area	SAERA	OU A ROD, as amended	2005 Decision Document
	NSGA Filling Station, Mogas and JP-5 ASTs	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31047-A)	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31049-A)	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31050-A)	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31051-A)	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31052-A)	SAERA	NA	OU A ROD
	Officer Hill and Amulet Housing (UST 31053-A)	SAERA	NA	OU A ROD
	Old Fuel Truck Shop (UST 10520-A)	SAERA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
	Old Fuel Truck Shop (UST 10520-B)	SAERA	NA	OU A ROD
	Pantograph Pad (UST RT-1)	SAERA	NA	OU A ROD
	Pumphouse 5 Area	SAERA	NA	OU A ROD
	Quarters A	SAERA	NA	OU A ROD
	ROICC Contractor's Area (UST ROICC-5)	SAERA	NA	OU A ROD
	ROICC Contractor's Area (UST ROICC-6)	SAERA	NA	OU A ROD
	ROICC Contractor's Area (UST ROICC-7)	SAERA	NA	OU A ROD
	ROICC Contractor's Area (UST ROICC-8)	SAERA	NA	OU A ROD
	ROICC Warehouse (UST ROICC-1)	SAERA	NA	OU A ROD
	ROICC Warehouse (UST ROICC-2)	SAERA	NA	OU A ROD
	ROICC Warehouse (UST ROICC-3)	SAERA	NA	OU A ROD
	ROICC Warehouse (UST ROICC-4)	SAERA	NA	OU A ROD
	Runway 5-23 Avgas Valve Pit	SAERA	NA	OU A ROD
	Sewage Lift Station 10 (UST 42483-A)	SAERA	NA	OU A ROD
	Sewage Lift Station 11 (UST 42484-A)	SAERA	NA	OU A ROD
	Shack O-52 (UST O-52)	SAERA	NA	OU A ROD
	Shack O-69 (UST B)	SAERA	NA	OU A ROD
	South Avgas Pipeline at North Sweeper Creek	SAERA	NA	OU A ROD
	South of Runway 18-36 Area	SAERA	OU A ROD, as amended	Decision Document Pending ADEC approval in 2006
	Tanker Shed (UST 42494)	SAERA	OU A ROD, as amended	2005 Decision Document
	Telephone Exchange Building (UST 10324-A)	SAERA	NA	OU A ROD
	Telephone Substation T-100 (UST T-100-B)	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area A	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area B	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area C	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area D	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area E (Truck Fill Stand)	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area F	SAERA	NA	OU A ROD
	TFB to TFC Pipeline—Area G	SAERA	NA	OU A ROD
	TFC to NSGA Pipeline—Area A	SAERA	NA	OU A ROD
	TFC to NSGA Pipeline—Area B	SAERA	NA	OU A ROD
	TFC to NSGA Pipeline—Area C	SAERA	NA	OU A ROD
	TFC to NSGA Pipeline—Area D	SAERA	NA	OU A ROD
	TFC to NSGA Pipeline—Area E (Truck Fill Stand)	SAERA	NA	OU A ROD

Table 2-2 (Continued)
CERCLA and Petroleum Sites Listed or Evaluated on Adak Island

SWMU or SA No.[a]	Site Name[b]	Listed or Investigated Under	Interim Remedy	Final Remedy
	USGS (NOAA) Building (USTs NOAA-A, -C, and -D)	SAERA	NA	OU A ROD
	Yakutat Hangar (UST T-2039-A)	SAERA	OU A ROD, as amended	2005 Decision Document
	Yakutat Hangar (USTs T-2039-B and T-2039-C)	SAERA	NA	OU A ROD

[a]Sites are listed first by SWMU or SA number, then by water body, then by alphabetical petroleum site name.
[b]First name shown is name under CERCLA; alternative name (“a.k.a. _____”) is name under SAERA.
[c]SWMUs 1 (CERCLA portion only), 2 (minefield portion only), and 8 and SA 93 will be evaluated in the OU B process. The SAERA portion of SWMU 1 and the landfill portion of SWMU 2 were evaluated in the OU A ROD.
[d]SWMU or SA numbers were assigned only to sites in the Federal Facilities Agreement.

Notes:
AIMD - Aircraft Intermediate Maintenance Detachment
AST - aboveground storage tank
avgas - aviation gasoline
CDAA - circular disposed antenna array
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
DEC-SW - Alaska Department of Environmental Conservation Solid Waste Regulation
DRMO - Defense Reutilization Marketing Office
GCI - General Communications, Inc.
GSE - ground support equipment
JP-5 - jet petroleum No. 5
Loran - long-range navigation
MAUW - modified advanced underwater weapons
NA - not applicable
NAVFAC - Naval Facility
NMCB - Naval Mobile Construction Battalion
NOAA - National Oceanic and Atmospheric Administration
NORPAC - North Pacific
NSGA - Naval Security Group Activity
OB/OD - open burn/open detonation
O/W - oil/water separator
PCB - polychlorinated biphenyl
RCRA - Resource Conservation and Recovery Act
ROD - record of decision
ROICC - resident officer in charge of construction
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit
TFB - Tank Farm B
TFC - Tank Farm C
USGS - U.S. Geological Survey
UST - underground storage tank

Table 2-3
OU A No Further Action CERCLA Sites

Site[a]
SWMU 3, Clam Lagoon Landfill
SWMU 5, North Davis Road Landfill
SWMU 6, Andrew Lake Drum Disposal Area 1
SWMU 7, Andrew Lake Drum Disposal Area 2
SWMU 9, Black Power Club
SWMU 21B, White Alice Lower Quarry
SWMU 21C, White Alice East Disposal Area
SWMU 24, Hazardous Waste Storage Facility — RCRA Closure under FFCA[b]
SWMU 26, Mitt Lake Drum Disposal Area
SWMU 27, Lake Leone Drum Disposal Area
SWMU 28, Lake Betty Drum Disposal Area
SWMU 30, Magazine 4 Landfill
SWMU 42, GSE Steam Clean Oil/Water Separator
SWMU 43, AIMD Acid Battery Storage Area
SWMU 51, NSGA Transportation Bldg. 10354 Waste Storage Area
SWMU 54, NMCB Battery Storage
SWMU 65, Contractor's Camp Fire/Demolition Site
SWMU 66, Palisades Lake PCB spill
SWMU 68, New Pesticide Storage Area
SWMU 69, Ski Lodge Waste Pile
SWMU 70, Davis Road Asphalt Drums
SWMU 71, NSGA Fueling Facility
SWMU 72, NSGA Transportation Building 10354
SWMU 74, Old Batch Facility[c]
SA 75, Asphalt Storage Area
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area — RCRA Closure under FFCA[d]
SA 83, Former Chiefs Club Station
SA 90, Husky Road Landfill
SA 91, Airplane Crash Sites
SA 92, Waste Ordnance Pile (Fin Field)
SA 94, Chemical Weapons Disposal Area
SA 95, Transformer Disposal Area
Clam Lagoon
Andrew Lake

Table 2-3 (Continued)
OU A No Further Action CERCLA Sites

[a]The total number of no further action CERCLA sites is 34, and the total number of no further action petroleum sites is 82 (see Table 2-4). However, the total number of no further action sites is 114 not 116, because SWMUs 24 and 74 are listed under CERCLA and petroleum sites.
[b]SWMU 24, Hazardous Waste Storage Facility is included as a no further action site for both RCRA and petroleum sites (see Tables 2-4).
[c]SWMU 74, Old Batch Facility is included as a no further action site for both CERCLA and petroleum sites (see Table 2-4).
[d]This site is both a RCRA and SAERA site. This site is a no further action site under RCRA, as shown in this table. The selected remedial alternative under SAERA is limited soil removal (see Figure 2-2 and Table 4-4).

Notes:
AIMD - Aircraft Intermediate Maintenance Detachment
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
FFCA - Federal Facilities Compliance Agreement
GSE - ground support equipment
NMCB - Naval Mobile Construction Battalion
NSGA - Naval Security Group Activity
OU - operable unit
PCB - polychlorinated biphenyl
RCRA - Resource Conservation and Recovery Act
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit

Table 2-4
OU A No Further Action Petroleum Sites

Site[a]
Administration Building (UST 30004-A)
Armory (UST 10311-A)
Artillery Battalion (USTs ART-1 and ART-2)
Bering Chapel (UST 42090-A)
Boy Scout Camp, South Haven Lake (UST BS-2)
CDAA Complex (USTs 10580 and 10654)
Clam Road Truck Fill Stand
Cold Storage Facility (AST T-1440)
Contractor’s Pad UST T-1706 (Navy Pad)
Drum Disposal Area at Tank Farm D
Elementary School (UST 42017-A)
Housing Outfall Area (Sandy Cove)
Kuluk Housing (UST HST-6C)
Kuluk Recreation Center (UST 30034)
Line Crew Building (USTs 2776, 2776-B, and 2776-C)
Loran Station (USTs V149A, V149B, and V149C)
MAUW Compound (UST 24032-B)
McDonald’s UST
Medical Center (UST 27088)
Mount Moffett Power Plant 5 (Used Oil AST)
Mount Moffett Power Plant 5 (Used Oil Pit)
Mount Moffett Tower (Mogas AST and Used Oil AST)
Navy Exchange Building (UST 30026)
Navy Exchange Building (UST 30033)
New Transportation Building (O/W 10644)
New Transportation Building (UST 10590)
New Transportation Building (UST 10591)
NSGA Filling Station, Mogas and JP-5 ASTs
Officer Hill and Amulet Housing (UST 31050-A)
Officer Hill and Amulet Housing (UST 31051-A)
Officer Hill and Amulet Housing (UST 31053-A)
Old Fuel Truck Shop (UST 10520-A)
Old Fuel Truck Shop (UST 10520-B)
Pantograph Pad (UST RT-1)
Pumphouse 5 Area
ROICC Contractor’s Area (UST ROICC-5)
ROICC Contractor’s Area (UST ROICC-6)
ROICC Warehouse (UST ROICC-1)
ROICC Warehouse (UST ROICC-4)
SA 81, Gun Turret Hill
SA 84, Sand Shed

Table 2-4 (Continued)
OU A No Further Action Petroleum Sites

Site[a]
SA 85, New Baler Building
SA 86, Old Happy Valley Child Care Center
SA 87, Old Zeto Point Wizard Station
SA 89, Tank Farm C
SA 96, NORPAC Hill Debris Site
SA 97, Generator Debris Site
Sewage Life Station 10 (UST 42483-A)
Sewage Lift Station 11 (UST 42484-A)
Shack O-52 (UST O-52)
Shack 0-69 (UST B)
South Avgas Pipeline at North Sweeper Creek
SWMU 1, Andrew Lake OB/OD and Range
SWMU 12, Quartermaster Road Debris Disposal Area
SWMU 22, Avgas Drum Storage Area South of Tank Farm 1
SWMU 24, Hazardous Waste Storage Facility[b]
SWMU 31, Runway 18-36 Aviation Gas Drum Disposal
SWMU 34, Steam Plant 4 Used Oil AST
SWMU 35, Ground Support Equipment Building
SWMU 41, GSE Used Oil Storage Area
SWMU 44, AIMD Used Oil Storage Area
SWMU 45, Sewage Treatment Plan Petroleum Contamination (including SWMUs 46 through 50)
SWMU 55, Public Works Transportation Department Waste Storage Area[c]
SWMU 56, Public Works Transportation Department Storage Tank
SWMU 57, Fuels Facility Refueling Dock
SWMU 64, Tank Farm D
SWMU 74, Old Batch Facility[d]
Telephone Exchange Building (UST 10324-A)
Telephone Substation T-100 (UST T-100-B)
TFB to TFC Pipeline—Area A
TFB to TFC Pipeline—Area B
TFB to TFC Pipeline—Area C
TFB to TFC Pipeline—Area D
TFB to TFC Pipeline—Area E (Truck Fill Stand)
TFB to TFC Pipeline—Area F
TFB to TFC Pipeline—Area G
TFC to NSGA Pipeline—Area A
TFC to NSGA Pipeline—Area B
TFC to NSGA Pipeline—Area C
TFC to NSGA Pipeline—Area D
TFC to NSGA Pipeline—Area E
USGS (NOAA) Building (USTs NOAA-A, -C, and -D)

Table 2-4 (Continued)
OU A No Further Action Petroleum Sites

[a]The total number of no further action petroleum sites is 82, and the total number of no further action CERCLA sites is 34 (see Table 2-3). However, the total number of no further action sites is 114 not 116, because SWMUs 24 and 74 are listed under CERCLA and petroleum sites.
[b]SWMU 24, Hazardous Waste Storage Facility is included as a no further action site for both RCRA (see Table 2-3) and petroleum sites.
[c]This site is both a CERCLA and SAERA site. This site is a no further action site under SAERA as shown in this table. The selected remedial alternative under CERCLA is institutional controls (see Figure 2-1 and Table 4-2).
[d]SWMU 74, Old Batch Facility is included as a no further action site for both CERCLA (see Table 2-3) and petroleum sites.

Notes:
AIMD - Aircraft Intermediate Maintenance Detachment
AST - aboveground storage tank
avgas - aviation gasoline
CDAA - circular disposed antenna array
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
GSE - ground support equipment
JP-5 - jet petroleum No. 5
loran - long-range navigation
MAUW - modified advanced underwater weapons
mogas - motor vehicle gasoline
NOAA - National Oceanic and Atmospheric Administration
NORPAC - North Pacific
NSGA - Naval Security Group Activity
OB/OD - ordnance burn, ordnance detonation
OU - operable unit
RCRA - Resource Conservation and Recovery Act
ROICC - resident officer in charge of construction
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit
TFB - Tank Farm B
TFC - Tank Farm C
USGS - U.S. Geological Survey
UST - underground storage tank

3.0 BACKGROUND

Military presence on Adak began in 1942 with its occupation as a staging area to mount a counter-offensive to dislodge the Japanese from Attu and Kiska Islands. The Navy presence at Adak was officially recognized by Public Land Order 1949, dated August 19, 1959, which withdrew the northern portion of Adak Island, comprising approximately 76,800 acres, for use by the Navy for military purposes. The Navy also used the base to conduct a variety of Cold War-era military activities. Naval Air Facility Adak was on the list of Department of Defense installations recommended for closure in 1995, and that recommendation became final when Congress did not disapprove the list. The active Navy mission ceased, and the base operationally closed on March 31, 1997.

From April 1997 through September 2000, critical facilities such as the power plant, airfield, and environmental cleanup systems were operated by the Navy through a caretaker contractor. In June 1998, the Navy entered into a lease with the Adak Reuse Corporation (ARC), the designated local redevelopment authority that authorized ARC to use or sublease property in the developed core of the military reservation for commercial reuse purposes. In October 2000, ARC commenced operation of community facilities such as the airfield and utility systems in support of reuse activities under the authority of this lease.

In September 2000, the federal government entered into a land transfer agreement with The Aleut Corporation (TAC), a Native corporation, as documented in the Interim Conveyance document issued by the United States Department of the Interior, Bureau of Land Management. This agreement set forth the terms and conditions for the conveyance of approximately 47,000 acres of the former Adak Naval Complex property to TAC. The actual conveyance or transfer of property occurred on March 17, 2004. The Interim Conveyance document is published as Attachment D-1 of the ICMP, which is Appendix D of the Comprehensive Monitoring Plan (CMP), Revision 2 (U.S. Navy 2005c). The land transfer included all of the downtown area, housing units, and industrial facilities. Excluded from this transfer are any offshore islands, islets, rocks, reefs, and spires; those fixtures and equipment owned by the United States and associated with the airfield; those improvements owned by the United States and managed by the Federal Aviation Administration; and those improvements owned by the United States and managed by the Fish and Wildlife Service. The Aleut Corporation transferred the portion of the former Adak Naval Complex known as Adak Airport and associated facilities and aviation easements, not including Federal Aviation Administration navigation aids or weather reporting equipment, to the State of Alaska.

3.1 OPERABLE UNIT A

OU A addresses chemical releases to the environment throughout the entire military reservation. The investigation and remediation of OU A sites involved state regulations, as well as CERCLA and RCRA procedures. As discussed in Section 2, a total of 180 sites were evaluated for OU A. Two of these sites were deferred to OU B (SWMU 8 and SA 93). Of the remaining 178 sites, 121 sites were petroleum sites, 50 sites were investigated under CERCLA, 5 were investigated under both CERCLA and SAERA, and 2 were investigated under both RCRA and SAERA. Figure 2-1 presents an overview of the process used to evaluate OU A CERCLA sites, and Figure 2-2 presents an overview of the process used to evaluate OU A petroleum sites.

3.1.1 CERCLA and RCRA Sites

This section provides background information for the CERCLA and RCRA sites discussed in this second 5-year review. Site history, use, wastes generated, and chemicals of concern (COCs) are summarized below for each CERCLA and RCRA site that required remedial action. Information in this section generally provides the basis for taking action at each site and summarizes activities up through signing of the OU A ROD. Ongoing activities are mentioned with reference to additional details in later sections. Complementary site information, including site figures, is provided in the Site Catalog (Appendix A). Selected remedies, implementation, and operation and maintenance for the sites that required remedial action are presented in Section 4. Data collected during this 5-year review period are discussed in Section 6.4.

SWMU 2, Causeway Landfill

SWMU 2, the Causeway Landfill, is located on the eastern side of Clam Road on a narrow strip of land separating Clam Lagoon from Sitkin Sound (Figure 2-3). The landfill is approximately 2 to 3 acres in area and is about 4 to 6 feet thick. The elevation of the site is between 5 and 20 feet above mean lower low water (MLLW). An elevated ridgeline along Sitkin Sound marks its eastern boundary, and Clam Road marks its western boundary. To the west of the site are several depressions permanently filled with water, remaining from borrow operations. Materials observed within these pits consist of clean sands, cobbles, and boulders. To the west of these water-filled depressions is a linear ridge of organic materials and gravels that appear to have been stripped from the area to expose the underlying cobble and gravel. The landfill has been covered with a soil cap; however, metal debris could be seen protruding from this cover based on a 1975 aerial photograph.

The Causeway Landfill was operated from the mid-1950s to the early 1960s and reportedly received waste materials that included sanitary trash, construction debris, scrap equipment, and other refuse generated by Naval Security Group Activity (NSGA) (NEESA 1986). No records have been found indicating the amount of hazardous material that may have entered the landfill.

Based on known operations at NSGA, it has been estimated that less than 50 gallons of liquid waste per month were disposed of at this location (NEESA 1986).

World War II defensive plans for the island from May 1945 contained proposed locations for defensive works including 27 minefield locations with instructions to emplace mines in the event of imminent invasion. The threat of invasion of Adak never occurred and 3 months after the date of the defensive plan, World War II ended. Nonetheless, the potential minefields were investigated intrusively or by surface inspection. Live mines and training mines (both inert and live) were found only at the SWMU 2 minefield, geographically separate from the SWMU 2 landfill to the south. The mines are believed to have been placed there for training purposes and not as part of the defensive plan. In 1998, the mines were removed from the site by the Navy.

SWMU 2, Causeway Landfill was investigated from 1994 through 1997 for subsurface and surface contamination, including ordnance compounds. No detections of ordnance compounds were identified from subsurface soil or groundwater samples, and no visual evidence of MEC in landfill debris was observed during intrusive investigations. Inspections of the Causeway Landfill in May 2001 and in subsequent years show that the landfill cover is intact. Equitable servitudes dictate that the land use at this site remain nonresidential in perpetuity and that no activities are permitted to compromise the integrity of the landfill cover.

Analytical results of sediment, soil, and groundwater samples were used in a Preliminary Source Evaluation 2 (PSE-2) (U.S. Navy 1995f) and a revised PSE-2 (U.S. Navy 1996a). The estimated cumulative human health risk under a residential use scenario was 1.1×10^{-5} due to the presence of Aroclors, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), and semivolatile organic compounds (SVOCs) in the subsurface soil. The ecological hazard index (HI) was 85, based on exposure to subsurface soils. Ecological receptors used in the risk assessment do not burrow; therefore, as long as the landfill cover is not disturbed, the site does not pose a significant risk to ecological receptors.

SWMU 4, South Davis Road Landfill

SWMU 4, South Davis Road Landfill, is located on the eastern shore of Andrew Lake (Figure 2-3). The western boundary of the site is the shoreline of Andrew Lake. The eastern boundary of the site is at the base of a ridge that ranges from approximately 90 feet above MLLW on the north to approximately 50 feet above MLLW on the southern boundary of the site.

The surface of the site is approximately 20 to 25 feet above MLLW and is relatively flat and featureless. The elevation of Andrew Lake is approximately 15 feet above MLLW. Two intermittent streams transect the site that is predominantly covered with grasses, dwarf woody shrubs (tundra), and mosses. Metal and other debris were observed on the surface in a 1975 aerial photograph and protruded from the soil at several locations. Field observations indicate that the landfill encompasses approximately 3 acres.

The South Davis Road Landfill was operated from the early to late 1940s (NEESA 1986). The date of closure is uncertain, but is believed to be prior to 1950 (SAIC 1991). The majority of the materials disposed of in this landfill are believed to be solid wastes generated from the construction and subsequent demolition of Albert Mitchell Airfield. Albert Mitchell Airfield was constructed between Clam Lagoon and Andrew Lake in 1942. Albert Mitchell Airfield was closed in 1945, and all associated activities were transferred to Davis Field at Naval Air Facility (NAF) Adak.

Analytical results of sediment, soil, surface water, and sediment samples were used in a PSE-2 (U.S. Navy 1995f) and a revised PSE-2 (U.S. Navy 1996a). The human health risk under a residential use exposure scenario was estimated to be 4.5E-05. The primary risk driver was arsenic in subsurface soil. The ecological HI associated with soil was 126. Primary ecological risk drivers were inorganics, Aroclors, and 2,3,7,8-TCDD. Ecological receptors used in the risk assessment do not burrow; therefore, as long as the landfill cover is not disturbed, the site does not pose a significant risk to ecological receptors.

SWMU 10, Old Baler Building

SWMU 10 the Old Baler Building site is located west of Monument Hill and approximately 1,200 feet north of Sweeper Cove (Figure 2-3). The Old Baler facility was once used to mechanically compact and compress municipal waste. Polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), SVOCs, and inorganics have been detected in soils at this site. The presence of these chemicals constitutes the principal concern at SWMU 10.

The facility is approximately 1.5 acres in area. It has a foundation footprint measuring approximately 100 feet (east-west dimension) in width by 200 feet (north-south dimension) in length. SWMU 10 ranges in elevation from 32.6 feet above mean sea level (msl) at the northeast end of the site to 20.6 feet above msl at the southwest corner. The ground surface at the site is gradually sloped to the southwest.

The date when operations started at the Old Baler facility is not known. Based on historical information, the building housing the baling equipment (used for compacting waste material) was constructed as a warehouse during World War II (SAIC 1991). In the late 1950s, the building was converted into a compaction and baling facility for municipal waste. Before its conversion, the building was used as an auto repair shop and living quarters for the line crew (U.S. Navy 2001b). Materials reportedly stored in the building in the past include transformers, traffic signs, pipe, wire spools, metal fencing, tires, welding gases, and 55-gallon drums of lubricants and transmission oils (U.S. Navy 1995g).

The baler building was demolished in 1992, and the concrete foundation pad was left in place. There is currently no activity at the site. Access to the site is restricted by an enclosing perimeter fence.

Analytical results of surface soil samples collected for the site inspection (U.S. Navy 1992) were used in a PSE-1 (U.S. Navy 1995g). Human health risk under a residential exposure scenario was estimated to be 6E-05. The estimated risk under an industrial exposure scenario (current use) is 3×10^{-6}. The primary risk drivers are indeno(1,2,3-cd)pyrene and Aroclor 1260 in surface soil. The ecological HI associated with surface soil was 59. The primary ecological risk driver is Aroclor 1260 in surface soil. Because of the site and habitat characteristics, the site was found to not pose a significant risk to ecological receptors.

SWMU 11, Palisades Landfill

SWMU 11, Palisades Landfill, is located several miles north of the main downtown area and was used as the primary disposal area for all operations on Adak Island from the 1940s to approximately 1970 (Figure 2-3). The landfill area, which is approximately 6 acres, covers portions of the coastal uplands immediately adjacent to Kuluk Bay and part of a canyon or ravine. The ravine is approximately 1,200 feet long, 5 to 300 feet wide, and 5 to 150 feet deep, with a small stream (Palisades Creek) that runs through it. The mouth of the ravine opens immediately to Kuluk Bay.

The landfill received wastes from the 1940s to the 1990s. Approximately 80,000 to 100,000 cubic yards of solid waste are located in the landfill. A wide variety of materials was reportedly disposed of at Palisades Landfill, including waste petroleum, oil, and lubricant (POL); chlorinated and nonchlorinated solvents; paint waste; sanitary trash; scrap vehicles; lead and mercury batteries; construction waste; and mercury. The landfill was covered with local soils in the early 1970s after disposal practices were stopped. A portion of the material disposed of within the ravine has no cover and is on a slope. The exposed waste in the ravine consists primarily of barrels and construction waste. The waste in the ravine covers a portion of Palisades Creek, which runs through the landfill before emptying into Kuluk Bay. The landfill does not extend into Kuluk Bay. Groundwater occurs locally under the site and discharges into the marine environment at the downgradient boundary.

Surface soil, groundwater, surface water, and stream sediment samples were collected during the 1988 and 1992 site investigations. VOCs, SVOCs, Aroclors, and inorganics were detected in soil. VOCs, SVOCs, and inorganics were detected in sediment. Inorganics were detected in surface water. Although no remedial investigation or risk assessment was performed at the time, the FFA parties concluded that performing an interim remedial action was the best option because of the following:

- The potential for exposure to contaminants in the environment in concentrations high enough to pose unacceptable human health risks or ecological impacts, based on the estimated nature and volume of wastes disposed of

- The toxic nature of the materials disposed of (e.g., chlorinated solvents were reportedly disposed of at both sites)

- The proximity of the site to sensitive marine environments

- The limited number of cost-effective remedial alternatives available for landfills

- The perception that the benefit gained by performing a detailed RI and feasibility study (FS) prior to choosing an appropriate remedy would be offset by the cost of that investigation and the delay in implementing an action

- The need to stabilize the landfill and minimize further degradation

Note that risk potentially attributable to SWMU 11 is assessed as part of the monitoring program established for Kuluk Bay (discussed in Section 6.4), the downgradient water body which was evaluated by a risk assessment in the Adak RI/FS (U.S. Navy 1997a). The remedy consisted of the installation of the landfill cover. Rock sole fillet and blue mussel tissue monitoring began in 1996, as discussed in Sections 4 and 6.4. There is also a fish consumption advisory for Kuluk Bay. The interim remedial actions reduced exposures and, therefore, risks to both human and ecological receptors.

SWMU 13, Metals Landfill

SWMU 13, Metals Landfill, is located immediately southeast of the central community of Adak and is bounded by Monument Hill to the west and Kuluk Bay to the east (Figure 2-3). The total volume of landfill waste and soil in Metals Landfill is approximately 400,000 cubic yards, not including the material that was scattered on the surface and adjacent to the shoreline. The total site area is approximately 28 acres, of which approximately 19 acres were used as a landfill.

Metals Landfill began operations in the 1940s and received a variety of waste materials, including sanitary trash, construction waste, paints, chlorinated and nonchlorinated solvents, batteries, scrap vehicles, medical waste, and sewage sludge. In 1970, restrictions were placed on the types of materials that could be disposed of at the landfill. Beginning in 1988, when a sludge press was installed at the sewage treatment plant, dewatered sewage sludge was disposed of on the southern end of the eastern section of the landfill. The landfill stopped receiving wastes in 1989.

A site inspection of Metals Landfill was conducted in 1989 by regulatory agencies. The investigation discovered four drums with liquid, one cracked vehicular battery, and one acetylene cylinder scattered in one small area of the landfill. As a result of the inspection, the regulatory agencies determined that the battery area contained hazardous waste and, therefore, was considered a hazardous waste pile under RCRA. This is the only area of the landfill to have a RCRA violation. The remaining landfill has been designated as a solid waste management unit under RCRA. The presence of the batteries resulted in a Federal Facilities Compliance Agreement being signed and issued by the EPA in November 1990 (USEPA 1990). This hazardous waste pile was closed under RCRA guidelines.

Surface and subsurface soil, groundwater, surface water, and sediment samples were collected during the 1989 and 1992 site investigations, and quarterly groundwater sampling was conducted in 1992 and 1993. VOCs, SVOCs, pesticides, Aroclors, and inorganics were detected in soil. Total petroleum hydrocarbons (TPH) were detected above regulatory criteria in one well. Although no RI or risk assessment was performed at the time, the FFA parties concluded that performing an interim remedial action was the best option because of the following:

- The potential for exposure to contaminants in the environment in concentrations high enough to pose unacceptable human health risks or ecological impacts, based on the estimated nature and volume of wastes disposed of
- The toxic nature of the materials disposed of (e.g., chlorinated solvents were reportedly disposed of at both sites)
- The proximity of the site to sensitive marine environments
- The limited number of cost-effective remedial alternatives available for landfills
- The perception that the benefit gained by performing a detailed RI/FS prior to choosing an appropriate remedy would be offset by the cost of that investigation and the delay in implementing an action
- The need to stabilize the landfill and minimize further degradation

After the landfill was recontoured and capped in 1996, the Navy performed additional construction activities at the site. In 2000, the Navy removed approximately 98 percent of the scrapped equipment and miscellaneous metal debris that littered approximately 1,500 feet of the shoreline along the landfill, and installed a protective riprap cover over the shoreline (U.S. Navy 2004b).

The Navy maintains the cover so that the potential exposure pathways are not complete. There is currently no potential future adverse risk to human health or ecological receptors. Risk that is potentially attributable to SWMU 13 is assessed as part of the monitoring program established for Kuluk Bay, the downgradient water body, which was evaluated by a risk assessment in the Adak RI/FS (U.S. Navy 1997a). The remedy and monitoring program consist of the installation of the landfill cover, and rock sole fillet and blue mussel tissue monitoring beginning in 1996, as discussed in Sections 4 and 6.4. There is also a fish consumption advisory for Kuluk Bay.

SWMU 14, Old Pesticide Disposal Area

SWMU 14, the Old Pesticide Disposal Area, consists of a vacant property located to the southwest of the Public Works building in the downtown area (Figures 2-3 and 2-4). The site includes the foundation of former Building 1471 and an abandoned drain field reportedly used to disperse pesticide rinse water (Tetra Tech 1989). The site is bounded to the north by the Public Works building parking area and Raven Street, to the south by Public Works Road, to the west by an unnamed dirt road, and to the east by the Public Works building and its unnamed paved access road. Except for the concrete building foundation (slab) the site consists of a featureless, flat-lying, unpaved soil area covered with gravel. Elevation of the site ranges from about 23 to 24 feet above mean lower low water (MLLW). Sweeper Cove is located approximately 1,500 feet south of the site.

Building 1471 was used from 1950 to 1987 for handling a variety of pesticides (Tetra Tech 1989). From 1950 to 1980, residual material and rinse water from pesticide handling were discharged through a drainpipe to a subsurface drainfield at the south end of the building. The drainpipe reportedly broke in 1980, resulting in discharge directly to the ground surface from 1980 to 1984 (NEESA 1986). Recycling of pesticide wastes and rinse water was initiated in 1984, and no additional wastewater was discharged to the site. During active use of the drainfield, an estimated 10 pounds per month of pesticides were reportedly discharged to the site, including Tordon, Dursban, pyrethrum, boric acid, Safrotin, and Vaponite (NEESA 1986). The basis for this estimate was not provided in the report.

Building 1471 was also used as a motor vehicle filling station from approximately 1950 to 1985. Two USTs, one for leaded and one for unleaded gasoline, were reportedly located approximately 100 feet south of the building foundation. The contents were reported to have been drained in 1988, but the tanks were believed to have been left in place (Hertzog 1988). In 1992, the Navy used ground-penetrating radar to locate the USTs. Suspect locations were identified. Excavations to locate the tanks occurred in 1996 during the PSE-2 field work. Empty fuel pipes were found and excavated, but there was no evidence of buried USTs.

Analytical results of groundwater samples, and surface and subsurface soil samples were used to evaluate human health risk (U.S. Navy 1996a). The cancer risk for the Adak residential scenario is 4.2×10^{-5}. The risk drivers for this site are benzo(a)pyrene in soil and tetrachloroethene in groundwater. The noncancer risk HI for the residential scenario is less than 1. SWMU 14 is not considered an ecological risk, because the site is not a likely habitat for foraging or nesting by ecological receptors.

SWMU 14 was also evaluated under SAERA, because it contains petroleum contamination. The site was screened by the Alaska DEC groundwater cleanup levels and was retained for evaluation in the focused feasibility study, because the maximum concentration of gasoline-range organics (GRO) exceeded the screening criteria of 1,300 µg/L (18 AAC 75.345) during all four quarterly groundwater sampling events in 1999 and 2000 (U.S. Navy 2001a). Additionally, toluene was detected at 370,000 µg/L in June 2000, which exceeds the ROD-established groundwater cleanup levels of 1,000 µg/L (18 AAC 75.345)(U.S. Navy 2001a).

SWMU 15, Future Jobs/Defense Reutilization Marketing Office

SWMU 15, Future Jobs/Defense Reutilization Marketing Office (DRMO), also known as the former Hazardous Waste Storage Area, is located south of the Public Works Building and north of Sweeper Cover between Warehouse No. 2 (Building T-1443) and Warehouse No. 3 (Building T-1446), which are to the east and west of the site, respectively (Figures 2-3 and 2-4). The site is bordered on the north by Public Works Road and on the south by a paved area used for temporary storage of container vans and supplies. The entire 3½ acre site is surrounded by a 6-foot-high chain-link fence, with another fence separating it into north and south storage areas. The only structure on site is a sheet metal storage shed at the northeast corner. The site is relatively flat, ranging between 18 and 19 feet above MLLW.

SWMU 15 was used as a storage yard from the 1950s until the site was cleared in 1992. It was initially used by DRMO (formerly the Defense Property Disposal Office) until 1984. Materials were left at the site until their removal in 1992 (U.S. Navy 1996a). Materials stored at the site included construction materials (drums, crates, pipe, conductor cable, and brick), paints, chlorinated and nonchlorinated solvents, utility line transformers, and compounds. According to a previous study (Tetra Tech 1989), no hazardous wastes have been stored at the site since 1984. As indicated in the initial assessment study (NEESA 1986), 150 gallons of PCB transformer coolant were spilled near the southeast corner of the south fenced area (Hertzog 1988).

In 1992, approximately 252 cubic yards of surface soil were removed, based on sampling conducted in 1990. Additional samples of surface and subsurface soil, sediment, and groundwater were collected in 1996 for the PSE-2.

Analytical results of groundwater and surface and subsurface soil samples were used to evaluate human health and ecological risk (U.S. Navy 1996a). The cancer risk for the Adak residential scenario is 7.1×10^{-5}. The primary risk drivers are Aroclor 1260 and dioxin/furans in soil and tetrachloroethene in groundwater. The noncancer risk HI for the residential scenario is less than 1. SWMU 15 is not considered an ecological risk, because the site is not a likely habitat for foraging or nesting by ecological receptors.

SWMU 16, Former Firefighting Training Area

SWMU 16, the Former Firefighting Training Area, occupies approximately 4 acres between taxiways about 500 feet south of the west end of Runway 5-23 (Figure 2-3). It is generally flat, with elevations ranging from 5 to 12 feet above MLLW.

From 1970 to 1989, firefighting training exercises were performed at this site. During these exercises, petroleum, waste oil, and solvents were floated on water within burn pits and repeatedly ignited and extinguished as part of the firefighting training. Three burn pits were constructed within the training area. The pits were constructed of soil berms on top of a concrete surface. It was estimated that 120 gallons of flammable liquid were used during each exercise. In 1985, 20,000 gallons of waste petroleum were reportedly disposed of at the site (NEESA 1986) and apparently ignited for firefighting training.

Analytical results of sediment, surface and subsurface soil, and groundwater were used to assess human health and ecological risk in the PSE report for the site (U.S. Navy 1996a). The ecological HI for the site was 70, which warranted further action. The risk driver was Aroclor 1260. In 1997, the Navy conducted an interim removal of soil near the concrete apron, which contained PCBs in excess of 1 mg/kg. Another risk evaluation that was based on post-removal conditions (U.S. Navy 1997a) indicates that the human health cancer risk is 4×10^{-5}, because of Aroclor 1260 in soil (based on a residential scenario). The ecological HI was reduced to 27 as a result of the removal action, which was determined to be acceptable for several reasons presented in the revised PSE in the RI/FS report (U.S. Navy 1997a).

SWMU 17, Power Plant 3 Area

SWMU 17, the Power Plant 3 Area, is west of the downtown core area and Runway 18-36 (Figures 2-3 and 2-4). SWMU 17 contains or contained a number of areas of concern, including the waste oil pond, the north pond, the bulk storage waste oil tank, two oil/water separators, two temporary drum accumulation areas, the power plant tank farm, the seepage area along the slope below the power plant, a Quonset hut used previously for transformer storage, the dry cleaners, and stained areas within the ditches along both sides of Akutan Way.

Power Plant 3 became operational in 1950. Two of the aboveground storage tanks (ASTs) stored jet petroleum No. 5 (JP-5), one stored waste oil, and the remaining two stored reserve oil supplies. The waste oil pond was constructed in the mid-1960s to contain waste POL generated at the plant. The Quonset hut has historically been used for electric line and transformer repairs and for auto repair. The dry-cleaning facility located south of the power plant began operation in 1968. The power plant continues to serve as the main electrical generating source on Adak. The other facilities at Power Plant 3, such as the dry cleaners and the Quonset hut, are not currently in use.

The two vertical ASTs (31018 and 31019) were reported to be cleaned and closed during 1998. One horizontal AST (31017) was also reported to be removed at that time. The two remaining ASTs (31015 and 31016) remain in operation and contain JP-5 used to fuel the power plant.

Seeps of free product were observed along the roadside ditches in 1995. The Navy installed coffer dams within the trench to act as oil/water separators. Approximately 5,000 gallons of water and product were recovered from the trench by January 1996.

In October 1995, the Navy's Environmental/Safety Department observed that free product was entering the roadside ditches at Akutan Way and Amulet Way as the water table rose. Navy personnel placed absorbent booms in the ditches downgradient of the seeps as a temporary measure to prevent oil from entering the stormdrain system and eventually reaching South Sweeper Creek. Temporary accumulation berms were constructed, which consisted of soil berms to catch the oil and underflow pipe outfalls to pass stormwater to catchbasins. Approximately 110 cubic yards of stained soil was removed from the ditches downgradient of the berms in October 1995 to prevent potential migration of petroleum with stormwater.

During the summer of 1996, a product recovery trench was constructed at the intersection of Amulet Way and Akutan Way. During the construction of the recovery trench, much of the stained surface soil in the ditches was excavated.

As part of the CERCLA investigation for the site, analytical results of sediment, surface and subsurface soil, groundwater and surface water were used to assess human health and ecological risk in the PSE report for the site (U.S. Navy 1996a and U.S. Navy 1997a). Freshwater sediments and surface water presented potential adverse risk to ecological receptors. Sediments in the waste oil pond (and adjacent surface soil) and the retention pond, which contain inorganics, SVOCs, and PCB compounds, expose benthic fauna to adverse risk. Surface water in the retention pond presents adverse risk to birds. The human health cancer risk and the noncancer HI based on the residential scenario were 4×10^{-4} and 45 respectively (U.S. Navy 2000d). The primary cancer risk drivers were Aroclor 1260, arsenic, and beryllium in surface water and Aroclor 1254 and beryllium in groundwater. The primary noncancer risk drivers were various inorganics in surface water and groundwater.

As part of the SAERA investigation for the site, the petroleum issues were addressed. Free product was detected in 7 of 18 wells. The maximum diesel-range organics (DRO) concentration in surface soil was 220,000 mg/kg, which exceeds the ROD-established soil cleanup levels (18 AAC 75.340) of 8,250 mg/kg for industrial sites. The maximum DRO concentration in subsurface soil was 71,000 mg/kg, which exceeds the ROD-established soil cleanup level (18 AAC 75.340) of 12,500 mg/kg for industrial sites. SVOCs in groundwater from one location and xylene in surface water from one location exceeded ROD-established cleanup levels (18 AAC 75.345). Section 6.2 discusses the results of the monitoring activities that have taken place at the SWMU 17, Power Plant Area since completion of the first five-year review (U.S. Navy 2001b).

In 1999, oil/water separators O/W1 and O/W2 were removed and their inflows were rerouted directly to the sanitary sewer system. Also in 1999, contaminated soils in the waste oil pond and water retention pond were removed and treated by thermal desorption on-island (U.S. Navy, USEPA, and Alaska DEC 2000). In 2000, the existing free-product recovery trench was re-designed and upgraded to improve product recovery rates. In addition, another interim remedial action to eliminate free-product seeps at the ground surface was completed in 2002 (BEESC 2002).

A subsurface investigation (including completion of soil borings and installation of monitoring wells) was undertaken in summer 2001 at SWMU 17 to characterize contamination that may have originated from the power plant. As discussed in Section 6.4, free-product recovery has been conducted at the SWMU 17, Power Plant Area intermittently from August 1996 through July 2002. The free-product recovery system at SWMU 17 met the technical practicable endpoint as established in the OU A ROD and 18 AAC 75.325(f)(1)(B) for recovery systems that are dependent on water table depression to facilitate product recovery (URSG 2002). The product recovery system was shut down on July 25, 2002 and designated for removal. The SWMU 17, Power Plant Area is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2006. Results of the risk assessment identified human health risk below target health goals and ecological hazard levels of 1.49 for DRO in sediment, only slightly greater than target health goal of 1, provided that ICs remain in effect. The risk assessment concluded that the ecological threat to aquatic species of Yakutat Creek is unlikely to present a significant risk. The sediment samples collected in 2005, and used to quantify ecological hazard, showed significant attenuation from the sediment samples collected in 1999 prior to the source removal actions. Any potential threat is likely continuing to lessen over time. A decision document for memorializing the final remedy for the SWMU 17, Power Plant Area will be finalized in 2006.

SWMU 18, South Sector Drum Disposal Area

SWMU 18, the South Sector Drum Disposal Area, was located at the base of an abandoned quarry located west of the downtown area (Figure 2-3). Approximately twenty 55-gallon drums were disposed of on low-lying tundra. The drums were heavily rusted and were most likely deposited during the 1940s. There is no information on the contents of the drums or any other history available.

This area, together with SWMU 19, became White Alice Landfill, which received construction wastes in the 1990s until it was covered with soil and closed according to Alaska solid waste regulations in 1998.

SWMU 19, Quarry Metal Disposal Area

SWMU 19, Quarry Metal Disposal Area, was a small scrap metal disposal area located in an abandoned quarry west of the downtown (Figure 2-3). Scrap metal, including material from demolition of Quonset huts, has been placed on the floor of the quarry. The disposal area was active from 1980 to 1985. No information was available on the history of any contaminant releases at the site.

This area, together with SWMU 18, became White Alice Landfill, which received additional construction wastes in the 1990s until it was covered with soil and closed according to Alaska solid waste regulations in 1998.

SWMU 20, White Alice/Trout Creek Disposal Area

SWMU 20, the White Alice/Trout Creek Disposal Area, is located approximately 2 miles west of the downtown area (Figure 2-3). SWMU 20 consists of two distinct topographic environments: (1) a steep (50 percent grade) northwest-facing hillside, approximately 200 feet wide and 500 feet long, which is covered with native vegetation and debris; and (2) a portion of the heavily vegetated, marshy Trout Creek floodplain, at the base of the hillside, which extends approximately 1,000 feet downstream (Tetra Tech 1989). Trout Creek, a salmon-spawning habitat, meanders southwesterly through the bottom of the valley and eventually discharges to Shagak Bay, approximately 1 mile to the west.

The White Alice Complex was constructed in 1956 as part of a military communications network. The complex was dismantled between 1980 and 1982. An initial assessment study conducted in 1986 (NEESA 1986) determined that material from the demolition of the White Alice Complex may have been deposited at the Trout Creek and White Alice Quarry areas. During the demolition, a contractor allegedly disposed of approximately 2,000 gallons of PCB-containing fluids in 55-gallon drums from 51 transformers at SWMU 20 (NEESA 1986). No documented evidence exists to support this allegation. It is not known whether the Trout Creek area was used for waste disposal prior to 1980.

Approximately one hundred 55-gallon drums, some of which may have contained PCB-containing fluids, together with other debris, were removed from SWMU 20 in 1992. PCB-containing soil was excavated and disposed of off site in 1992 (U.S. Navy 1995g). Based on the results of previous investigations, PCBs and inorganics are the principal COCs at this site.

Analytical results of sediment, surface and subsurface soil, surface water, and fish tissue were used to assess human health and ecological risk in the PSE report for the site (U.S. Navy 1996a). The human health cancer risk was calculated as 2×10^{-5}. The risk driver is Aroclor 1260 in surface soil. The noncancer HI and other human health scenarios were below levels of concern. The ecological HI is 231, which is significantly higher than the target HI of 10. The primary ecological risk drivers are Aroclor 1260 in the surface and subsurface soil and silver in the surface water. The ecological risk was explained as acceptable, based on the fact that the area of contamination is small (720 square feet) compared to the habitat area of the species that inhabit the area (U.S. Navy 1996a). Additionally, a majority of the risk was from Aroclor 1260 in subsurface soil. Because the water table is shallow (0.5 foot), it is unlikely that burrowing animals will contact subsurface soils.

SWMU 21A, White Alice Upper Quarry

SWMU 21A, the White Alice Upper Quarry, is an abandoned quarry located approximately 2 miles west of the downtown area (Figure 2-3).

The White Alice Complex was constructed in 1956 as part of a military communications network, which was dismantled between 1980 and 1982 (NEESA 1986). The White Alice Quarry Disposal Area was originally the site of a series of borrow pits that supplied foundation materials used during road and building construction. SWMU 21A was used as a disposal area between 1980 and 1982.

Historical information does not clearly define what wastes were disposed of at SWMU 21A. During demolition activities (1980 to 1982), the demolition contractor drained fluids containing PCBs from 51 transformers into 55-gallon drums before removing electrical equipment to an off-site location (NEESA 1986). Disposal of the estimated 2,000 gallons of transformer oil was never documented; however, SWMU 21A is a possible disposal site.

Surficial soils containing PCBs were identified at the site during the site inspection (Tetra Tech 1989). Surficial soils that contained PCB concentrations greater than 10 mg/kg were excavated and removed in 1992. A 2,000- to 3,000-square-foot synthetic membrane (20 mil thick) was installed over areas where highest PCB concentrations were detected in confirmation samples. The liner was covered with a minimum of 12 inches of clean fill.

Analytical results of soil samples were used to assess human health and ecological risk. The human health residential cancer risk was calculated as 1.4×10^{-5} (U.S. Navy, USEPA, and Alaska DEC 2000). The risk driver is Aroclor 1260. The noncancer HI and other human health scenarios were below levels of concern. The ecological HI is 32 because of Aroclor 1260 in the soil (U.S. Navy 1995g). This ecological risk is not significant because the soil causing the risk has been covered with a synthetic membrane and at least 12 inches of clean fill.

SWMU 23, Heart Lake Drum Disposal Area

SWMU 23, the Heart Lake Drum Disposal Area, lies approximately 0.4 mile southeast of Heart Lake and approximately 2 miles southwest of downtown Adak (Figure 2-3). A small 1-acre lake (referred to in investigation records as Lake B) just northeast of the site discharges through the drum disposal area to a small stream. This stream discharges west to a small 2.3-acre unnamed lake (referred to as Lake A), which is adjacent to the west side of the site. This lake discharges to Heart Lake, which discharges to Shagak Bay.

The Heart Lake Drum Disposal Area, at a grade of approximately 15 percent, covers approximately 8 acres of a valley floor that trends southwest toward Lake A. The site ranges south from 260 feet above MLLW near the access road and hillsides to 205 feet above MLLW on the valley floor. The entire site is covered by tundra vegetation (lichen, grasses, and mosses). The substrate is primarily silt with some sand and unconsolidated rock on the upper elevations.

The Heart Lake Drum Disposal Area was reportedly used for the disposal of approximately twenty 55-gallon drums over a period of 3 years during the 1940s. Estimates of the areal extent of the site range from 1 to 8 acres (NEESA 1986, SAIC 1991, and Tetra Tech 1989). During a site visit in 1993, drums were observed scattered over the site, with 15 to 18 drums grouped in a drainage ditch downstream of Lake B at the northeast edge of the site (U.S. Navy 1995g). The drums were described in an earlier study as empty, with any residual contents they may have contained at the time of disposal released prior to this inspection (NEESA 1986). One large tank (approximately 1,500 gallons) was also observed at the site. The nature of previous drum and tank contents is unknown. The drums may have contained fuels, POL, paints, solvents (chlorinated or nonchlorinated), pesticides, or other drummed products typically used on Adak Island during World War II (NEESA 1986).

In the course of the removal of the drums during summer 1994, it was observed that most of the drums had neither tops nor bottoms and were in a narrow surface water drainage (2 feet wide by 3 feet deep) that drains from Lake B into Lake A. It is likely that these drums were originally placed for drainage control, a practice that has been noted at other areas on Adak Island, such as SWMUs 3 and 30. Other drums found on the site were whole and may have contained chemicals. An attempt was made to remove a few of the more visible drums scattered across the valley. Two drums removed from the steep southern hillside of the valley had intact tops and bottoms with a few rust holes and, although empty, had dark staining and a petroleum/fuel odor.

Analytical results of sediment samples were used to assess human health and ecological risk (U.S. Navy 1995g). The human health cancer risk and the noncancer HI for the Adak residential scenario were calculated as 1×10^{-5} and 7, respectively (U.S. Navy, USEPA, and Alaska DEC 2000). The risk drivers for the cancer and noncancer risks were arsenic and manganese, respectively. The cancer risks based on other human health scenarios were below levels of concern. Ecological HIs from exposure primarily to manganese in soil and sediment were estimated at 92 and 51, respectively. However, the ecological risks are not significant, because the samples containing the highest manganese concentrations were collected from two small areas (less than 1 square yard) where metal debris rusted.

SWMU 25, Roberts Landfill

SWMU 25, the Roberts Landfill, is located approximately 1 mile southwest of NAF Adak (Figure 2-3). The boundary of Roberts Landfill encompasses 59 acres, including a main portion, a designated asbestos disposal area, and partially buried metal bunkers filled with asbestos material. The areal extent of refuse within the main portion of the landfill is 28.5 acres.

The landfill operated from the early 1950s until 1972 and then again from 1975 to the 2000, when it was capped and closed. During the initial operation, wastes managed included sanitary trash, metal debris, batteries, solvents, waste paints, and construction rubble. Between 1975 and 2000, the landfill accepted only sanitary trash. Portions of the landfill were reopened for disposal of demolition debris in 2001 (U.S. Navy 2002a) and again in 2002 for the demolition and disposal of 52 cabins (U.S. Navy 2003e). The landfill was subsequently closed again in 2002. The Navy has monitored the groundwater around the landfill quarterly beginning in 1995 and then annually since 1996. No significant releases have been detected. Results of the monitoring program are discussed in Section 6.4.

Remedial actions at SWMU 25 have been addressed through operational and closure requirements of the State of Alaska solid waste regulations.

SWMU 29, Finger Bay Landfill

SWMU 29 is located in a low-lying area about 2,600 feet south of Sweeper Cove and 1,800 feet north of Finger Bay (Figure 2-3). The landfill was reportedly used for waste disposal between 1972 and 1975. The areal extent of the landfill is estimated to be approximately 6.7 acres, based on geophysical information (Tetra Tech 1989). Nearby landmarks include a Quonset hut and cabin located about 700 feet northwest of the landfill and about 100 feet west of an unnamed stream. The stream, which drains the site vicinity, flows from the northeast to the southwest, passing through a weir located immediately northwest of the landfill and ultimately to Finger Bay.

The ground surface above the landfill is graded relatively flat, ranging from 100 to 130 feet above MLLW. Previous investigations indicated that the surface consists of 0.5 to 1 foot of gravelly fill overlying between 2 and 7 feet of debris. Debris identified in the landfill includes construction wastes (concrete, wire, various metal scraps, wood) and household garbage (cans, bottles, garden hose, plastic products). The base of the landfill and the surrounding surface are predominantly low-permeability volcanic ash or bedrock. Vegetation is sparse over much of the landfill surface, and the surrounding landscape is vegetation typical for lowland tundra.

In 1996 the Navy removed seven intact 15-gallon containers and pieces of 8 to 10 others from the unnamed stream. The white material in some of the drums was reported to be spent calcium carbide (U.S. Navy 1997a).

Analytical results of sediment, subsurface soil, and groundwater samples were used to assess human health and ecological risk (U.S. Navy 1997a). The human health cancer risk for the Adak residential scenario was calculated as 3×10^{-5}. The risk driver for the cancer risk is Aroclor 1254 in soil. The cancer and noncancer risks, based on other human health scenarios, were below levels of concern. The ecological HI caused by exposure to chemicals in sediment was estimated to be 23, most of which was associated with one sample collected near the 15-gallon containers in the stream that were removed. The ecological HI caused by exposure to chemicals in subsurface soil was estimated to be 172. The only burrowing animals on Adak are the Norway rat and the arctic fox, neither of which is expected to commonly use this site, because of the sparse vegetation.

SWMUs 52, 53, and 59, Former Loran Station

The Former Loran (long-range navigation) Station was constructed between 1948 and 1950 to support U.S. Naval and Coast Guard navigation in and out of the Aleutian Islands. The station was closed in 1979. Since then, it has fallen into a state of disrepair, evidently from vandalism and the extreme weather conditions.

The Former Loran Station includes the following SWMUs: SWMU 52 (Loran Transmitter Complex, referred to as the Signal Building), SWMU 53 (Loran Paint/Workshop Building, referred to as the Paint Storage Shed), and SWMU 59 (Loran Boiler and Barracks, referred to as the Mechanical Building).

The station is located on a northwest-facing promontory along the Bering Sea coastline (Figure 2-3). The promontory is located on the northwest flank of Mount Adagdak. The station was constructed on a relatively gentle (16 percent grade) portion of the west-facing slope between 150 and 300 feet above MLLW. West of the site, the land surface drops more sharply (53 percent grade) toward the Bering Sea. To the north, a steep shoreline escarpment (67 percent grade) bounds the facility. Areas within 1 mile to the south and east of the Former Loran Station are undeveloped and are expected to remain so.

The site also includes a former UST pit. The three tanks and their contents were removed in July 1994. The pit was backfilled with 200 cubic yards of soil. A septic system and its outflow fixtures are located on the western escarpment. Debris is scattered on both escarpments. Live ordnance (an illuminator cartridge) was discovered along the western escarpment in July 1995 during sampling activities (U.S. Navy 1996a).

Isolated debris, including empty drums and pieces of scrap metal and wood, is strewn about the western escarpment downhill from the buildings. The structure and contents of each of the three buildings have been severely damaged from vandalism and weather.

The foundation for the former Larson Building is located on the upper terrace above the three buildings. This building was razed in 1983. Debris, presumably derived from the demolition of the Larson Building, lies directly downslope on the northern escarpment. The debris along the northern escarpment includes over 100 empty drums, the original contents of which are unknown; building materials such as steel and wood, most likely derived from the former Larson Building; electrical components; old automobiles; and a few pieces of nondescript “large equipment.” Additional debris is reportedly buried or wedged along the bottom of the escarpment, where the land surface consists of large (8- to 10-foot-diameter) boulders. Because of the steepness of the slope, no definitive inventory of the debris has been made.

Analytical results of surface and subsurface soil samples were used to assess human health and ecological risk (U.S. Navy 1996a). The human health cancer risk for the Adak residential scenario was calculated as 5×10^{-5}. The risk drivers were benzo(a)pyrene and arsenic in surface soil. The cancer and noncancer risks, based on other human health scenarios, were below levels of concern. The ecological HI caused by exposure to chemicals was estimated to be 260, most of which were two semivolatile compounds in surface soil. Because these compounds were detected in 1 of 36 samples, the exposure to receptors would be negligible and the ecological risk is not significant.

SWMU 55, Public Works Transportation Department Waste Storage Area

SWMU 55, the Public Works Transportation Department Waste Storage Area, is located in the industrial area of downtown Adak (Figure 2-3). It is west of the Red Shed (Building T-1441). SWMU 55 consists of approximately 0.7 acre of flat, gravel-covered surface (approximately 150 by 200 feet). The elevation of most of SWMU 55 is 19 feet above MLLW. Site drainage leads to Sweeper Cove, about 700 feet away. A steel storage shed (30 by 24 feet) was erected in 1983 in the east-central area of the site. Wastes stored on site included POL, spent solvents, and other maintenance-related materials.

The exact starting date for waste accumulation and storage at this site is not known; however, it is assumed that such storage took place concurrently with vehicle maintenance operations in Building T-1441 (Red Shed). The Red Shed was constructed in 1944, and it was originally the property of the U.S. Army, which designated it as the Transit Shed. In 1951, this property was transferred to the U.S. Navy, and the Red Shed became a vehicle maintenance and storage area. In 1983, the Navy constructed the SWMU 55 steel storage shed for storage of flammable materials. New oil, hydraulic and transmission fluids, and other vehicle-care products were also stored inside of and adjacent to the steel shed. In approximately 1983, the Navy began to store accumulated waste oils, spent solvents, and other maintenance-related materials outside of the steel storage shed. Surface soils beneath and around the drums showed signs of staining under the wooden pallets during the 1995 field investigation.

Under the CERCLA evaluation, analytical results of groundwater, surface and subsurface soil, and sediment samples were used to assess human health and ecological risk (U.S. Navy 1996a). The human health cancer risk and noncancer HI for the Adak residential scenario were calculated as 1×10^{-4} and 1, respectively. The risk driver for the cancer and noncancer risks is tetrachloroethene in groundwater. The cancer and noncancer risks, based on other human health scenarios, were below levels of concern. There is no ecological risk because of the absence of ecological habitat and receptors.

This site was also evaluated under SAERA. No concentrations of DRO exceeded the screening criterion for industrial sites.

SWMU 67, White Alice PCB Spill Site

SWMU 67, the White Alice PCB Spill Site (formerly called Site 22), is a former military communications complex located approximately 2 miles west of downtown Adak (Figure 2-3). Prior to the removal action in 1997, the site consisted of the remains of three building foundations, abandoned concrete pads, and eight Dew Line radar nets.

SWMU 67 is situated on a flattened hilltop approximately 595 feet above MLLW. The slopes of the surrounding hillsides vary, exceeding 50 percent in some areas. The site occupies the highest topographic point in the vicinity.

The White Alice Complex was constructed in 1956 and consisted of large transmitting and receiving dish antennae. The complex was dismantled between 1980 and 1982. According to the initial assessment study report (NEESA 1986), the demolition contractor drained fluids containing PCBs from 51 transformers into 55-gallon drums prior to removing electrical equipment. During this process, an unknown volume of transformer oil was spilled inside and outside the easternmost building of the White Alice Complex.

Two USTs containing JP-5 were removed from the White Alice Complex during the summer of 1994 (S&W 1994a and 1994b). Approximately 200 cubic yards of soils were determined to be impacted by chemicals associated with the tanks. No soils were removed from the site during the tank removal.

Following the PSE-2 of SWMU 67 (U.S. Navy 1996a), an interim removal action was conducted in 1997 consisting of the following:

- Transport of approximately 984 cubic yards of soils from Site 16A stockpiles (located adjacent to SWMU 16) containing PCBs (less than 50 mg/kg) to SWMU 67.
- Construction of a multi-layered impermeable cap over the areas of highest observed contamination (soil with more than 25 mg/kg PCBs) to prevent migration of PCBs from the site. The cap also covers the soils transported from Site 16A.

The work performed at SWMU 67 did not conform exactly to the previously published plans (U.S. Navy 1997c and Foster Wheeler 1997a), in that the boundary of the multi-layered cap extends farther than originally planned.

Analytical results of surface and subsurface soil and sediment samples were used to assess human health and ecological risk based on post removal conditions (U.S. Navy 1997a). A residential scenario was not evaluated, because establishing a residence at this location was determined to be not feasible. The cancer and noncancer risks, based on other human health scenarios, were below levels of concern. The ecological HI from sediment and surface soil was estimated to be 68 and 86, respectively, primarily from Aroclor 1260. Capping reduced the ecological risk by more than 99 percent. Detections of the residual PCBs in the soil outside the cap were infrequent and discontinuous. Downgradient seeps where sediments were collected do not provide significant habitat for receptors. Therefore, the ecological risks are negligible.

SA 76, Old Line Shed Building

SA 76, Old Line Shed Building, measures approximately 500 feet (north-south dimension) by 320 feet (east-west dimension), or 3.7 acres in area. The site is located approximately 1,500 feet north of Sweeper Cove and 2,400 feet west of Kuluk Bay (Figure 2-3). The elevation ranges from approximately 25 feet msl on the northern edge of the site to 20 feet above msl at the southern boundary. The dominant feature of SA 76 is a concrete foundation pad measuring 75 feet (east-west dimension) by 200 feet (north-south dimension).

Available historical information indicates the Old Line Shed Building was once used for office space, living quarters for the line crew, and storage space for a variety of materials, including transformers (U.S. Navy 2001b). Information about construction dates is not available. In 1982, the building was damaged during a severe windstorm and was rendered uninhabitable. The structure was later removed, and the remaining foundation pad was used to store stockpiled soils.

Review of historical records and documents for SA 76 did not indicate prior disposal or burial of materials containing hazardous waste (U.S. Navy 1992). There are three known potential sources of petroleum hydrocarbons: (1) the underground fuel (gasoline and diesel) supply lines from the motor gasoline (mogas) supply system formerly located at SWMU 75 west of the site, (2) the former automobile service station located south of the site at SWMU 14, and (3) the fuel oil release associated with the Adak housing area near the site (SWMU 62). The mogas ASTs were dismantled in the 1960s. It is unknown whether the underground supply lines were abandoned in place. The former service station at SWMU 14 was abandoned in the mid-1980s. During operations, the facility serviced vehicles with leaded and unleaded gasoline. Heating oil has leaked from piping at much of the housing area north of the site. No other potential sources of chemicals associated with past site activities have been identified.

Analytical data from the limited site inspection (U.S. Navy 1992) were used in the PSE-1 Batch 2 report (U.S. Navy 1995f) to evaluate human health and ecological risks. The human health cancer risk using the Adak residential scenario was 1×10^{-4}, and the risk using the occupational and recreational scenario was more than an order of magnitude lower. Arsenic in soil and lead in groundwater were the risk drivers. Noncancer risks were below the target HI of 1. The ecological risk was summarized by an HI of 11, which is slightly above the target level of 10 or lower. The site is industrial and provides poor natural habitat for ecological receptors.

Kuluk Bay

Kuluk Bay borders the most developed portion of Adak Island; both industrial and residential areas are located along its western shore (Figure 2-3). The Bayshore Highway runs along the shore of Kuluk Bay from the mouth of Sweeper Cove to the mouth of Clam Lagoon, affording easy access. The western shoreline of Kuluk Bay with its sandy beach is easily accessed by foot. Access to the northern and southern shorelines is limited, because of the steep cliffs and rocky shoreline.

Kuluk Bay is used primarily for recreational purposes, which include beachcombing, fishing, and shellfishing. Recreational opportunities for island residents include walks along the sandy beach and exploration of the rocky shorelines. Fishing from shore along the breakwater separating Sweeper Cove and Kuluk Bay for a variety of resident fish is common. Runs of pink salmon that occur in August and September in NAVFAC and Airport Creeks also attract onshore fishermen. Fishing by boat in Kuluk Bay for a variety of resident fish, including halibut, is expected to occur. Shellfishing in Kuluk Bay has not been previously documented. However, shellfish resources with potential uses are present. Extensive mussel beds that could be harvested are present along the rocky shoreline during low tide. The presence of other bivalves (e.g., clams) in subtidal sediments appears to be very limited (USFWS 1995 and U.S. Navy 1996b).

The Kuluk Bay Risk Assessment (U.S. Navy 1997b) evaluated ecological and human health risks using exposures based on current and future recreational use and future subsistence use of Kuluk Bay. Analytical results of sediment, surface water, rock sole, and blue mussels collected in 1995 and 1996 were used in the risk assessment. The most significant risks were identified for subsistence harvesters with a hazard index of 7 and a cancer risk of 1×10^{-4}. The primary risk drivers were Aroclor 1254 in fish and shellfish. Antimony in sediment posed a small risk for benthic invertebrates at 2 of 23 stations. Results from rock sole fillet and blue mussel tissue monitoring beginning in 1996 are discussed in Section 6.4.

Sweeper Cove

Sweeper Cove is the most actively used water body at Adak, because it is adjacent to the main industrial portion of the downtown area (Figure 2-3).

Sweeper Cove is an estuary with a surface area of approximately 450 acres and receives drainage from approximately 4,511 terrestrial acres. The western portion of Sweeper Cove includes a shallow inlet that was developed into a small boat harbor. The northern shoreline has been altered by construction activities begun by the military in 1942. South Sweeper Creek and Mitt Creek are the primary drainages into Sweeper Cove.

The shoreline geology varies from sandy beaches near the larger stream discharges to rocky beaches. There appear to be natural depositional areas of sands where some streams discharge into Sweeper Cove shorelines, exposed bedrock found on the southern shoreline of Sweeper Cove, and boulder riprap bulkheads constructed during the military development of the northern shoreline. The subtidal region is almost entirely sand, with an increasing percentage of fine material as the distance from shore increases.

Because Sweeper Cove has received the drainage from a majority of the developed area on Adak, the potential for contaminants to deposit in Sweeper Cove has been a concern. As part of the RI, samples of sediment, surface water, marine worm tissue, blue mussel tissue, and bottom fish tissue were collected in 1996 and analyzed. According to the risk assessment (U.S. Navy 1997a), the cancer risk to the recreational user was 1E-05, and the cancer and noncancer risks to the subsistence fisher were 1×10^{-3} and an HI of 10, respectively. Risk drivers causing cancer risks for the recreational user were Aroclor 1260 and arsenic in rock sole. Risk drivers causing cancer risks for the subsistence fisher were Aroclor 1260 and arsenic in rock sole and blue mussel. Risk drivers causing the noncancer risk for subsistence fishers were antimony, arsenic, and cadmium in rock sole. The risk assessment also concluded that there were significant ecological risks to benthic invertebrates (HIs between 10 and 100), based on sediment quality values and sediment toxicity test exceedances. Primary risk drivers were polycyclic aromatic hydrocarbons (PAHs). Results from rock sole fillet and blue mussel tissue monitoring beginning in 1996 are discussed in Section 6.4.

South Sweeper Creek

The principal surface drainage feature in the Sweeper Cove drainage basin is South Sweeper Creek. South Sweeper Creek is west of the downtown core area and Runway 18-36 (Figure 2-3). South Sweeper Creek is fed by Yakutat Creek, Airport Ditch, and other small tributaries. Streams on the southern portion of the drainage basin discharge directly into Sweeper Cove. In addition, water collected in the runway canals (diversionary structures that provide drainage and dewatering for the airport) is discharged to lower South Sweeper Creek via a pair of pumps.

The lower reach of South Sweeper Creek is up to 120 feet wide. Sediments in the lower reach are sand- and silt-sized, indicating that this area is depositional (unlike the tributaries, which have faster flow and primarily sand and gravel in their creek bottoms). Benthic invertebrates and fish prefer rocky/gravelly creek bottoms and are unlikely to live in fine-grain substrate. Sediments measured in the lower reach were 3.5 to 5 feet thick, which is thicker than sediment measured upstream.

Sediment samples were collected from South Sweeper Creek in 1995 during the PSEs for SWMUs 16 and 17 (U.S. Navy 1996a), in 1996 for the RI/FS (U.S. Navy 1997a), and in 1998 for supplemental risk evaluation (U.S. Navy, USEPA, and Alaska DEC 2001). Contaminant in creek sediments do not pose a significant human health risk (U.S. Navy, USEPA, and Alaska DEC 2001). Despite conclusions of no likely adverse ecological risk in the RI/FS, remedial action objectives were developed in the RI/FS for protection of ecological receptors from possible adverse effects of PCBs in sediments indicated by the elevated hazard quotient for Aroclor 1260. Aroclor was established as the COC in sediment (U.S. Navy, USEPA, and Alaska DEC 2001).

3.1.2 Petroleum Sites

This section provides background information for the petroleum sites discussed in this second 5-year review. Only sites with further actions following the first 5-year review are included in this section. However, since no sites achieved NFA or NFRAP status during the first 5-year review period, background information is presented for the same group of sites as was presented in the first 5-year review. Note that three sites (SWMUs 14, 15, and 17) are combined CERCLA and petroleum sites. Background information for these sites is provided in Section 3.1.1, and is not repeated here. Finally, the background discussions for the NMCB Building Area, T-1416

Expanded Area and NMCB Building (UST T-1416-A) were combined, as were the background discussions for SWMU 58, Heating Plant 6 and SA 73, Heating Plant 6.

Site history, use, and COCs are summarized below for each of the petroleum sites that required remedial action. Information in this section generally provides the basis for taking action at each site and summarizes activities up through signing of the OU A ROD. Ongoing activities are mentioned with reference to additional details in later sections. Additional site information is provided in the Site Catalog in Appendix A. Selected remedies, implementation, and operation and maintenance for the sites are presented in Section 4. Data collected during this 5-year review period are discussed in Section 6.4.

Amulet Housing, Well AMW-706 Area

The Amulet Housing area (Figure 2-4) was used for warehousing engineering equipment in the 1940s until housing units were constructed in the early 1950s. Most housing units and their associated fuel tanks were removed in the late 1980s to early 1990s. Well AMW-706 was installed during the RI at Tank Farm A as part of a group of wells used to assess groundwater quality and flow characteristics outside of the Tank Farm A source areas (U.S. Navy 2001a). Petroleum hydrocarbons were detected in soil and groundwater samples collected from the AMW-706 boring drilled at the site in August 1993 at concentrations exceeding the Alaska DEC matrix levels. The source of petroleum hydrocarbons observed at the AMW-706 area has not been identified, but may include leaks or spills from the USTs used to store JP-5 for residential heating at Officer Hill and Amulet Housing; SWMU 60, Tank Farm A; and SWMU 17, Power Plant 3; as well as unknown sources.

Downgradient migration to South Sweeper Creek via overland flow is not a potential migration pathway, because petroleum-affected surface soil, which for residential scenarios is defined as less than 2 feet below ground surface (bgs), were not found. Groundwater was encountered at the site and is a potential migration pathway.

Total lead was the only analyte detected in groundwater that exceeded screening criteria in samples collected in 1993. The exceedances were found to be the results of high turbidity in the environmental sample collected from the well. This conclusion was drawn, based on the total lead analytical results from groundwater samples collected between 1999 and 2000 using low-flow and low-turbidity methods, which were below the Alaska DEC 18 AAC 75 Table B-2 lead criterion. Screening was not performed for surface water and sediment at South Sweeper Creek, because the sediments could be impacted by multiple sources. These sediments were instead evaluated under a separate investigation.

In 1996, the site was retained for further evaluation under the SAERA process, because, although the maximum subsurface soil concentration for DRO was below the screening criterion (in 1996) of 5,000 mg/kg for residential sites, the source area is located less than 200 feet from the downgradient exposure medium (DEM), South Sweeper Creek.

Compliance groundwater monitoring was conducted between 1999 and 2002. Monitoring was discontinued at this site in 2003, because total and dissolved lead concentrations in groundwater were less than Alaska DEC groundwater cleanup levels for six consecutive sampling events.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Amulet Housing, Well AMW-709 Area

As stated previously, the Amulet Housing area (Figure 2-4) was used for warehousing engineering equipment in the 1940s until housing units were constructed in the early 1950s. Most housing units and their associated fuel tanks were removed in the late 1980s to early 1990s. Well AMW-709 was installed during the RI at Tank Farm A as part of a group of wells used to assess groundwater quality and flow characteristics outside of the Tank Farm A source areas (U.S. Navy 1999). Petroleum hydrocarbons were detected in soil and groundwater samples collected from the AMW-709 boring drilled at the site in August 1993 at concentrations exceeding the Alaska DEC matrix levels. The source of petroleum hydrocarbons observed at the AMW-709 area has not been identified, but may include leaks or spills from the USTs used to store JP-5 for residential heating at Officer Hill and Amulet Housing. The source of petroleum chemicals does not appear to be associated with Tank Farm A.

Downgradient migration to South Sweeper Creek via overland flow is not a potential migration pathway, because petroleum-affected surface soil, which for residential scenarios is defined as less than 2 feet bgs, was not found. Groundwater was encountered at the site and is a potential migration pathway.

Based on field screening and laboratory results, petroleum-affected soils are limited to subsurface soil. Total lead was the only analyte detected in groundwater that exceeded screening criteria in samples collected in 1993. The exceedances were found to be the result of high turbidity in the environmental sample collected from the well. This conclusion was based on the total lead analytical results from groundwater samples collected between 1999 and 2000 using low-flow and low-turbidity methods, which were below the Alaska DEC 18 AAC 75 Table B-2 lead criterion. Screening was not performed for surface water and sediment at South Sweeper Creek, because the sediments could be impacted by multiple sources. These sediments were evaluated under a separate investigation.

In 1996, the site was retained for further evaluation under the SAERA process, because, although the maximum subsurface soil concentration for DRO was below the screening criterion (in 1996) of 5,000 mg/kg for residential sites, the source area is located less than 200 feet from the DEM, South Sweeper Creek.

Compliance groundwater monitoring was conducted between 1999 and 2002. Monitoring was discontinued at this site in 2003, because total and dissolved lead concentrations in groundwater were less than Alaska DEC groundwater cleanup levels for six consecutive sampling events.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4

The Antenna Field is located on a hilltop northeast of Palisades Lake, midway between downtown Adak and Clam Lagoon (Figure 2-4). Three buildings and antennas were built in 1948 on the site. USTs ANT-1, ANT-2, ANT-3, and ANT-4 supplied JP-5 as heating fuel to the buildings, but were removed in 1993. Several small holes were observed in USTs ANT-3 and ANT-4 upon removal. The source of the petroleum release is not recorded, but appears to have originated from the USTs.

The general topography of the Antenna Field is irregular and is characterized by hills and drainage swales. Palisades Lake is located about 750 feet downgradient (southwest) of the site and is considered to be the downgradient exposure media (DEM), because the site topography slopes predominantly to the southwest. Downgradient migration via overland flow is possible, but unlikely. Although groundwater is present at the site, groundwater recharges slowly or is not present at all, given the relatively impermeable nature of the underlying tephra.

In 1996, the site was screened using the Alaska DEC matrix cleanup levels and the Alaska DEC supplemental criteria. The site was retained for further investigation, because the maximum DRO concentration was slightly above the supplemental criterion for subsurface soil. (Note that supplemental criterion for DRO no longer applies to this site. ROD-established cleanup levels now apply to this site, as discussed in Section 7.2.)

Natural attenuation groundwater monitoring for this site began in 1999 and is ongoing, as discussed in Section 4.1.4.

ASR-8 Facility, UST 42007-B

The ASR-8 Facility houses the transmitter formerly used by the Federal Aviation Agency. The facility is located on Bering Hill, on the crest of a ridge overlooking downtown (Figure 2-4). UST 42007-B was used to store JP-5 to supply an emergency generator. The UST was decommissioned and removed in 1995. The tank appeared to be in good condition when it was removed. The source of petroleum release is not recorded, but it appears to have originated from the UST, or from overfills and piping leaks.

The general topography surrounding the former location of UST 42007-B consists of hills and swales. The area immediately surrounding the former tank consists of a gravel driving surface and parking area underlain by sand. Downgradient migration via overland flow to an unnamed creek approximately 75 feet west of the site is possible, but unlikely. No groundwater was encountered at the site nor is it expected, because the site is located on tephra, a low-permeability, low-storage-capacity, silt/clay unit. Therefore, downgradient migration via groundwater is unlikely.

The maximum detected concentration of DRO in subsurface soils remaining in place was 4,500 mg/kg. In 1996, the ASR-8 Facility site was retained for further analysis under the SAERA process, because, although the maximum subsurface soil concentration of DRO was less than the screening criterion for recreational sites of 12,500 mg/kg, the source area is less than 200 feet from the downgradient surface water body. Soil exceeding the ROD-established Alaska DEC 18 AAC 75 criteria was proposed to be removed during the limited soil removals conducted in 1999. However, operations at the facility during this time prevented this activity from taking place. As discussed in Section 4, the soil removal component of the remedy at this site is planned for 2008.

Boy Scout Camp, West Haven Lake (UST BS-1)

The former Boy Scout Camp is located in a remote area near the western shores of Haven Lake, about 2 miles north of downtown (Figure 2-4). The former Boy Scout Camp site and surrounding area was formerly used for ordnance storage during the 1940s. During this period several warehouses, Quonset huts, and operations buildings associated with this military use were present in the area. Only remnants of these structures remain. The cabin that was used to house the Boy Scout Camp during the mid- to late 1980s has also been removed. The building foundation, a concrete pad 17.5 by 24 feet in dimension, still exists on the site. The 850-gallon wooden stave tank (UST BS-1) was probably installed adjacent to the eastern wall of the cabin in 1944, but was removed in 1993. Lightweight fuel oil (likely JP-5) was stored in former UST BS-1, presumably to heat the cabin.

The general topography of the Boy Scout Camp, West Haven Lake site slopes downward to the east, where Haven Lake lies approximately 130 feet east. The groundwater surface intercepts the ground surface at various points across the site area. As a result, groundwater flows freely out of and across the surface of the ground from seeps, springs, and similar features. Downgradient migration to Haven Lake via overland flow or shallow groundwater flow is possible. Groundwater encountered at the site is a possible migration pathway.

UST BS-1 and associated piping were removed in September 1993. During the UST closure, the tank was reported in poor condition with a narrow hole about 1 foot long on top of the tank and the wood moderately weathered. DRO in soil samples collected from the north and west walls of the excavation at 2.5 feet bgs yielded concentrations above Alaska DEC cleanup requirements (S&W 1993). An additional site investigation to measure chemical concentrations in soil and groundwater in the vicinity of the UST was conducted in 1996 and 1997, and three monitoring wells were installed. DRO was detected in surface and subsurface soil samples at concentrations above Alaska DEC 18 AAC 75 criteria. Concentrations of all detected analytes (DRO; GRO; benzene, toluene, ethylbenzene, and xylenes [BTEX]; and low-molecular-weight polycyclic aromatic hydrocarbons [LPAHs] in groundwater were below the Alaska DEC cleanup criteria.

In 1997, the site was retained for further study, because the site contains DRO in surface and subsurface soils at concentrations exceeding Alaska DEC supplemental criteria and because the site is less than 200 feet from the DEM. In 1999, an estimated 107 cubic yards of petroleum-affected soil were excavated during a removal action. Field screening of soil samples collected upon completion of the removal action indicated that petroleum hydrocarbon concentrations in soil remaining at the former UST BS-1 site exceeded Alaska DEC Method Two cleanup levels along the southern, eastern, and western boundaries of the excavation. Because additional soil removal was not possible due to site conditions, a groundwater monitoring well (10-401) was installed at the site. No exceedances of soil cleanup criteria were noted. Groundwater samples were collected from two wells (10-400 and 10-401) on site between 1999 and 2000 during comprehensive monitoring activities. Limited groundwater monitoring endpoints were achieved and groundwater monitoring was discontinued at this site in 2000.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Contractor's Camp Burn Pad

The Contractor's Camp Burn Pad (Figure 2-4) formerly served as a warehouse foundation in the Resident Officer in Charge of Construction (ROICC) Contractor's Area for storing equipment and supplies and later was used for soil treatment operations conducted with a thermal desorption unit.

Surface runoff is expected to be minimal because the site is flat and drainage is poor. A marsh area is approximately 205 feet west-southwest (downgradient) of the former location of the burn pad.

In response to reports that a fuel spill had occurred next to the burn pad during operation of the thermal desorber, a field investigation was conducted in 1997 to evaluate the extent of petroleum-affected soil. The investigation included collecting subsurface soil from 10 Geoprobe locations and four hand auger locations in the area of the reported spill. Twenty-three soil samples were collected at depths ranging from 0.1 to 9 feet bgs. DRO was measured in these samples at concentrations ranging from 16 to 7,400 mg/kg. The Alaska DEC Method Two soil cleanup level of 230 mg/kg was exceeded in seven of these samples.

In 1999, approximately 105 cubic yards of in-place soil containing petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels was removed from the site for treatment and disposal. In 2000, an additional 20 cubic yards of petroleum-affected soil were removed from beneath Drennen Road, and laboratory analyses of excavation bottom samples indicated the absence of petroleum hydrocarbons in soil above applicable cleanup levels (U.S. Navy 2000c).

Groundwater was encountered at the site and is a possible migration pathway. Analytical results from a groundwater sample collected in 1998 showed no exceedances to the ROD-established Alaska DEC 18 AAC 75 criteria. DRO concentrations in post-excavation samples were below the 230 mg/kg cleanup level (U.S. Navy 2000a).

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Finger Bay Quonset Hut (UST FBQH-1)

The Finger Bay Quonset Hut, located near the end of Finger Bay Road, was built in the 1940s and used to support activities at the Finger Bay drydock and repair center (Figure 2-4). Between the 1960s and early 1990s, Quonset huts around this area were used as recreational sites for on-island personnel. The UST at this site was used to store JP-5 as fuel for an oil furnace in the Quonset hut. The date that the UST was installed is unknown, but believed to be in the late 1940s.

The Finger Bay Quonset Hut UST FBQH-1 and associated piping, believed to be the source, were removed in 1997. During the UST removal, two soil samples were collected from the floor of the excavation. DRO concentrations in both soil samples exceeded the Alaska DEC Method Two soil cleanup level of 230 mg/kg. An additional site investigation was required. Groundwater was not encountered during the UST removal activities.

Monitoring well FB-101 was installed near the site on July 25, 1998. Petroleum constituents were not detected in accompanying soil or groundwater samples at concentrations above the ROD-established Alaska DEC 18 AAC 75 criteria.

Limited soil removal activities commenced in September 1999. Approximately 22 cubic yards of soil containing petroleum-related compounds at concentrations exceeding Alaska DEC

Method Two soil cleanup levels were removed from the site. Soils containing petroleum-related compounds at concentrations greater than Alaska DEC 18 AAC 75 criteria remain in place at the site. However, further excavation was limited by shallow bedrock.

The site remedy shifted from limited soil removal to limited groundwater monitoring with Alaska DEC concurrence in 1999 (Agency comments to the Draft Limited Soil Removal Report, dated September 21, 1999). Per Alaska DEC comments dated August 30, 2001, one downgradient monitoring well was installed in 2001. Limited groundwater monitoring commenced in wells FB-101 and FB-206 in 2001. The site met the endpoint criteria based upon the 2001 and 2002 analytical results, and groundwater monitoring was stopped in 2002.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Former Power Plant, Building T-1451

The Former Power Plant Building T-1451 site is located in the southeast portion of downtown Adak, at the southeast corner of Public Works Road and Main Road (Figure 2-4). The facility was constructed in 1944 and consisted of a power plant building, three diesel ASTs, a fuel pump shed, a water tank, and a septic tank (EMCON 1995). Sometime after 1986, the power plant building was expanded and the former ASTs removed. It appears that the existing structure overlies much of the location of the three former ASTs.

The former ASTs were supplied by a 2-inch-diameter service pipeline used to transfer diesel fuel from former Fuel Dock 7 to the NSGA at Clam Lagoon. No records of release from the former tanks are available.

An 8-inch-diameter pipeline that reportedly transferred aviation gas from former Fuel Dock 7 to Tank Farm B ran along the eastern side of Main Road past the Former Power Plant site, but was abandoned in 1977. The Main Road Pipeline (6”, JP-5) is located west of the site along the west side of Main Road. This pipeline was reportedly cleaned but not closed. A pipeline investigation will be performed in 2006 to determine whether all pipelines in the vicinity of this site have been decommissioned.

The site is relatively flat, soils are highly permeable, and all identified petroleum-affected soils were subsurface. Downgradient migration of chemicals to East Canal via overland flow is possible, but not probable. Petroleum-related compounds in near-surface soils could be leached and migrate downgradient through groundwater.

In 1992, an investigation conducted for the Main Road Pipeline (U.S. Navy 1994) included the collection of soil and groundwater samples at well MRP-MW5 located southwest of the Former Power Plant. DRO was not detected in the three soil samples or GRO in one soil sample; however, the detection limits were above the Alaska DEC soil cleanup criteria. DRO was detected in groundwater at a concentration below the Alaska DEC 18 AAC 75 criteria. During 1993, monitoring well AMW-703 was installed to characterize regional groundwater quality and flow as part of the Tank Farm A release investigation (EMCON 1995). DRO and GRO concentrations exceeded the Alaska DEC soil cleanup criteria in two soil samples. DRO concentrations also exceeded the Alaska DEC cleanup criterion in the one groundwater sample collected.

In 1996 and 1997, an additional site investigation was conducted where seven hand-auger borings, seven Geoprobe soil borings, three 2-inch and four ½-inch monitoring wells were installed. DRO concentrations exceeded Alaska cleanup criteria in 12 soil samples and 8 groundwater samples. DRO and GRO were not detected in the four surface water samples collected from standing water in the East Canal (the DEM for this site). The site was retained for further evaluation under the SAERA process, because the maximum DRO subsurface soil concentration of 30,000 mg/kg exceeded the screening criterion of 12,500 mg/kg for industrial sites.

In 1998, a groundwater sample was collected from monitoring well 01-118. Analytical results showed DRO at a concentration that exceeded the ROD-established cleanup criteria. GRO and BTEX were also detected, but did not exceed the criteria. Well 01-118 was also sampled for total and dissolved lead as part of the Comprehensive Monitoring Program. No lead exceedances were noted in groundwater samples. However, benzene was detected at a concentration above the Alaska DEC groundwater cleanup level.

Natural attenuation groundwater monitoring for DRO, GRO, residual-range organics (RRO) and BTEX was initiated in 1999. Compliance groundwater monitoring for lead also commenced at this site in 1999. Only DRO and RRO concentrations were greater than OU A ROD cleanup criteria between 1999 and 2002. Two new monitoring wells were installed immediately downgradient of the site during 2003. As discussed in Sections 4.1.4 and 6.4, natural attenuation monitoring for DRO is ongoing at four wells (01-118, 01-150, 01-151, and E-701), while attenuation monitoring for GRO and BTEX was discontinued at locations 01-118, 01-150, and 01-151 in 2003, and compliance monitoring for lead was discontinued at all wells in 2003. RRO monitoring is also ongoing at location 01-118.

GCI Compound (UST GC-1)

The GCI Compound is located west of Main Road, approximately 600 feet southwest of the intersection of Main Road and Terminal Road, in downtown Adak, west of the high school and east of the air terminal building (Figure 2-4). The site was previously used by the Navy as a gasoline and motor pool facility (U.S. Navy 1995c), but now is a long-distance telecommunications transmitter and receiver facility. The history and use of UST GC-1 are not documented.

The ground surface at the GCI Compound consists of a level gravel lot with patches of grass within the fenced enclosure and an extensive level area covered with native grasses outside the fenced area. East Canal is the closest surface water body, located approximately 1,000 feet southwest of the site.

In 1992, an investigation conducted for the 6-inch JP-5 Main Road Pipeline (U.S. Navy 1994) included the collection of five soil samples and one groundwater sample from MRP-9. DRO analytical results from one soil sample exceeded the Alaska DEC 18 AAC 75 criterion.

Former UST GCI-1 and the associated piping were removed in April 1995. During tank removal activities, a previously unknown pipeline believed to be a remote supply/fill pipe separated from the tank, and about 2,000 gallons of water and unknown-type of petroleum residuals discharged into the excavation. Approximately 90 percent of the released liquid was recovered prior to backfilling the excavation. The pipe was plugged and left in place. DRO was detected at concentrations exceeding the Alaska DEC matrix level in two samples collected during the UST removal, and GRO was detected in one sample at a concentration greater than the Alaska DEC matrix level. The UST appeared to be in good condition when removed.

Nine 2-inch monitoring wells and two soil borings were installed at the site in 1996. DRO and GRO exceeded Alaska DEC 18 AAC 75 soil cleanup levels in one of two soil samples, respectively. Exceedances of groundwater criteria were also noted in two wells for DRO and in seven wells for GRO collected in 1996. An additional four soil borings were installed above the groundwater table at the facility to determine oxygen gradients in the subsurface soil in 1997. Two 0.5-inch monitoring wells were also installed in 1997. DRO concentrations in one soil sample collected in 1997 exceeded the soil cleanup criterion. Three monitoring wells were resampled in 1997, and exceedances of groundwater criteria were noted in one well for DRO and in three wells for GRO.

An additional monitoring well (04-701) was installed in 1998 to be used for sentinel monitoring during comprehensive monitoring activities. Wells 04-203 and 04-701 were sampled for groundwater in 1998. No exceedances of either soil or groundwater criteria were noted in samples collected from well 04-701; however, DRO and GRO concentrations were above their respective cleanup levels in well 04-203. Comprehensive monitoring results from well 04-701 in the 1999-2000 season yielded concentrations of DRO and GRO near their respective detection limits.

Free product was first observed in well 04-201 in October 1996 and later measured in well 04-202 in October 1997. Less than 5 gallons of product were recovered from passive skimmers installed for 2 to 3 months during 1997. Since 1997, the Navy has gauged the wells at the site periodically for the presence of free product. Until 2005, free product had not been observed in any monitoring well at the site since October 1997 (see Section 6.4).

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at the GCI Compound, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site. The GCI Compound is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The Decision Document identifies monitored natural attenuation monitoring and ICs as the final remedy. Monitoring activities commenced in 2005.

Girl Scout Camp, UST GS-1

The former Girl Scout Camp was located 2 miles northeast of downtown Adak and Runway 5-23 (Figure 2-4). This site, which was used by the 349th Engineers Regiment in the 1940s, included several Quonset huts and other buildings that have since been removed. One cabin that is still in place at the site was used to house Girl Scouts in the mid- to late 1980s. The former Girl Scout Camp site lies in a relatively flat area surrounded by hills and swales. The closest year-round water body, Palisades Lake, is located about 390 feet northeast of the source area.

A UST (UST GS-1) formerly present at the site is thought to have been installed between 1945 and 1947. The UST was used for storing JP-5 for heating buildings that have since been removed. The 850-gallon wooden UST showed signs of moderate weathering when it was removed in August 1993. Records indicating releases or tank-tightness reports were not available for this tank. The two soil samples collected from the excavation floor at a depth of 7 feet bgs had DRO concentrations that exceeded Alaska DEC Method One soil cleanup levels. Therefore, an additional investigation was required.

During the additional site investigation conducted in 1996 and 1997, one 2-inch diameter groundwater monitoring well and three soil borings were installed. In addition, a staff gauge was installed at Palisades Lake. Surface and subsurface soil, groundwater, and surface water samples were collected. DRO concentrations exceeded Alaska DEC soil cleanup levels in one subsurface soil sample and two surface soil samples. DRO, GRO, and BTEX were not detected in groundwater samples. DRO was detected at a maximum concentration of 1,300 µg/L in surface water.

When well 10-120 was resampled in 1998, the DRO concentration was below the Alaska DEC cleanup criteria. DRO concentrations ranged from 380 to 580 µg/L in the two surface water samples collected in 1998.

In 1999, approximately 192 cubic yards of in-place soil containing petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels were removed from the site for treatment and disposal. DRO, GRO, and RRO concentrations from all but one sample of soils remaining on site are below Alaska DEC Method Two soil cleanup levels for the over-40-inch rainfall zone and protection of migration to groundwater.

Although analyses of one soil sample produced a DRO concentration (250 mg/kg) slightly above the Alaska DEC Method Two cleanup level (230 mg/kg), little or no impact from this minor exceedance is anticipated. All concentrations of other petroleum-related compounds were below Alaska DEC soil cleanup levels. In addition, groundwater is not considered a continuous transport pathway from the Girl Scout Camp site to Palisades Lake, because the site is situated on tephra.

As discussed in Section 4.1.3, the site status changed to NFA in 2005 with Alaska DEC concurrence (Alaska DEC 2005c).

Housing Area (Arctic Acres)

The Housing Area (Arctic Acres) site is located in downtown Adak, east of Main Road and north of Kagalaska Drive (Figure 2-4). All housing units have been vacant since at least early 1996 (EMCON 1996). Heating fuel (JP-5) was formerly delivered to each unit through underground pressurized ¾-inch steel pipelines connected to two 27,000-gallon steel ASTs.

The site consists of housing units, paved roads, and flat gravel areas constructed in 1975. The site is drained by roadside ditches and storm drains that flow toward Kuluk Bay. Groundwater elevations measured at the site indicate that groundwater flows towards Kuluk Bay, approximately 1,000 feet to the east, on the eastern portion of the site and toward the East Canal, approximately 3,550 feet to the west, on the western portion of the site.

During a routine pipeline test in August 1993, investigators discovered that JP-5 had been released from the pipeline. Ten leaks caused by corrosion were found along a 150-foot length of pipeline running in an east-west direction under Dolly Varden Drive between Buildings 27055 and 27054 and Building 27058 (EMCON 1996). The combined leak rate was estimated at 7.5 gallons per hour, but it was not known how long the pipeline had been releasing product. Therefore, the total volume released was unknown. The fuel line was repaired within one day of the discovery of the leaks.

During the limited investigation of the pipeline leak conducted in August 1993, monitoring well AAMW-E298-1 was installed south of the repaired fuel line. DRO was detected at a concentration of 14,000 mg/kg in the sample collected from the AAMW-E298-1 boring. Free product (0.71 foot) was measured in the well in August 1993. When the well was inspected in February 1996, no free product was observed.

Two monitoring wells were installed west of well AAMW-E298-1 in 1996. DRO, GRO, and BTEX were not detected in the soil. DRO concentrations in groundwater samples collected from the three wells ranged from 2,500 to 12,700 µg/L. Free product was not detected in any of the wells during quarterly monitoring activities in 1996 and 1997.

In 1998, monitoring well 03-890 was installed approximately 500 feet west of the former leak. DRO was detected at a concentration of 34,000 mg/kg in the soil sample collected from the 03-890 soil boring. Exceedances of the Alaska DRO groundwater cleanup criterion were noted in both wells. The GRO concentration from the groundwater sample collected from well 03-890 also exceeded the ROD-established Alaska 18 AAC 75.345 Table C value.

In 1999, three monitoring wells (03-420, 03-421, and 03-422) were installed approximately 250 feet west of well 03-890, approximately 300 feet southwest of well 03-890, and approximately 300 feet south of well 03-416, respectively. DRO concentrations from the five soil samples collected from wells 03-420 and 03-421 exceeded the ROD-established Alaska DEC 18 AAC 75 soil cleanup criterion. DRO was detected at levels barely above the detection limit in soil samples collected from well 03-422.

Natural attenuation monitoring was conducted between 1999 and 2004. Product recovery was initiated at wells 03-421 and 03-890 in 2000 and continued until November 2002. Six new wells (AA-01 through AA-06) were installed in 2001. Limited monitoring was initiated at four of these wells in 2002. Target analyte concentrations in groundwater at these wells met monitoring endpoint criteria. Monitoring was discontinued at wells AA-03 and AA-04 in 2002 and at wells AA-02, AA-05, and AA-06 in 2003. DRO concentrations were greater than the Alaska DEC groundwater cleanup level at well 03-421 (between 1999 and 2002). Target analyte concentrations in groundwater at well 03-422 from 1999 to 2002 met monitoring endpoint criteria. DRO and GRO concentrations at well 03-890 were greater than Alaska DEC groundwater cleanup levels between 1999 and 2002. Monitoring was discontinued at wells 03-421, 03-422, and 03-890 in 2003. During the 1999–2000 sampling event, concentrations of benzene at well 03-890 were greater than the Alaska DEC groundwater cleanup level. DRO concentrations were greater than the Alaska DEC groundwater cleanup level at well 03-420 (between 2001 and 2004). Analyses for GRO and BTEX compounds were discontinued at this site during 2003. Natural attenuation monitoring for DRO is ongoing, as discussed in Sections 4.1.4 and 6.4.

MAUW Compound, UST 24000-A

The Modified Advanced Underwater Weapons (MAUW) Compound is an abandoned facility located north of Runway 5-23, on the south side of Tundra Road (Figure 2-4). The facility was formerly a secured compound used for ammunition storage. Building 24000-A was the Advanced Undersea Weapons shop. UST 24000-A, installed in 1976, stored JP-5 to fuel the Building 24000 boiler and emergency generator. The ground in the immediate vicinity of the tank is flat, but the compound as a whole slopes downward to the northeast. Landrum Creek is located approximately 390 feet northeast and downgradient of the site.

The UST failed a tank-tightness test in 1993 and was taken out of service before May 1994. The UST and associated piping were removed in October 1994. The condition of the UST upon removal was not reported. No spills or releases were reported to have occurred while the UST was in operation. The source could possibly be from leaks in the tank, overfilling, or leaking pipe joints. Five of eight subsurface soil samples collected from the excavation at depths between 5 and 6.5 feet bgs exceeded Alaska DEC 18 AAC 75 soil cleanup criteria.

Three groundwater monitoring wells and two hand auger borings were installed in 1996. DRO and GRO concentrations from all but one surface and subsurface soil boring were below Alaska DEC soil cleanup levels. No exceedances of the DRO groundwater cleanup criterion were noted, and GRO and BTEX were not detected.

Monitoring well 07-140 was installed in 1999 downgradient of well 07-103. DRO concentrations in soil boring 07-140 exceeded the ROD-established Alaska DEC soil cleanup criterion. DRO concentrations in well 07-103 exceeded the ROD-established Alaska DEC 18 AAC 75 groundwater criterion during comprehensive monitoring plan activities between 1999 and 2000. DRO was detected in well 07-140 at levels below the groundwater cleanup criterion. BTEX constituents were not detected in either well. No target analytes were detected above groundwater cleanup levels in either well in 2001. No limited groundwater sampling was conducted after 2001.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Mount Moffett Power Plant 5, USTs 10574 Through 10577

Mount Moffett Power Plant 5 is located approximately 1 mile north of Runway 5-23, northwest of downtown Adak, on the north side of Red Road (Figure 2-4). Mount Moffett Power Plant 5 housed the power generators for the large antenna field located nearby. USTs 10574 through 10577 stored the supply fuel, JP-5, for the generators inside the power plant.

The general topography of the site slopes to the southeast. An unnamed creek is approximately 1,000 feet downgradient of the source area.

The USTs were installed in 1965. UST 10576 failed a tank-tightness test in 1993. USTs 10576 and 10577 and associated piping were removed in September 1994. USTs 10574 and 10575 and associated piping were removed later in April 1996. Stained soil was observed beneath the tanks during removal of the USTs. The tanks showed mild corrosion, but no holes were observed. The release mechanism is unknown, but could possibly be from overfilling. Groundwater was not encountered in the excavation. Twenty-seven soil samples were collected during the tank removals, and DRO concentrations from several locations exceeded the Alaska DEC soil matrix level.

Three soil borings and one monitoring well were completed in 1996. DRO was detected in 1 of 6 samples at concentrations exceeding the Alaska DEC soil cleanup criterion. GRO and BTEX in soil were either not detected or detected at levels slightly above the detection limit. Groundwater was not present in the monitoring well, which is located on a low-permeability, tephra-over-bedrock unit.

Approximately 60 cubic yards of petroleum-affected soil were removed from the site in 1999. DRO concentrations measured in soil remaining at the site is above the Alaska DEC Method Two soil cleanup level for the over-40-inch rainfall zone and protection of migration to groundwater. Groundwater is not considered a complete transport pathway from the site to the downgradient surface water located 1,000 feet to the south.

The risk of exposure and potential for surface run-off of petroleum contaminants at this site has been significantly reduced by removing petroleum-contaminated surface soil and backfilling with clean soil.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

NAVFAC Compound, USTs 20052 and 20053

The Naval Facility (NAVFAC) Compound is located north of downtown Adak, approximately 3,200 feet north of Runway 5-23, and approximately 450 feet west of Kuluk Bay (Figure 2-4). The NAVFAC Compound was used for electronic surveillance of sonar buoys in the Pacific Ocean. USTs 20052 and 20053 were installed in 1986 to provide fuel (JP-5) for heating boilers and emergency generators in the electrical power plant (Building 10528) located within the compound.

UST use was discontinued in June 1994. No spills or releases were reported to have occurred while the USTs were in operation. The USTs were removed in October 1994. During removal activities, DRO concentrations from 11 of 16 soil samples collected from underneath tank piping and from the excavation exceeded the Alaska Matrix Level B criterion of 200 mg/kg.

Two monitoring wells and four Geoprobe wells were installed between 1996 and 1997. DRO was detected in the soil at concentrations of 22,000 and 20 mg/kg in borings 08-101 and 08-102, respectively. DRO, GRO, and BTEX were not detected in the other four soil borings. DRO was detected in groundwater at concentrations of 9,900 and 1,100 µg/L from wells 08-101 and 08-106, respectively. Benzene was also detected in well 08-101 at a concentration of 1.2 µg/L. Well 08-101 was resampled in 1997 and 1998. Although DRO was detected at levels between 1,400 and 2,900 µg/L in well 08-101, GRO and benzene were not detected. The site was retained for further evaluation because the maximum DRO concentration in soil exceeded the Alaska DEC matrix level and Alaska DEC supplemental criterion (12,500 mg/kg) for industrial sites.

Well 08-101 was sampled as part of the Comprehensive Monitoring Program between 1999 and 2000. DRO and GRO concentrations in groundwater were below the ROD-established Alaska DEC 18 AAC 75.345 Table C values. Limited groundwater monitoring activities stopped in 2000.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Navy Exchange Building, UST 30027-A

The Navy Exchange (NEX) Building is located in downtown Adak and is surrounded by housing areas to the east and south, the former McDonald's restaurant to the west, and the child-care center to the north (Figure 2-4). The NEX building was constructed in 1973 (Tryck Nyman Hayes 1996) and used to house the NEX commissary, gasoline service station, and vehicle maintenance garage (EMCON 1996). UST 30027-A was installed in 1974 and stored used oil generated by the garage operations at Building 30027.

The ground surface is relatively flat in the immediate vicinity of the site and is covered by an asphalt parking lot and an open field. The closest downgradient surface water body is East Canal, located approximately 2,500 feet west of the site.

UST 30027-A was removed in August 1993. DRO and GRO were detected in the two soil samples collected from the excavation floor beneath the UST at a depth of 2.5 feet bgs at maximum concentrations of 8,000 and 110 mg/kg, respectively. Because analytical results exceeded the DRO criterion established by Alaska DEC, additional investigation was required.

In 1998, one soil boring was drilled near the former UST location. DRO and GRO were reported in the sample collected between 3 and 5 feet bgs at concentrations above their respective Alaska DEC Method Two soil cleanup criteria.

In 1999, approximately 37 cubic yards of petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels were removed for treatment and disposal. Although DRO concentrations reported for soil remaining on site are above the Alaska DEC Method Two soil cleanup level for the over-40-inch rainfall zone and protection of migration to groundwater, further excavation in this area is not possible because of the proximity of a building to the north and buried utilities to the south, east, and west.

Because of the inaccessibility of the remaining petroleum in soil, the site remedy shifted from limited soil removal to limited groundwater monitoring, with Alaska DEC concurrence in 1999 (Agency comments of Draft Limited Soil Removal Report, dated September 21, 1999). Per Alaska DEC comments dated August 30, 2001, one monitoring well (04-871) was installed in the former UST location in 1999. Limited groundwater monitoring commenced in 1999. The site met the endpoint criteria based upon the 1999 and 2000 analytical results, and groundwater monitoring was stopped in 2000.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

New Roberts Housing, UST HST-7C

The New Roberts Housing area is located near downtown Adak at the western end of Sweeper Cove, adjacent to the fuel pier and the small boat harbor (Figure 2-4). The former housing units that made up the New Roberts Housing area were vacated during 1998 and have all been subsequently demolished. UST HST-7C and the associated oil/water separator were installed in 1987 to serve the New Roberts Housing fuel distribution system. The fuel distribution system provided JP-5 heating fuel to the former housing area.

The site is relatively flat with several depressions across the site, which allow surface water to pond during rain. The closest surface water body to the site is Helmet Creek, which is less than 10 feet west of the site. However, groundwater flows toward Sweeper Cove, which lies approximately 1,300 feet to the east.

The UST, the oil/water separator, and associated piping were decommissioned and removed in April 1995. At the time of removal, the tank appeared to be in good condition, but a hole was found in the line connecting it to the oil/water separator. DRO was detected at a maximum concentration of 17,000 mg/kg in one soil sample collected from the bottom of the excavation. No records are available on petroleum releases at this facility. The release mechanisms are probably loose joints between the oil/water separator and the UST or the hole found at the time of removal in the line to the oil/water separator.

One monitoring well was installed at the site between the former tank excavation and Helmut Creek in 1996. DRO was detected in soil samples collected from the boring at concentrations ranging from 320 to 1,400 mg/kg. Two sediment and surface water samples were collected from Helmut Creek from upgradient and downgradient locations. DRO was detected at a concentration of 8.8 mg/kg in the downgradient sediment sample. DRO, GRO, and BTEX were not detected in the surface water.

Three monitoring wells were installed at the site between the former tank excavation and Sweeper Cove in 1999 when it was found that groundwater flowed to the east. DRO concentrations in monitoring well boring 06-300 exceeded the soil cleanup criterion. The wells were added to the limited monitoring program in 1999 and limited groundwater monitoring was conducted between 1999 and 2001. Target analyte concentrations in groundwater were less than Alaska DEC groundwater cleanup levels for two consecutive sampling events during 1999 and 2000, but additional sampling was recommended for 2001 because aliphatic DRO exceeded cleanup criteria at location 06-101. Limited groundwater sampling stopped in 2001.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

NMCB Building Area, T-1416 Expanded Area, and NMCB Building (UST T-1416-A)

The Naval Marine Construction Battalion (NMCB) Building Expanded Area site is located in downtown Adak on the northern shore of Sweeper Cove (Figure 2-4). The site and surrounding area were used primarily for industrial purposes up to the military drawdown at Adak in the late 1990s (U.S. Navy 1998a). Three buildings were constructed in the area in the early 1940s, of which only Building T-1416 still remains at the site. The pre-engineered building, located east of Building T-1416, was constructed during 1994. The buildings and surrounding land were used as a woodworking shop, supply depot, machine shop, vehicle motor pool maintenance facility, equipment storage area, and vehicle parking area. Five docks, formerly located at the southern margin of the site, were constructed prior to 1945 and were associated with site operations (EMCON 1996). The Fish and Wildlife Building, located north of Seawall Road, formerly housed the administrative functions of the U.S. Fish and Wildlife Service. Three abandoned underground fuel transfer pipelines cross the site.

The land that makes up the NMCB Building Expanded Area site has been extensively altered since the military first occupied Adak Island during World War II. This area was part of a back-beach lagoon prior to occupation and was rapidly converted to a fuel receipt and distribution center and industrial area to support the U.S. Aleutian campaign of World War II.

No documented releases of petroleum hydrocarbons at the NMCB Building Expanded Area have been recorded. However, several sources of petroleum releases are present at the site. These sources include two abandoned 8-inch-diameter fuel transfer pipelines, one abandoned 12-inch-diameter fuel transfer pipeline, the former used oil collection tank UST T-1416-A, an inactive AST located south of the southwest corner of Building T-1416, and a 550-gallon JP-5 storage tank located along the east wall of Building T-1416. Petroleum sheens reportedly were observed in 1994 on ponded water between Building T-1416 and Seawall Road (EMCON 1996).

In September 1990, an abandoned fuel line located near the southeast corner of Runway 18-36 was uncovered during installation of a new fuel line adjacent to Main Road. The abandoned fuel line reportedly was a source of subsurface fuel contamination, and residual product was observed in the excavated trench. This release may have contributed to, or been associated with, petroleum hydrocarbons released to the environment at the NMCB Building Expanded Area.

Investigations conducted prior to 1996 include: Tank Farm A reconnaissance investigation, Main Road pipeline release investigation, Tank Farm A release investigation, UST T-1416-A closure assessment, site assessment for Sewage Lift Station 11, and the pipeline Area E site assessment. UST T-1416-A was removed during 1994, and UST 42484-A and associated piping were removed during June 1995 as part of the environmental cleanup at the former Adak Naval Complex. The 1995 pipeline assessment also included the removal of a valve pit along the pipeline trace north of Seawall Road. DRO and GRO at concentrations greater than the Alaska DEC soil cleanup levels were confirmed in samples of subsurface soil collected at the NMCB Building Expanded Area during these investigations and removal actions.

In 1996, eighteen 2-inch-diameter monitoring wells, four Geoprobe wells, and four Geoprobe borings were installed at the site. DRO and GRO were detected in the soil at maximum concentrations of 43,000 and 27,000 mg/kg, respectively. DRO, GRO, and BTEX concentrations in groundwater exceeded Alaska DEC groundwater cleanup criteria in more than half of the wells sampled. Three of these wells were resampled in October 1997, and similar analytical results were reported.

Marine sediment and surface water samples were collected from 12 locations in Sweeper Cove offshore from NMCB in 1998. GRO was detected in three surface water samples collected south of building T-1416, south of the Fish and Wildlife Building, and south of the junction of Seawall and Main Roads. The maximum GRO concentration detected was 67 µg/L. BTEX constituents were reported in six surface water samples collected closest to the shoreline, and the maximum BTEX concentration detected was 33 µg/L. DRO was not detected in any surface water samples collected, but was detected in all 12 marine sediment samples, ranging in concentrations from 37 to 146 mg/kg. Total PAHs were detected in 2 of 12 marine sediment samples.

Since the completion of the OU A ROD, numerous other investigations have taken place at the NMCB Building Expanded Area, including installation of additional monitoring wells and collection of additional soil, sediment, and surface water samples. Data are currently available for petroleum-related compounds, VOCs, and SVOCs in soil and groundwater samples collected at the site between 1993 and 2002, and petroleum-related compounds and SVOCs in sediment and surface water samples collected between 1993 and 2003. Results of chemical analyses for GRO, DRO, RRO, or BTEX are available for 161 soil samples collected from 103 locations, 118 groundwater samples collected from 50 locations, 19 marine sediment samples from 14 locations in Sweeper Cove, 11 marine surface water samples from 11 locations in Sweeper Cove, three fresh-water sediment samples collected from three locations in the East Canal, and five fresh surface water samples collected from four locations in the East Canal. Section 6.4 discusses the results of the monitoring activities that have taken place at the NMCB Building Expanded Area since completion of the first 5-year review (U.S. Navy 2001b).

As discussed in Section 6.4, free-product recovery has been conducted at the NMCB Building Expanded Area site intermittently from September 1997 through July 2005. As of July 2005, free-product recovery at the NMCB Building Expanded Area has met the practicable endpoint established for the shut down of product recovery as specified in the OU A ROD. Alaska DEC approved the interim remedial action free-product closure report for this site in January 2006.

The NMCB Building Expanded Area site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2005. Results of this risk assessment identified human health risk and ecological hazard levels above target health goals, provided that ICs remain in effect. The decision document for final remedial action for the NMCB Building Expanded Area site will be executed in 2006. (U.S. Navy and Alaska DEC 2006). The final remedy consists of ICs, free-product recovery, and monitored natural attenuation.

NORPAC Hill Seep Area

The precise location of the NORPAC Hill Seep has not been confirmed, but on the basis of field observations has been approximately located at the shoreline of Kuluk Bay southeast of NORPAC Hill (Figure 2-4). A petroleum sheen has been occasionally observed for several years, usually during high tide, on the surface of Kuluk Bay in this vicinity. No specific information is available regarding when sheens were observed at the site. Most likely these sheens were observed after 1996, since no investigations were performed prior to this date. Presuming that the petroleum source is on shore, the seep area should be situated at or near the base of a rock-covered slope that descends steeply from the Bayshore Highway down to the shoreline of Kuluk Bay. The petroleum hydrocarbon within the sheen was identified as JP-5 (EMCON 1996).

The southeastern slope of NORPAC Hill has never been developed because of its extreme steepness. The Kuluk Housing area, which is now vacant, is located about 400 feet west-southwest of the shoreline seep area. Each housing unit used JP-5 fuel for heating purposes. This fuel was supplied to the units from ASTs via underground pipelines. Prior to the construction of Kuluk Housing, the area was occupied by Army barracks and mess halls (U.S. Navy 1955a), which were supplied with JP-5 as heating fuel.

Assuming that the released product is JP-5, potential sources in the vicinity include (1) the heating fuel systems for the nearby Kuluk Housing or the former Army barracks, (2) a fuel pipeline associated with a shutoff valve located about 250 feet west of and upgradient from the seep area, or (3) a source yet undiscovered. No releases are known to have occurred at the pipeline, the fuel shutoff valve, the former barracks area, or the Kuluk Housing units in the vicinity.

No investigations were conducted in the vicinity of the NORPAC Hill Seep prior to 1996. The initial investigations conducted in 1996 and 1997 included drilling six soil borings, five of which were completed as monitoring wells, and collecting one surface soil sample. Maximum detected concentrations of DRO and GRO in soil were 14,000 and 67 mg/kg, respectively. DRO was detected at a maximum concentration of 5,200 µg/L in groundwater. GRO, BTEX, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were not detected in any of the groundwater samples. In 1998, three monitoring wells were installed upgradient of the previous wells to try to determine the source area. Two of the three new wells reported DRO concentrations above the ROD-established Alaska DEC soil cleanup level. GRO was detected in one soil boring at a concentration near the detection limit. The maximum concentration of DRO detected in groundwater (6,180 µg/L) was detected in upgradient well 04-405. Section 6.2 discusses the results of the monitoring activities that have taken place at the NORPAC Hill Seep Area since completion of the first five-year review (U.S. Navy 2001b).

Between September 1996 and November 2001, a measurable product thickness was observed in two wells installed in the vicinity, 04-145 and 04-146. A measurable thickness of free product has not been reported in well 04-145 since November 29, 1999. The maximum product thickness measured in well 04-146 was 1.67 feet on April 25, 2000. A passive recovery bailer was installed in Well 04-146 on March 18, 1998. Product recovery was conducted through June 2000. A passive recovery bailer was re-installed in Well 04-146 on June 1, 2001, as discussed further in Section 6.4.

Free-product recovery conducted as an interim remedial action has met the practicable endpoint established for the shut down of product recovery as specified in the OU A ROD (Tetra Tech 2006). Alaska DEC approved the interim action free-product recovery closure report for this site in January 2006. The NORPAC Hill Seep Area site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). This decision document identified limited groundwater monitoring as the final remedy, and monitoring activities commenced in 2005.

Officer Hill and Amulet Housing, UST 31047-A

Officer Hill Housing is located northwest of Amulet Housing and west of downtown Adak. Former UST 31047-A was located approximately 1,800 feet west of Runway 18-36 and 7,500 feet west of Kuluk Bay (Figure 2-4). Building 31047 and the other residential housing units in the Officer Hill and Amulet Housing area were built in the 1960s. Land use in this area prior to the 1960s is unknown.

The original fuel oil tank installed at the time of construction of the housing units was replaced (in the same location) with a JP-5 UST in 1988. The condition of the original fuel oil tank when it was removed is unknown. UST 31047-A was used to store JP-5 for the oil furnace. The UST was removed in March 1995. At the time of removal, UST 31047-A appeared to be in excellent condition, with no observed dents, deformities, holes, or rust. DRO concentrations in soil samples collected during removal activities ranged from 9.7 to 3,000 mg/kg. Because analytical results indicated that concentrations of DRO in surface soil remaining near the vent pipe exceeded the screening criterion established by Alaska DEC, an additional investigation was required.

In 1996, two hand auger borings were installed in the vicinity of the former tank. Concentrations of DRO in surface and subsurface soil were reported at 24,700 and 19,000 mg/kg, respectively, which exceeded the Alaska DEC cleanup criterion.

In 1998, a site investigation was conducted to evaluate the extent of petroleum hydrocarbons found during the 1996 investigation. One soil boring was drilled to a depth of approximately 6 feet bgs. This boring was intended to be completed as a groundwater monitoring well. However, bedrock was encountered at a depth of 6 feet bgs and groundwater was not present in the boring. Analyses of the two soil samples collected from this boring did not detect DRO at concentrations above the Alaska DEC Method Two soil cleanup level established for this compound.

In 1999, approximately 7 cubic yards of soil containing petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels were removed from the site for treatment and disposal. Although all soils that could be removed from the excavation were removed, highly fractured bedrock encountered between 3 and 5 feet bgs appears to be impacted by petroleum contamination. Therefore, the DRO concentrations remaining in on-site soils is above the Alaska DEC Method Two soil cleanup level for the over-40-inch rainfall zone and protection of migration to groundwater. Further excavation in this area is not possible because of the presence of shallow bedrock and the proximity of Building 31047. Because shallow bedrock is present at the site and groundwater was not encountered during drilling activities in 1998, groundwater is not considered a continuous transport pathway from the Officer Hill and Amulet Housing site to Yakutat Creek, located 200 feet to the northwest.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Officer Hill and Amulet Housing, UST 31049-A

Officer Hill Housing is located northwest of Amulet Housing and west of downtown Adak. Former UST 31049-A was located approximately 1,800 feet west of Runway 18-36 and 7,500 feet west of Kuluk Bay (Figure 2-4). Building 31049 and the other residential housing units in the Officer Hill and Amulet Housing area were built in the 1960s. Land use in this area prior to the 1960s is unknown.

The original fuel oil tank installed at the time of construction of the housing units was replaced (in the same location) with a JP-5 UST in 1988. The condition of the original fuel oil tank when it was removed is unknown. UST 31049-A was used to store JP-5 for the oil furnace. The UST was removed in March 1995. At the time of removal, UST 31049-A appeared to be in excellent condition, with no observed dents, deformities, holes, or rust. DRO concentrations in soil samples collected during removal activities ranged from 9.0 to 390 mg/kg. Although the maximum DRO concentration in the soil samples collected during the UST closure were well below the Alaska DEC criterion, an additional investigation was required because the site is less that 200 feet from the DEM (an unnamed creek).

In 1998, a site investigation was conducted in the vicinity of the removed piping that had connected the housing unit furnace and UST 31049-A. One soil boring was drilled near the point where the piping entered the building. The maximum DRO concentration detected in the two soil samples collected from this boring was 12 mg/kg, well below the Alaska DEC Method Two soil cleanup level.

In 1999, approximately 2 cubic yards of soil containing petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels were removed from the site for treatment and disposal. Confirmation sampling identified concentrations of petroleum-related compounds below Alaska DEC soil cleanup levels.

As discussed in Section 4.1.3, the site status changed to NFA in 2005 with Alaska DEC concurrence (Alaska DEC 2005d).

Officer Hill and Amulet Housing, UST 31052-A

Officer Hill Housing is located northwest of Amulet Housing and west of downtown Adak. Former UST 31052-A was located approximately 1,300 feet west of Runway 18-36, 600 feet west of South Sweeper Creek, and 7,000 feet west of Kuluk Bay (Figure 2-4). Building 31052 and the other residential housing units in the Officer Hill and Amulet Housing area were built in the 1960s. Land use in this area prior to the 1960s is unknown.

The original fuel oil tank installed at the time of construction of the housing units was replaced (in the same location) with a JP-5 UST in 1988. The condition of the original fuel oil tank when it was removed is unknown. UST 31052-A was used to store JP-5 for the oil furnace. The UST was removed in March 1995. During the tank removal, groundwater was encountered at 5.5 feet bgs, and a heavy sheen was observed on the groundwater surface (U.S. Navy 2000c). DRO concentrations in soil samples collected during removal activities ranged from 5.0 to 3,100 mg/kg. UST 31052-A appeared to be in excellent condition at the time of removal, with no observed dents, deformities, holes, or rust. Because DRO concentrations in the soil samples collected during the UST closure exceeded the Alaska DEC criterion, an additional investigation was required.

In 1996 and 1997, a site investigation was conducted to verify that DRO concentrations were present at the vent standpipe and to determine the horizontal extent of petroleum-affected soil. The investigation included collecting soil samples from two hand-augered soil borings that were completed in the vicinity of former UST 31052-A and associated vent standpipe. The highest concentrations of DRO were in the surface and subsurface soil samples collected near the vent standpipe (2,650 and 1,100 mg/kg, respectively).

In 1998, an additional soil boring was drilled in the vicinity of the hand auger locations using Geoprobe drilling equipment. Of the two soil samples collected from the boring, the highest concentration of DRO (69 mg/kg) was detected in the sample collected from 3.5 to 5 feet bgs.

In 1999, approximately 2 cubic yards of soil containing petroleum-related compounds at concentrations exceeding Alaska DEC Method Two soil cleanup levels were removed from the site for treatment and disposal. Although DRO concentrations reported for soil remaining on site are above the Alaska DEC Method Two soil cleanup level for the over-40-inch rainfall zone and protection of migration to groundwater, further excavation in this area was not possible because of the proximity of a Building 31052 and the presence of shallow groundwater.

The site remedy shifted from limited soil removal to limited groundwater monitoring with Alaska DEC concurrence in 1999 (Agency comments to the Draft Limited Soil Removal Report, dated September 21, 1999). Per Alaska DEC comments dated August 30, 2001, because inaccessible petroleum in soil remained, one well was installed in 2001 to evaluate whether the remaining petroleum in soil was partitioning into groundwater at concentrations above Alaska DEC 18 AAC 75.345 Table C values. Limited groundwater monitoring commenced in well 05-372 in 2001. No target analytes were detected above OU A ROD cleanup levels in 2001 and 2002, and groundwater monitoring was stopped in 2002.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Quarters A, UST 42200

Quarters A is located on a small hill northeast of Bering Hill, west of Runway 18-36, and overlooking the former Officer Hill and Amulet Housing (Figure 2-4). Quarters A is a single-family residence formerly occupied by the Naval Air Facility Commander. The knoll where Quarters A is located was used during the 1940s as tent housing for troops. Former UST 42200 was used to store JP-5 fuel for heating Quarters A.

UST 42200 was removed in 1997. Soil samples were collected from the floor of the excavation and from under the supply/return lines against the building foundation. Upon removal, the tank was in excellent condition and did not appear to have holes in the body that would indicate leakage. DRO was reported at a concentration of 1,660 mg/kg in the soil sample collected under the former supply/return lines that exceeded the Alaska DEC Method One soil cleanup level (200 mg/kg) established for this compound. The source of petroleum release is not recorded.

In 1998, two soil borings were drilled in the vicinity of the former supply/return lines. DRO was not detected in these soil samples at concentrations above the Alaska DEC Method Two soil cleanup level established for this compound.

In 1999, approximately 3 cubic yards of petroleum-impacted soil were removed from the site for treatment and disposal. Confirmation sampling identified concentrations of petroleum-related compounds below Alaska DEC soil cleanup levels.

As discussed in Section 4.1.3, the site status changed to NFA in 2005 with Alaska DEC concurrence (Alaska DEC 2005e).

ROICC Contractor's Area, UST ROICC-7

The ROICC Contractor's Area is located north of the airport and downtown Adak in an unpopulated area (Figure 2-4). The ROICC Contractor's Area was used for storage of equipment and supplies for contractors working for the Navy. UST ROICC-7 was located on the south side of Davis Street near a concrete pad that had been a warehouse foundation.

The general topography of the site is flat. North Sweeper Creek is located approximately 2,200 feet to the south of the former location of UST ROICC-7. Groundwater flow is generally to the south-southeast toward North Sweeper Creek.

The history and use of the UST ROICC-7 are not documented. When the UST was removed in 1995, the tank was nearly full of oily water. The excavated tank was in moderate to good condition with moderate to heavy surface rust. A 4-inch-diameter hole and two piping connections were observed on the tank's top, but piping was not observed in the area of the tank. Hydrocarbon odors and a sheen on the tank were noted during excavation. The source of petroleum release is not recorded, but it appears to have originated from the UST. DRO was reported at a concentration of 16,000 mg/kg in the soil sample collected from the south end of the tank, exceeding the Alaska DEC Method One soil cleanup level (200 mg/kg) established for this compound.

In 1999, three groundwater monitoring wells were installed north of the former ROICC-7 excavation to find the source of benzene reported in groundwater samples collected from well 08-153. Benzene concentrations in the resulting boring for monitoring well 08-200 exceeded the soil cleanup criterion. Analytical results from groundwater samples collected during the first year of comprehensive monitoring exceeded the ROD-established Alaska DEC 18 AAC 75 groundwater cleanup criteria in wells 08-200 (for benzene and GRO) and 08-202 (for benzene). Limited groundwater monitoring was conducted between 1999 and 2002. Well 08-175 was installed in 2003 to evaluate natural attenuation downgradient. Natural attenuation evaluation monitoring was initiated at locations 08-175, 08-200, and 08-202 during 2003. Limited groundwater monitoring and natural attenuation evaluation are ongoing, as discussed in Section 4.1.4.

ROICC Contractor's Area, UST ROICC-8

The ROICC Contractor's Area is located north of the airport and downtown Adak in an unpopulated area (Figure 2-4). The ROICC Contractor's Area was used for storage of equipment and supplies for contractors working for the Navy. UST ROICC-8 was located near the southwest corner of the southern concrete pad in the ROICC Contractor's Area.

The general topography of the site is flat. The eastern margin of a large marsh area is located approximately 50 feet to the southwest of the source area. Kuluk Bay is located approximately 0.5 mile to the east of the former location of UST ROICC-8. Groundwater flow varies at the site, generally flowing to the southeast toward Kuluk Bay. However, occasionally, groundwater flows to the southwest toward the marsh.

The history and use of the UST ROICC-8 are not documented. The UST was removed in 1995. The excavated tank was in fair condition with moderate to heavy surface rust. The associated piping, which was moderately to heavily rusted, was removed together with the tank. The source of petroleum release is not recorded, but it appears to have originated from the UST. DRO was reported at a concentration of 11,000 mg/kg in the soil sample collected from the south end of the tank, exceeding the Alaska DEC Method One soil cleanup level (200 mg/kg) established for this compound.

In 1996, nine monitoring wells and two soil borings were installed at the site. DRO concentrations in the soil ranged from not detected to 801 mg/kg. GRO and BTEX were not detected in the soil. The maximum DRO and GRO concentrations reported in groundwater samples were 500 and 817 µg/L, respectively, from well 08-153. In addition, benzene was detected at a concentration of 24.8 µg/L in well 08-151.

In 1998, groundwater from wells 08-153 and 08-160 was resampled. Benzene and GRO were detected at concentrations of 1.4 and 110 µg/L, respectively, in well 08-153. Xylenes were detected at levels barely above the detection limit in both wells. No other constituents were reported.

In 1999, these two wells were resampled as part of the natural attenuation monitoring program. Analytical results from groundwater samples were below the ROD-established Alaska DEC 18 AAC 75.345 Table C values for three consecutive sampling events. Groundwater monitoring was discontinued at this site in 2003, because concentrations had achieved endpoint criteria.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

ROICC Warehouse, UST ROICC-2

The ROICC Warehouse is located north of downtown Adak, approximately 4,000 feet north of Runway 5-23 and approximately 1,650 feet west of Kuluk Bay (Figure 2-4). The ROICC Warehouse, built in the mid- to late 1940s, has always been used for storage of construction equipment and supplies for contractors working for the Navy. UST ROICC-2, a 1,300-gallon UST, was believed to have been used to collect and store diesel-range and heavier petroleum product.

The general topography of the ROICC Warehouse area is flat and surface water drainage is poor, creating pools of standing water on the site and throughout the area. The closest surface water body is NAVFAC Creek, located approximately 500 feet north of the site. The closest marine surface water body is Kuluk Bay, located approximately 1,650 feet east of the source.

UST ROICC-2 was decommissioned and removed in April 1995. At the time of removal, the tank was full of a water and product mix that had resulted from rainwater entering the tank through an exposed 4-inch-diameter hole on top of the tank. The tank was in poor condition, with surface rust and one 10-inch-long triangular hole above the ground surface. DRO concentrations from all five samples collected from the excavation exceeded the Alaska DEC soil matrix level. The history and exact use of the UST are not documented. The release mechanism is unknown, but could possibly be from overfilling or from the hole in the tank.

In 1996, two groundwater monitoring wells were installed downgradient of the former tank excavation. DRO, GRO, and BTEX were not detected in soil samples collected at the site. DRO and GRO were not detected in groundwater samples, and benzene was detected at a maximum concentration of 2.2 µg/L in groundwater. Well 08-171 was resampled in 1998, and DRO, GRO, and BTEX were not detected in groundwater.

In 1999, wells 08-203 and 08-204 were installed south of well 08-171 because of the variable groundwater flow direction. No exceedances of soil cleanup criteria were noted. Wells 08-171 and 08-203 were sampled between 1999 and 2000 as part of the limited monitoring program. Analytical results from groundwater samples collected for two consecutive sampling events were below the ROD-established Alaska DEC 18 AAC 75.345 Table C values. Groundwater monitoring was discontinued at this site in 2000, because concentrations had achieved endpoint criteria.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

ROICC Warehouse, UST ROICC-3

The ROICC Warehouse is located north of downtown Adak, approximately 4,000 feet north of Runway 5-23 and approximately 1,650 feet west of Kuluk Bay (Figure 2-4). The ROICC Warehouse, built in the mid- to late 1940s, has always been used for storage of construction equipment and supplies for contractors working for the Navy. UST ROICC-3, a 1,300-gallon UST, was believed to have been used to collect and store diesel-range and heavier petroleum product.

The general topography of the ROICC Warehouse area is flat and surface water drainage is poor, creating pools of standing water on the site and throughout the area. The closest surface water body is NAVFAC Creek, located approximately 500 feet north of the site. The closest marine surface water body is Kuluk Bay, located approximately 1,650 feet east of the source.

UST ROICC-3 was decommissioned and removed in April 1995. At the time of removal, the tank was in poor condition, with surface rust. DRO concentrations from two of three samples collected from the excavation exceeded the Alaska DEC soil matrix level. The history and exact use of the UST are not documented. The release mechanism is unknown, but could possibly be from overfilling, or from the hole in the tank.

In 1996, two groundwater monitoring wells were installed downgradient of the former tank excavation for UST ROICC-3 and the former tank excavation for UST-ROICC-2 located nearby. DRO, GRO, and BTEX were not detected in soil samples collected at the site. DRO and GRO were not detected in groundwater samples. Benzene was detected at a maximum concentration of 2.2 µg/L in groundwater. Well 08-171 was resampled in 1998, and DRO, GRO, and BTEX were not detected in groundwater.

In 1999, well 08-801 was installed west of the former tank excavation due to the variable groundwater flow direction. No analytes were detected in the soil sample collected. Wells 08-171 and 08-801 were sampled between 1999 and 2000 as part of the limited monitoring program, and analytical results from groundwater samples collected for two consecutive sampling events were below the ROD-established Alaska DEC 18 AAC 75.345 Table C values. Groundwater monitoring was discontinued at this site in 2000, because concentrations had achieved endpoint criteria.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

Runway 5-23 Avgas Valve Pit

The Runway 5-23 Avgas Valve Pit is located approximately 800 feet south of the southern end of Runway 5-23 and 50 feet west of a former truck fill stand (Figure 2-4). The valve pit is associated with an abandoned 6-inch-diameter aviation gasoline (avgas) transfer pipeline that supplied fuel to the Runway 5-23 truck fill stand. The pipeline has been abandoned after removal of the aboveground portions of the piping, draining of fuel from the buried sections, and capping of the pipe ends.

In 1994, a product sheen was observed on the groundwater surface in the excavation opened to remove the valve. One soil sample collected during the valve removal contained GRO at concentrations greater than Alaska DEC matrix levels. No records are available on petroleum releases at this facility. The release mechanism is unknown, but probably includes leaks from the piping and valve.

Two groundwater monitoring wells were installed in 1996. Concentrations of GRO in soil samples collected from location 14-100 exceeded Alaska DEC soil cleanup levels. Well 14-100 was sampled in 1996, 1997, 1998, and between 1999 and 2004 as part of the Comprehensive Monitoring Program. Benzene, aliphatic GRO, and total GRO concentrations in groundwater were greater than Alaska DEC groundwater cleanup levels between 1999 and 2002. A new well, 14-110, was installed in 2003 to better evaluate groundwater characteristics. DRO analyses were discontinued in 2003, since concentrations met the monitoring endpoint criteria. Natural attenuation monitoring is ongoing at this site, as discussed in Section 4.1.4.

SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area

SA 77, the Fuels Facility, is located west of Sweeper Cove on the east side of Transit Road near its intersection with Cross Road (Figure 2-4). The Small Drum Storage Area, situated at the southwest corner of the Fuels Facility, was a temporary transfer area for sealed 55-gallon drums containing non-hazardous petroleum-based residuals and mopping rags generated from the Fuels Division operations between 1980 and 1994.

The Small Drum Storage Area is characterized by flat terrain. However, a manmade berm lies approximately 40 feet to the northeast, and ponding may occur during rainstorms. The ground at the site is covered by compacted gravel. The site is 205 feet west of Sweeper Cove.

In June 1989, the site was listed as a source area (SA 77), because the EPA observed that drums were not labeled during a site inspection of the site. EPA assumed the drums to be improperly handled containers holding unknown waste compounds. In December 1994, a facility review by EMCON revealed three small, empty ASTs, two empty 55-gallon drums, one 55-gallon drum containing JP-5 contaminated pads, and several miscellaneous equipment filters.

In July 1993, DRO concentrations above the Alaska DEC soil matrix level were noted in 7 of 9 surface soil samples collected from the areas where drums historically had been stored. The maximum detected concentration of DRO in surface soil was 2,200 mg/kg. GRO, benzene, and BTEX were not detected in any of the samples. Three additional hand auger soil borings were installed in 1998, and DRO was detected in one boring at a concentration above the Alaska DEC soil cleanup level.

Insufficient data existed to perform a risk comparison of groundwater, surface water, and sediment concentration levels with federal maximum contaminant levels (MCLs), EPA default drinking water screening concentrations, or ambient sediment and water quality criteria. Significant chemical transport and accumulation is unlikely, given the flat gradient of the site, its compacted and gravelly surface, and the fact that the petroleum-affected soils were surficial and the DRO concentrations in the sample fell below the supplemental criterion threshold of 5,000 mg/kg.

Because the site had not been operated as a satellite accumulation area under RCRA and because the material stored at the site was not a hazardous waste, reports and inventory data do not exist (U.S. Navy 1995b). No records of petroleum releases are available.

The site was “clean closed” under RCRA in 1995 (with the ICs that restrict the property from future residential land use development), because the data collected during the RCRA closure showed that RCRA-regulated hazardous wastes were not present at the Small Drum Storage Area at concentrations warranting corrective action. This site was also evaluated as a petroleum site under SAERA. Under SAERA, this site was selected for limited soil removal to address elevated concentrations of petroleum compounds in soil. However, the limited soil removal at this site is delayed, because the site is a primary and active fueling facility. Thus, health and safety issues apply at this site. The limited soil removal action is currently planned for 2008.

SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs

SA 78, Old Transportation Building, is located approximately 5 miles north of downtown Adak in the NSGA complex, on the lower southern slope of Mount Adagdak, near the northwestern shore of Clam Lagoon (Figure 2-4). The Old Transportation Building was used as the NSGA fire station and transportation garage from 1950 until mid-1991 (U.S. Navy 1996b). Two USTs and two ASTs were used at the Old Transportation Building site to store mogas for vehicle fueling from the early 1960s until 1993. Exact installation dates of the USTs and ASTs are unknown.

The area east of the Old Transportation Building was filled, graded flat, and used as a vehicle fueling area. Although the site has been graded level, the surrounding topography of the Old Transportation Building site slopes southeast toward Clam Lagoon. Surface water runoff generally flows southeast toward Clam Lagoon, approximately 250 feet from the source area.

Environmental investigations during November 1990, May 1991, and February 1992 were conducted to evaluate soil and groundwater conditions at the Old Transportation Building as part of the preconstruction for a new bachelor enlisted quarters (BEQ) that was never built. Petroleum hydrocarbons were detected in surface soil and groundwater samples collected from the former fueling area during these investigations.

In May 1993, UST 10583 was excavated, removed, cleaned, and disposed of (Quest 1993). The two ASTs were removed during the excavation of the UST 10583 (EMCON 1996). Soil contamination and fuel leaking from piping connected to both ASTs and the UST were observed during tank removal activities. UST 10584 could not be located to be removed, and no records were available to confirm that the UST has been removed. GRO and BTEX were not detected in the three in-place soil samples collected from the excavation. However, these analyses were rejected because they did not meet Alaska DEC protocols (EMCON 1996).

Three monitoring wells (MW-116, MW-117, and MW-118) were installed in 1994 during the PSE-2 at several nearby sites. DRO was detected in the soil at location 10 and GRO and BTEX were detected in the groundwater in wells MW-117 and MW-118, downgradient of former UST 10583. No analytes were detected in the sediment samples collected along Clam Lagoon and an outfall discharge point. Between 1996 and 1997, seven soil borings and three monitoring wells (12-145, 12-151, and 12-152) were installed in the vicinity of the Old Transportation Building USTs and ASTs. DRO was detected in soil at all but one location and DRO, GRO, and BTEX were detected in groundwater from wells MW-117, 12-145, 12-151, and 12-152. Similar results were found when well MW-117 was resampled in 1997, 1998, and well 12-145 was resampled in 1997. Two downgradient monitoring wells (12-801 and 12-802) were installed in 1998. No constituents were detected in the groundwater samples collected from these wells in 1998, 1999, or 2000. Section 6.4 discusses the results of the monitoring activities that have taken place at SA 78 since completion of the first five-year review (U.S. Navy 2001b).

Monitoring wells within the vicinity of the Old Transportation Building site have been gauged periodically for the presence of free product. Since November 1996, free product has been detected five times in only one of seven wells: 12-145. An absorbent product removal device was installed in monitoring well 12-145 during October 1997. To evaluate product recovery rates, the absorbent device was checked monthly until June 2000. In spite of these efforts, a measurable quantity of free product was not recovered at this site. Because a measurable quantity of free product was not recovered at this site during the 33-month period from October 1997 to June 2000, the Navy contends that free product has been recovered at the site to the maximum extent practicable following the requirements of the ROD for OU A and 18 AAC 75.325(f)(1)(B). Product recovery efforts were discontinued at this site during July 2000. Section 6.4 further discusses the free-product recovery conducted at SA 78.

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at SA 78, Old Transportation Building site, Alaska DEC has been involved and concurred with subsequent decisions regarding the site. The Old Transportation Building site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The decision document identified monitored natural attenuation and ICs as the final remedy selected for this site. Monitoring activities commenced in 2005.

SA 79, Main Road Pipeline, South End

The southern portion of the Main Road Pipeline (6-inch JP-5) runs south along Transit Road, between the traffic circle and the Ash restaurant (Figure 2-4). The Main Road Pipeline historically supplied JP-5 for multiple facilities, including aircraft refueling hydrants, residential heating oil distribution tanks, and the Steam Plant 4 fuel supply tanks. The Main Road Pipeline was reportedly cleaned but not closed. Other pipelines are present in the vicinity of the site including a 10-inch avgas and 4-inch mogas pipeline. Both of these pipelines have been cleaned and closed.

Impacted soils were observed during repair and replacement of sections of the pipeline in 1990. It was unclear whether the soils were impacted from leaks within the pipeline, or from other sources. In 1992, DRO was detected at concentrations above the Alaska soil matrix level in several soil samples collected from points along the southern portion of the pipeline. Monitoring well MRP-MW8 was installed in the vicinity of the maximum DRO concentration detected. Exceedances of the Alaska DEC cleanup values were noted in the soil and groundwater samples collected from location MRP-MW8. When the well was resampled in 1997 and 1998, DRO concentrations still exceeded the Alaska groundwater cleanup criterion. However, GRO and BTEX were not detected.

Monitoring well 02-230 was installed between well MRP-MW8 and Sweeper Cove in 1999. Benzene and DRO concentrations in soil exceeded the ROD-established soil cleanup criteria in this boring. This well was sampled as part of the Comprehensive Monitoring Program between 1999 and 2000. DRO was detected at concentrations exceeding the Alaska groundwater cleanup criterion. GRO and BTEX were also detected, but at concentrations below the ROD-established cleanup levels.

Limited groundwater monitoring was conducted between 1999 and 2001. Target analyte concentrations in groundwater were less than Alaska DEC groundwater cleanup levels for two consecutive sampling events, although DRO was detected in both wells during November 1999. Groundwater monitoring was continued at these locations, because of the close proximity to Sweeper Cove. DRO concentrations exceeded cleanup criteria in groundwater samples collected in 2001, 2002, 2003, and 2004. Natural attenuation monitoring at this site is ongoing, as discussed in Section 4.1.4.

SA 80, Steam Plant 4, USTs 27089 and 27090

The SA 80, Steam Plant 4, USTs 27089 and 27090 site is located in the northern end of downtown Adak, approximately 2,000 feet east of Runway 18-36, 2,800 feet south of Runway 5-23, and approximately 2,500 feet southwest of NORPAC Hill (Figure 2-4). Steam Plant 4 was used to supply steam to various buildings in the area. The Steam Plant was built in the late

1940s and was operational until 1995 when an earthquake severed the main steam line that connected the steam plant to buildings in the area. USTs 27089 and 27090 were installed in 1950 and stored JP-5 fuel used for the boilers in the steam plant. The USTs were filled from the Main Road Pipeline (6-inch JP-5), which passes through the site.

The regional topography in this vicinity slopes gently toward the southwest, through the general topography of the site is flat to slightly undulating. Kuluk Bay is approximately 2,500 feet east of the site. The closest downgradient surface water body is East Canal, located approximately 1,400 feet west of the site.

Two releases were reported to have occurred at the site. In June 1991, a release of approximately 50 to 70 gallons occurred when a fill hole ruptured while servicing the tanks. In May 1995, prior to the removal of UST 27089, trace amounts of fuel reportedly dripped to surrounding soils from the ends of a section of the Main Road Pipeline under repair. Immediately following this release, 5 cubic yards of soil were removed from the area. It is unknown whether a spill or release occurred directly from either of the USTs during their use.

In 1992, three monitoring wells (SP4-1, SP4-2, and SP4-3) were installed near the tank farm in response to the 1991 release. DRO and GRO were detected in both soil and groundwater samples collected from wells SP4-1 and SP4-2, and DRO was also detected in the groundwater in well SP4-3.

In October 1993, UST 27090 showed signs of minor corrosion when it was removed (Navy 1995d). UST 27089 failed a tightness test later in 1993 and was deactivated. Associated piping connecting UST 27089 to the steam plant was removed in 1994. At that time, oily water was discovered in a concrete utility vault/corridor that contained the piping connecting the UST to the steam plant. Following removal of the oily water, the vault was removed. When UST 27089 was removed in May 1995, the tank contained 4,000 gallons of oily water and showed little signs of corrosion. No holes were observed in the tank; however, the large quantity of water in the tank suggests that a hole may have been present. Soil samples collected from both excavations yielded DRO concentrations above the Alaska soil matrix level.

Between 1996 and 1997, five soil borings, one 0.5-inch monitoring well, seven 2-inch monitoring wells, three 4-inch recovery wells, and one 6-inch recovery well were installed at the site. DRO and GRO were detected in the majority of samples analyzed. Well 04-164 was resampled in 1998 and 2002, and DRO, GRO and BTEX were present in the groundwater sample. Monitoring well 04-801 was installed downgradient of the site in 1998 as part of the Comprehensive Monitoring Program, and no constituents have been detected in samples collected between 1998 and 2002. Section 6.4 discusses the results of the monitoring activities that have taken place at SA 80 since completion of the first 5-year review (U.S. Navy 2001b).

Free product has been observed in 6 of 15 wells (SP4-2, 04-155, 04-157, 04-158, 04-159, and 04-173) at the site since 1997. Passive-style skimmers were initially installed in 1997 in wells SP4-2 and 04-155, where product was frequently detected. However, after further evaluation, skimmers were subsequently installed in wells 04-157, 04-158, and 04-173, where free product was intermittently present. Less than 25 gallons of free product have been recovered at SA 80 between January 1997 and June 2000. Free-product recovery efforts at the site were terminated during July 2000, because the Navy contends that free product has been recovered at the site to the maximum extent practicable. Section 6.4 further discusses the free-product recovery conducted at SA 80.

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at the SA 80, Steam Plant 4 site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site. The Steam Plant 4 site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identifies monitored natural attenuation and ICs as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

SA 82, P-80/P-81 Buildings, USTs 10579, 10587 and AST 10333

The P-80/P-81 Buildings were used by the former NSGA and are located on Stor Road, approximately 4,500 feet north of the main NSGA complex (Figure 2-4). UST 10587 and AST 10333 were located west of Building P-80 and were used to store JP-5 fuel for the heating boiler. UST 10579 was located northwest of Building P-81 and was used to store JP-5 fuel to supply the generator in Building P-81.

The natural topography of the area slopes gently at a 5 to 10 percent grade toward Clam Lagoon, approximately 1 mile to the southeast. The closest surface water body is an unnamed stream approximately 550 feet east-southeast of the site.

It is presumed that UST 10587 and AST 10333 were taken out of service when Building P-80 was abandoned. In 1991, piping believed to be part of the UST 10587 system was encountered during excavations in the area, but the UST was never found (EMCON 1996). AST 10333 was removed in August 1994 (U.S. Navy 1995e). Reports that UST 10579 was removed sometime in 1991 were confirmed by the Navy, however, no report documenting the removal was found.

Fourteen soil borings and seven monitoring wells were drilled between 1996 and 1997. DRO was detected in 10 of 21 subsurface soil samples at concentrations less than or equal to the Alaska DEC matrix cleanup level. GRO and BTEX were detected in soil, but at concentrations below the cleanup levels. DRO was detected in 5 of 7 groundwater samples from wells on the site. GRO was not detected. Monitoring well 12-185 was damaged and subsequently abandoned in 1998. Monitoring well 12-401 was installed downgradient of the site in 1998, and DRO was detected in the sample collected in 1998. No constituents have been detected in the well in samples collected between 1999 and 2000. No petroleum-related compounds were reported in groundwater samples collected from the site at concentrations greater than their respective Alaska DEC groundwater cleanup levels for groundwater not used as a drinking water source. Only DRO was reported in two groundwater samples (location 12-170 in 1996 and location 12-185 in 1997) at concentrations above its Alaska DEC groundwater cleanup level for groundwater used as a drinking water source. Section 6.4 discusses the results of the monitoring activities that have taken place at SA 82 since completion of the first 5-year review (U.S. Navy 2001b).

Free product has been detected intermittently in the two wells (12-170 and 12-180) situated in the former UST locations. Passive-style skimmers were used at this site to recover product when detected at measurable quantities. Total product recovered from this site is 0.04 gallon. Free product has not been observed in any monitoring well in the vicinity of the P-80/P-81 Buildings since July 31, 1998. Since that time, the Navy has gauged the wells at this site for the presence of free product monthly, then quarterly. Because free product has not been found in any monitoring well since July 1998, the Navy believes that free product has been recovered at this site to the maximum extent practicable as required by 18 AAC 75.325(f)(1)(B). Section 6.4 further discusses the free-product recovery conducted at SA 82.

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site. The SA 82 site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identifies limited groundwater monitoring as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

SA 88, P-70 Energy Generator, UST 10578

The SA 88, P-70 Energy Generator site is located on the north side of Giddens Road, north of the main NSGA complex (Figure 2-4). The P-70 Building was used for auxiliary power generation and miscellaneous storage at NSGA. UST 10578 was installed at Building P-70 in 1965 to store JP-5 for powering the generator.

The site itself is flat, having been cut into the slope and graded as a platform for the buildings. East of the site, the natural topography of the area slopes at a 10 to 25 percent grade toward Clam Lagoon, approximately 1,500 feet southeast. The closest surface water body is an unnamed creek approximately 350 feet southeast of the site.

UST 10578 was removed in May 1993. No records on releases from the UST are available. However, petroleum product “flowing” from the west sidewall of the excavation was recorded at 2 feet bgs (Quest 1993). The rate at which the product was released and the length of time the release was observed were not provided in the site assessment report. DRO was reported in all 4 soil samples collected from the sidewalls and base of the excavation at concentrations greater than the Alaska DEC soil matrix cleanup level.

Thirteen soil borings, 3 groundwater monitoring wells, 2 Geoprobe wells, and 3 product recovery wells were installed between September 1996 and May 1997. DRO was detected in 12 of 27 soil samples collected at 18 locations at concentrations above the Alaska DEC matrix cleanup level of 200 mg/kg. GRO and BTEX were also detected in soil, but at concentrations below the cleanup levels. DRO was detected in 7 of 8 wells sampled in 1996 and 1997 at a maximum concentration of 12,000 µg/L; GRO was detected in 2 of 8 wells. Several noncarcinogenic PAH were detected in 7 of 8 wells sampled in 1996 and 1997. No detections of these noncarcinogenic PAH were greater than Alaska DEC cleanup levels. Two downgradient monitoring wells (12-701 and 12-702) were installed in 1998 for the Comprehensive Monitoring Program. DRO was detected in well 12-702 at a concentration equal to Alaska DEC groundwater cleanup criterion in 1998. No constituents were detected in groundwater samples collected from well 12-701 between 1998 and 2000. Section 6.4 discusses the results of the monitoring activities that have taken place at SA 88 since completion of the first 5-year review (U.S. Navy 2001b).

Free product has been observed in 4 of 10 monitoring wells (12-162, 12-163, 12-198, and 12-252) at the P-70 Energy Generator site between 1996 and 2002. At least one passive-style skimmer was rotated between wells with measurable product thicknesses (12-162, 12-163, and 12-198) between January and December 1997. This recovery effort produced less than 5 gallons of product at the site during 1997. Approximately 26 gallons of free product have been recovered at the site between January 1997 and June 2000. The Navy contends that free product has been recovered at this site to the maximum extent practicable as required by 18 AAC 75.325(f)(1)(B). Section 6.4 further discusses the free-product recovery conducted at SA 88.

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site. The SA 88 site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identified limited groundwater monitoring as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

South of Runway 18-36 Area

The South of Runway 18-36 Area consists of the lowland area surrounding the southern portion of Runway 18-36 (Figure 2-4). It extends from the East Canal of the airport ditch system on the east to South Sweeper Creek on the west and south to Sweeper Cove. To the east, this site adjoins to another large petroleum-release site, the NMCB Building T-1416 Expanded Area. The primary physical features on the site include the southern portion of Runway 18-36, Main Road, the northern end of Transit Road south to the Transit Road Bridge, and the southern portion of the West Canal and the Crossover Canal of the airport ditch system. The canals that constitute the airport ditch system are engineered structures used to divert surface water from the vicinity of Runway 18-36. Because the site is within the low-fly zone established for the airfield, no buildings are located within the site boundaries.

Topography at South of Runway 18-36 Area is flat, low-lying land adjacent to and south of the Runway 18-36 area extending to Sweeper Cove. Elevations in this area are generally less than 15 feet above MLLW. The dike situated on the eastern shore of South Sweeper Creek constitutes the highest topographic point on the site.

Early in 1989, several leaks were discovered in underground pipelines that traverse the hillsides in the vicinity of Tank Farm A. These leaks typically occurred in abandoned World War II-era pipelines still connected to the active fuel distribution system. Two documented leaks within Tank A Farm occurred in abandoned branch fuel lines that were not properly isolated (U.S. Navy 1991). Fuel was released from these and other undocumented sources within Tank Farm A in quantities sufficient to migrate downslope and produce the petroleum impacts observable along the western shoreline of lower South Sweeper Creek. In September 1990, an abandoned fuel line located near the southeast corner of Runway 18-36 was uncovered during installation of a new fuel line adjacent to Main Road. The abandoned fuel line reportedly was the source of subsurface fuel release, and residual product was observed in the excavated trench.

Numerous investigations have been performed at the South of Runway 18-36 Area and the surrounding vicinity. These investigations include a 1989 phased site investigation conducted to evaluated the extent of the petroleum fuel release in the vicinity of Tank Farm A, a 1994 release investigation conducted to supplement the 1989 investigation, a 1994 release investigation conducted to evaluate the extent of fuels released in the vicinity of the Main Road Pipeline (6", JP-5), a 1996 release investigation work plan prepared to summarize site conditions, a 1999 site summary report, and a 2001 RI.

During these investigations, numerous monitoring wells were installed and many soil, groundwater, surface water and sediment samples were collected. These investigations identified DRO and benzene in soil and groundwater above Alaska DEC cleanup criteria, as well as the presence of free product floating on the surface of the groundwater. In addition, it was concluded that it was highly likely that petroleum hydrocarbon contamination entered South Sweeper Creek and potentially South Sweeper Cove. During the release investigation conducted at Tank Farm A in 1993, three distinct dissolved petroleum hydrocarbon plumes were identified in the South of Runway area: (1) along the eastern shore of South Sweeper Creek, (2) west of South Sweeper Creek near wells E-401 and LC-5A, and (3) from well E-210 into the NMCB area.

Cleanup activities that have been implemented at the South of Runway 18-36 Area include soil capping, sediment removal, replacement of crossover canal with metal culverts and contaminated soil excavation, installation of a product interception device, and pipeline cleaning and closures. In August 1998, petroleum aesthetic corrective action work was completed in the South of Runway 18-36 Area. Corrective action activities included capping 270 lineal feet of stained soil within the West Canal south of the Crossover Canal and removing a section of wooden pipeline. Removal, treatment, and disposal of PCB-contaminated sediment from South Sweeper Creek were completed from April to August 1999. Airport ditch culvert installation activities occurred from May to September 2001 to reduce the potential for contamination to seep into the airport ditch drainage system. The activities included installing two metal culverts north of the west ditch portion of Crossover Canal from the existing culverts in the South of Runway 18-36 Area to the south end of the West Canal. Approximately 70 cubic yards of petroleum-contaminated soil on the south bank of the Crossover Canal were removed for treatment and disposal. During August 2001, a product interception device was installed along the bank of South Sweeper Creek to prevent release of petroleum into the creek by eliminating an observed seep. This product interception device was installed adjacent to and east from the Transit Road Bridge. During June 2003, the cleaning and closure of three pipelines (a 10-inch avgas, an 8-inch mogas, and a 4-inch mogas pipeline) that cross the South of Runway 18-36 Area were completed.

Monitoring wells within the vicinity of the South of Runway 18-36 Area have been gauged periodically for the presence of free product since June 1997. Free product has been detected in several wells at least once. As discussed in Section 6.4, free-product recovery has been conducted at the site intermittently since June 1997. Product was collected using a passive-style skimmer and a peristaltic pump prior to operation of the automatic skimmer and subsequent to the breakdown of the automatic system. Approximately 39 gallons of product were collected from the site between June 1997 and December 1999 using both recovery methods. Section 6.4 discusses the results of the monitoring activities and free-product recovery efforts that have taken place at the South of Runway 18-36 Area since completion of the first 5-year review (U.S. Navy 2001b). As of July 2005, free-product recovery at the South of Runway 18-36 Area has met the practicable endpoint established for the shutdown of product recovery as specified in the OU A ROD. Alaska DEC approved the interim remedial action free-product closure report for this site in January 2006.

The South of Runway 18-36 Area is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2005. Results of this risk assessment identified ecological hazard levels above target health goals. Human health risk levels were found to be below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the South of Runway 18-36 Area will be finalized in 2006.

SWMU 58 and SA 73, Heating Plant 6

SWMU 58 and SA 73, Heating Plant 6, is situated in the southeast corner of the former NSGA complex, approximately 5 miles north of downtown Adak on the lower, southern slope of Mount Adagdak (Figure 2-4). The Heating Plant 6 site comprises Building 10385 and 10585, six former USTs, one former AST, and one former oil/water separator and was established in April 1977. Only the buildings remain at the site. The plant was bordered on the east by the NSGA complex, which closed in 1995. The tanks and oil/water separator were removed from the site between 1993 and 1996. Heating Plant 6 supplied heat and power to the NSGA complex during its operational history from the 1950s until 1995 (EMCON 1996). The NSGA complex is currently unused.

The Heating Plant No. 6 site encompasses approximately one-third of an acre. The primary physical features on the site are the heating plant (Building 10348) the former NSGA, Gladdings Road, and a large gravel parking area that formerly contained the on-site USTs and oil/water separator. Native tundra grasses exist south of the site. Two drainage ditches that channel surface water runoff toward Clam Lagoon are located at the edge of the gravel area.

Four source areas were identified at the Heating Plant 6 site: AST 10348-A, USTs 10570 through 10573 and 10585-A, UST V-118, and O/W 10348-B. The following describes the removal and cleanup activities associated with each source area.

AST 10348-A, was formerly located adjacent to the south wall of the heating plant building near its southeast corner. The tank was taken out of service in April 1994.

USTs 10570, 10571, 10572, 10573, and 10585-A constitute the former fuel farm for Heating Plant 6. USTs 10572 and 10573 were removed from the site in August 1994. USTs 10570 and 10571 were removed in April 1996. The tanks were generally reported to be in good condition on removal; however, free product was encountered on the groundwater at 14 feet bgs during removal activities. UST 10585-A was removed from the site in July 1993.

UST V-118 was a 1,500-gallon steel tank that is believed to have stored either mogas or diesel fuel. The date that the tank was taken out of service is not known, but is presumed to be prior to 1994. After deactivation, the manway cover to UST V-118 was left unsecured, allowing water to enter the tank. During June 1994, prior to the removal of the UST, water was twice pumped out of the tank and passed through an oil/water separator and activated carbon before being discharged to the Adak wastewater treatment plant. UST V-118 was removed from the site on September 14, 1994.

O/W 10348-B was a 1,000-gallon concrete tank that collected waste fluids from floor drains within the Heating Plant 6 building. The oil/water separator was a 1.5- by 1.5- by 1-foot rectangular box installed within the concrete tank. The date that the oil/water separator was taken out of service is not known, but a dye test performed prior to removal confirmed that the floor drains in the heating plant building had been sealed. O/W 10348-B was removed from the site during September 1994, and a seep identified as free product and flowing at a rate of approximately 2 gallons per minute was noted at about 9 feet bgs on the south wall of the excavation. Excavation activities were stopped at this point and the excavation was backfilled. A monitoring well was installed in the backfilled excavation to monitor product accumulation. This well showed water at 7.5 feet bgs and an accumulation of less than 0.5 inch of product.

During July 1998 a French drain was installed in the north-south-trending drainage ditch and small secondary ditch south of the Heating Plant 6 site as an aesthetic corrective action. The northwest-southeast-trending ditch was unaltered. The north-south-trending drainage ditch was cleared of vegetation, a geotextile liner was installed at the bottom of the ditch, and a 4-inch-diameter perforated drainpipe (French drain) was laid on top of the liner. The ditch was then backfilled with crushed rock, pit run (quarry material), and topsoil. The topsoil was then fertilized and seeded to promote vegetation growth (U.S. Navy 1998b).

Between 1993 and 1999, 46 soil samples were collected across the Heating Plant 6 site from 33 locations. DRO was detected in all but 3 of these 46 samples and exceeded the Alaska DEC Method Two soil criterion of 230 mg/kg in 28 of the 46 samples. GRO exceeded the Alaska DEC Method Two soil criterion of 260 mg/kg in 5 samples.

In 1996 and 1997, 18 groundwater samples were collected from 12 wells and analyzed for DRO, GRO, and BTEX. DRO was detected in every groundwater sample collected in 1996 and 1997, with concentrations ranging from 1,300 to 15,000 µg/L. GRO was detected in only nine of these samples. Neither DRO nor GRO was detected in concentrations greater than the Alaska DEC criteria for groundwater not used as a drinking water source of 15,000 and 13,000 µg/L, respectively, from groundwater samples collected in 1996 and 1997. Two of the 18 groundwater wells were resampled in 1998. In 1998, two sentinel wells (12-601 and 12-604) were installed in the southeastern portion of the site, downgradient from the USTs. DRO has not been detected in well 12-601 since 2000, and GRO has not been detected in well 12-601 since 1999. Section 6.4 discusses the results of the monitoring activities that have taken place at the site since completion of the first 5-year review (U.S. Navy 2001b).

As discussed in Section 6.4, monitoring wells within the vicinity of the Heating Plant 6 site have been gauged periodically for the presence of free product since October 1996. Passive-style product skimmers were installed in selected monitoring and recovery wells in January 1997. These skimmers were rotated among the 7 wells that contained measurable product thickness. The skimmers operated continually at the site from January through May 1997, and intermittently as product volume decreased. Approximately 5 gallons of free product were recovered from the Heating Plant 6 site during the first 5 months of product recovery efforts and decreased to less than 0.25 gallon between 1997 and October 1999. No product has been recovered since October 1999. The Navy contends that free product has been recovered at this site to the maximum extent practicable, as required by 18 AAC 75.325(f)(1)(B). Product recovery efforts were discontinued at this site during July 2000.

While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at the Heating Plant 6 site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site. The Heating Plant 6 site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identifies monitored natural attenuation and ICs as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

SWMU 60, Tank Farm A

Tank Farm A, designated SWMU 60, is a former bulk fuel-storage facility located in the upland area west of Runway 18-36 (Figure 2-4). It occupies an area of approximately 55 acres situated on a hill with steeply sloped margins. The site is approximately 200 feet south of Yakutat Creek and approximately 900 feet west of South Sweeper Creek.

When constructed in 1943, the facility consisted of 45 bulk storage field-constructed tanks (FCTs) ranging in capacity from 21,000 to 420,000 gallons. The FCTs were primarily constructed above the ground surface. Some may have been partially buried or built into hillsides. The tanks were either placed upon a thin concrete pad or compact earth. Fuel was transferred to, from, and throughout the tank farm by a system of underground pipelines. During the 1950s, many of the existing tanks were taken out service, and as many as 30 FCTs were crushed in place and buried (U.S. Navy 2001b). The records reviewed by EMCON (1995) indicated that 43 FCTs were demolished in 1984 by crushing in place and covering with graded material and topsoil. The two remaining FCTs were removed in 1993 (EMCON 1995).

A number of releases have been identified in the Tank Farm A area. During the 1950s, several FCTs were reported to be leaking, and fuel was observed seeping out of hillside soil into the creek adjacent to the former high school and NEX Building 10320 (NEESA 1986). Several releases from underground fuel lines were identified in early 1989, some of which resulted in fuel reaching ditches and entering South Sweeper Creek (EMCON 1995). In 1989, Navy personnel constructed containment ponds and used oil-containment booms to contain and mitigate the migration of fuel from the source area. The abandoned pipelines were also isolated from the active pipelines.

Numerous previous investigations were performed at Tank Farm A and the surrounding areas. Eight monitoring wells were installed at Tank Farm A during expanded site investigations conducted between 1987 and 1988. The contractor concluded that the overall human health and environmental hazard was low, but recommended removal of fuel-contaminated soil and sediment.

A preliminary assessment of fuel contamination was performed in 1989, following a release of JP-5 from an abandoned pipeline located north of FCT T8304. Visibly contaminated soils were reported extending northward from the abandoned pipeline to Hillside Boulevard. A soil vapor survey showed elevated petroleum vapors in the soil over a wide area north of the leak.

A three-phase investigation to define the extent of petroleum hydrocarbon impacts was performed from 1989 to 1990. This investigation concluded that as much as 1.2 million gallons of residual fuel may be present in approximately 146,000 cubic yards of soil in the Tank Farm A area (and extending into the area south of Runway 18-36). TPH concentrations greater than 1,000 mg/kg were found in soil samples collected from beneath removed sections of an underground JP-5 pipeline extending from Tank Farm D to Power Plant 3.

In 1993, TPH concentrations ranging between 2,000 and 9,400 mg/kg were detected in soil samples collected in conjunction with removal of the last two FCTs and associated fuel-distribution piping.

During the release investigation conducted in 1993, concentrations of TPH as diesel fuel were reported above 2,000 mg/kg in 15 soil samples and above 1,000 µg/L in wells E-020 and E-024. Although visibly contaminated sediments were observed in stream bottoms in several locations, no petroleum hydrocarbons were detected in any surface water samples.

Between 1996 and 1997, four monitoring wells were installed. Soil and groundwater samples were collected from these borings, and 10 sediment and surface water sample pairs were collected from drainage ditches in Tank Farm A. No exceedance of the Alaska DEC soil cleanup level for DRO was noted. One exceedance of the Alaska DEC groundwater cleanup level for DRO was noted in the sample collected from well LC-5A (located near the traffic circle). No GRO exceedance was noted in either soil or groundwater. Benzene exceedances were noted in groundwater collected from wells E-006 and E-501. DRO was detected in 7 of 10 sediment samples and in 2 of 10 surface water samples.

Natural attenuation monitoring was conducted between 1999 and 2004, both before and after signing of the OU A ROD in 2000, in which monitored natural attenuation was selected as the remedy for SWMU 60. GRO and BTEX concentrations at well LC-5A met monitoring endpoint criteria in 2003. Monitoring for these chemicals at this location were discontinued in 2004. GRO and DRO concentrations at well MW-E006 met monitoring endpoint criteria in 2003. Monitoring for these chemicals at this location were discontinued in 2004. DRO, GRO, and BTEX concentrations at well MW-E501 met monitoring endpoint criteria in 2003. Monitoring at this location was discontinued in 2004. Natural attenuation monitoring for DRO is ongoing at location LC-5A, natural attenuation monitoring for BTEX continues at location MW-E006, and visual inspections of the South Sweeper Creek shoreline for petroleum seeps and sheen commenced in 2005. Visual inspections are not part of the remedy for the site, but visual inspections are recommended for addition to the remedy.

SWMU 61, Tank Farm B

Tank Farm B, designated SWMU 61, is located next to and north of Runway 5-2 (Figure 2-4). Tank Farm B is surrounded on three sides by water. North Sweeper Creek is located at the base of the hill to the south and east. An unnamed creek, which flows into North Sweeper Creek, is located at the base of the hill to the north. When constructed in 1943, the facility originally consisted of forty 23,800-gallon USTs and one 420,000-gallon FCT, designated V156-A2. All of these tanks were originally used to store avgas and had a combined capacity of 1.37 million gallons. A second 420,000-gallon FCT (10262-A1) was constructed in 1958. This tank was originally used to store avgas, but was retrofitted to store JP-5 fuel and then mogas. The FCTs were primarily constructed beneath the ground surface. A pump house was located on top of each FCT. Fuel was transferred to, from, and throughout Tank Farm B by several pipelines ranging from 6 to 10 inches in diameter. The pipelines were connected to FCTs and USTs through valve pits (one valve pit per tank).

In 1992, results from a soil-gas survey identified two areas of elevated concentrations of volatile organic vapors in the subsurface, one on the east side of FCT 10262-A1 and the other on the south side of UST pair T8761-9A and B, where the tank system piping enters the main fuel distribution pipeline. These areas correspond to the locations previously identified as petroleum-release source areas.

During September 1993, 30 of the 40 USTs were removed at Tank Farm B. Soil samples collected from the floors and sidewalls of each excavation indicated the presence of petroleum hydrocarbons in the soil. Although no record of the removal of the 10 remaining USTs exists, a site survey using ground-penetrating radar and electromagnetic techniques did not confirm the presence of these tanks (EMCON 1996).

Removal of most of the aboveground sections of pipelines, plugging of abandoned underground sections of pipelines, and cleaning and disposing of piping and other debris at Tank Farm B was completed in 1993. Soil analytical results from soil samples collected from under valve pits and from below the removed aboveground pipeline sections and flanges indicated the presence of petroleum hydrocarbons in the soil (U.S. Navy 1994). In 1996, FCT 10262-A1 was drained, isolated from the associated pipelines, cleaned, inspected, and placed on inactive status. Additional soil and groundwater samples were collected from areas identified in the previous investigations between 1996 and 1997. The 10-inch-diameter pipeline to fuel Pier A-1 was drained, cleaned, and abandoned in 2003 (U.S. Navy 2003c).

Four areas where petroleum hydrocarbons were detected in soil samples collected during the previous investigations are described below:

- The central area is located approximately 20 feet east of FCT 10262-A1, extending approximately 130 feet south to the former valve pit and approximately 110 feet east to the blind flange on the inactive 6-inch-diameter fuel-transfer pipeline. DRO and GRO were detected in soil at concentrations of up to 11,800 and 2,000 mg/kg, respectively.

- The east area is located south of former UST pair T8761-9A and B. DRO and GRO were detected in soil at concentrations of up to 220 and 1,800 mg/kg, respectively. Lead was also detected at a concentration of 464 mg/kg in a sample collected from the area between the two valve pits associated with the former USTs.

- The north area is located at the northern margin of Tank Farm B downslope from former UST pair T8767-12A and B. GRO was reported at a maximum concentration of 1,400 mg/kg.

- A second north area is located approximately 300 feet north of the valve pit where the 4-inch-diameter avgas pipeline and the 6-inch-diameter avgas pipeline intersect. DRO was reported at a concentration of 383 mg/kg in one sample.

In 1996, the site was screened using the Alaska DEC supplemental criteria and was retained, because the maximum DRO concentration in surface soil (11,800 mg/kg) exceeded the screening level of 5,000 mg/kg for industrial sites, and the maximum GRO concentrations in subsurface soils (2,000 mg/kg) exceeded the screening level of 1,400 mg/kg. DRO, GRO, and BTEX were detected at Tank Farm B in groundwater at wells TFB-MW4A and TFB-MW4B.

DRO, GRO, and BTEX were detected in well TFB-MW4B in groundwater samples collected during 1996 and 1998, and DRO was also detected in well TFB-MW4A. No other constituents were reported in the seven wells sampled.

Natural attenuation monitoring was conducted between 1999 and 2004, both before and after signing of the OU A ROD in 2000, in which monitored natural attenuation was selected as the remedy for SWMU 61. New well 14-113 was installed in 2003 to monitor natural attenuation conditions adjacent to North Sweeper Creek and to provide for surface water protection monitoring (USGS 2005). Concentrations of GRO and BTEX met monitoring endpoint criteria in TFB-MW4A in 2003. Monitoring was discontinued at this location during 2004. Natural attenuation monitoring for GRO and BTEX continues at locations 14-113, 14-210, and TFB-MW4B, and visual inspections of the North Sweeper Creek shoreline for petroleum seeps and sheen commenced in 2005.

SWMU 62, New Housing Fuel Leak

SWMU 62, New Housing Fuel Leak, is located in the downtown area of Adak, east of Runway 18-36, north of Public Works Road, west of Bayshore Highway, and south of Kagalaska Drive (Figure 2-4). SWMU 62 occupies an area of approximately 100 acres and includes Sandy Cove Housing, Eagle Bay Housing, Turnkey Housing, two school buildings and yards, and miscellaneous facilities.

Initial investigation reports for SWMU 62 divided the three housing areas according to the proximity of leaks, apparent extent of free product, and individual housing units. The subdivisions are as follows:

- Sandy Cove Housing:
  - Unit 102
  - Units 107 and 146
  - Units 114, 116, 160, and 167
  - Units 134, 139, 179, 184, and 187

- Eagle Bay Housing:
  - Unit 303

- Turnkey Housing:
  - Unit 67

Each housing unit is supplied with JP-5 heating fuel from one or two 500-gallon ASTs, installed in 1998 to replace the former distribution and storage system. Prior to the installation of the 500-gallon ASTs, JP-5 heating fuel was distributed to the housing units through a network of underground piping. The fuel was stored in several large ASTs that were filled via piping connected to the Sandy Cove, Eagle Bay, and Turnkey Housing tank farms.

Groundwater is found as both a laterally discontinuous perched layer and a regional water table aquifer beneath SWMU 62. Groundwater appears to flow toward Kuluk Bay, the East Canal, and Sweeper Cove, dependent on its proximity to each.

In 1988 and 1989, the Navy conducted reviews of inventory records and visual site inspections in housing units and crawl spaces after occupants reported hydrocarbon-like odors. As a result of the visual inspections, five piping fuel leaks were discovered and repaired. Because of these detected leaks, the heating fuel distribution system was pressure tested. As a result of the pressure testing, 16 additional piping leaks were detected and repaired: 13 in Sandy Cove, 2 in Eagle Bay, and 1 in Turnkey Housing (U.S. Navy 1999). The substance released from the pipes was JP-5; however, the volume of the release has not been determined. Based on the results from these investigations, approximately 102 cubic yards of surface soil was removed from beneath the housing units. The excavated material was replaced with clean sand, and vapor barriers were installed and sealed to the housing unit foundations.

Free product was encountered in 46 of 109 monitoring wells installed in 1989. Ten recovery wells were installed in Sandy Cove Housing, 6 recovery wells were installed in Eagle Bay Housing, and 1 product recovery trench was installed adjacent to and west of Sandy Cove Housing Unit 167 for interim remedial action. Free product was not measured in Turnkey Housing wells. A total of 45 additional monitoring wells and 10 recovery wells were installed in 1993 to evaluate existing conditions.

A separate release investigation was conducted in 1993 to evaluate potential petroleum-related contamination along the Main Road Pipeline (6-inch JP-5). DRO concentrations were detected of 20,000 mg/kg in soil and 4,100 µg/L in groundwater samples collected from MRP-MW1. GRO was reported at 1,700 mg/kg in the soil sample from MRP-MW4. Free product was detected in one well (MRP-MW1) that was installed within the free-product plume associated with the Sandy Cove Housing Unit 102 area.

Between 1996 and 1999, 48 monitoring and Geoprobe wells were installed. The maximum concentration of DRO detected in subsurface soil samples collected from Unit 102; Units 107 and 146; Units 114, 116, 134, 139, 160, 167, 179, 184, and 187; and Unit 303 was 2,700, 19,000, 12,000, and 18,000 mg/kg, respectively. The maximum concentration of DRO detected in groundwater samples collected from Unit 102; Units 107 and 146; Units 114, 116, 134, 139, 160, 167, 179, 184, and 187; and Unit 303 was 18,000, 14,000, 23,000, and 23,000 µg/L, respectively.

Since site investigation activities began during 1989, more than 200 groundwater wells have been installed within the SWMU 62 site. These wells were periodically gauged for the presence of free product between November 1992 and October 2003. During this time period, free product was observed at a measurable thickness in 112 wells. In addition, a petroleum seep into the East Canal of the airport ditch system was identified west of the Eagle Bay Housing area.

Free-product recovery efforts began in 1989. The system operated regularly for the first year. After the first or second year of operation, maintenance issues appear to have resulted in intermittent operation of the system until 1993, when the system was inspected (U.S. Navy 1999). The system was repaired and restarted in 1994. In 1996, installation of a new total-fluids recovery system was completed and the system was started in October 1996. Since operation of the total-fluids recovery system started in 1996, the system operated relatively continuously, except for planned shutdowns for well development and maintenance (Foster Wheeler 1994 through 1997). The total volume of the free product recovered from November 1996 to May 2000 is approximately 18,000 gallons. The total volume of free product recovered since 1989 is approximately 154,000 gallons. This estimate is based on monthly progress reports and recovered volumes reported in previous investigations. The recovery system was shut down in May 2000.

Post-recovery monitoring was conducted at the New Housing Fuel Leak site for a 2-year period following shutdown of the free-product recovery system. At the end of the 2-year period, the Navy monitoring contractor determined that post-recovery monitoring could be discontinued at the site (U.S. Navy 2003g). The Navy estimates that between 1,400 and 6,900 gallons of recoverable free product remain in the subsurface at the New Housing Fuel Leak site.
Section 6.4 discusses the results of the product monitoring activities conducted at the site since 2001.

The SWMU 62, New Housing Fuel Leak site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risks above target health goals for residential child exposures to DRO in surface soil. The cumulative risks and hazards for construction workers, building workers, adult residents, and trespassers, did not exceed target health goals, provided that ICs remain in effect. In December 2005, the Navy and Alaska DEC submitted a Proposed Plan for the preferred remedial alternatives for SWMU 62 to the Adak community for review and comment. Surface water protection monitoring is ongoing at this site. Modifications to the groundwater monitoring program will be implemented once a final remedy is selected for the site. A decision document memorializing the final remedy for this site is anticipated in 2006.

Tanker Shed, UST 42494

The Tanker Shed is located approximately at the midpoint between Main Road and Runway 18-36 in downtown Adak (Figure 2-4). The Tanker Shed was used to perform maintenance on the tanker trucks that transport fuel for the housing area heating system and for aircraft refueling. The Tanker Shed building is currently unused. It is not known when the Tanker Shed was built, but it was likely in the 1960s, based on the type of construction. UST 42494 was installed in 1985 to collect used oil generated during vehicle maintenance and to collect fluids from the oil/water separator system. The oil/water separator system was connected to the catch basin associated with the truck wash rack.

Most of the land surface around the Tanker Shed is flat and paved with concrete or asphalt. The land surface immediately east of the building is unimproved and covered with tundra grass. The regional topography in this vicinity slopes to the west. The closest downgradient surface water body is East Canal, located approximately 800 feet west of former UST 42494.

The UST was reported to be in good condition when removed in 1995, with no cracks, dents, deformities, or holes. DRO concentrations exceeded the Alaska soil matrix level in two soil samples collected from the bottom of the excavation. A petroleum hydrocarbon sheen was observed on groundwater within the UST excavation. The associated underground piping was removed to the edge of the excavation, and the cut ends were capped with concrete. There was no record that a spill or release occurred directly from the UST. The likely source of the petroleum hydrocarbons at the site is from overfilling or piping leakage.

During the investigation conducted between 1996 and 1997 at the site, one 2-inch-diameter monitoring well, eleven 4-inch-diameter recovery wells, five 6-inch-diameter recovery wells, one ½-inch-diameter monitoring well, 7 hollow-stem auger soil borings, and 15 Geoprobe soil borings were installed at the site to delimit the horizontal extent of free product and petroleum-affected soils (U.S. Navy 1999). DRO concentrations exceeded the Alaska cleanup level in soil samples collected from 14 locations, and exceedances of GRO in soil were noted at 4 locations. DRO, GRO, and benzene concentrations in groundwater exceeded Alaska DEC groundwater cleanup levels (used as a drinking water source) in 5, 5, and 7 samples, respectively. Two of these wells were resampled in 1997. Although DRO, GRO, and benzene concentrations were less than those in samples collected in 1996, they still exceeded Alaska groundwater cleanup criteria.

Two downgradient wells (04-317 and 04-601) were installed in 1998, and groundwater samples were collected from well 04-317 in 1998 and 2001. DRO and benzene exceedances were reported in 1998 and 2001, and GRO exceedances of the ROD-established Alaska groundwater criteria (18 AAC 75.345 Table C values) were reported in 2001. Groundwater samples were collected from well 04-601 between 1999 and 2002 as part of the Comprehensive Monitoring Program. Benzene and DRO exceedances of the ROD-established Alaska groundwater criteria (18 AAC 75.345 Table C values) were reported.

In 2001, a supplemental site assessment was conducted to address data gaps. Section 6.4 discusses the results of the activities conducted at the site since 2001.

As discussed in Section 6.4, free-product recovery was conducted at the Tanker Shed site from January 1997 through November 2001. Approximately 528 gallons of free product were recovered at the Tanker Shed during this 5-year period. The product recovery system was shut down for the winter on November 12, 2001, and did not operate during 2002 or 2003. Product recovery activities were restarted in August 2004 and continued until July 2005. As discussed in Section 4.1.3, additional product recovery was selected as one of the interim remedies. This site was one of 14 sites in the OU A ROD with free-product recovery as an interim remedy. In addition, the 2005 decision document for the 10 no-risk petroleum sites identified free-product recovery as part of the final remedy for this site. Free-product recovery as part of the final remedy concluded at this site in July 2005, as the practicable endpoint for free-product recovery was reached. This was discussed in the free-product recovery closure report for this site, approved by Alaska DEC in January 2006.

The Tanker Shed site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site during 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals, provided that ICs remain in effect. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identified monitored natural attenuation and ICs as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

Yakutat Hangar, UST, T-2039-A

The Yakutat Hangar site is located approximately 1,800 feet west of Runway 18-36 and approximately 1,500 feet south of the west end of Runway 5-23 (Figure 2-4). Building T-2039 was built in the 1940s as an airplane hangar. It is unknown when the automobile repair garage was constructed. Sometime in the late 1970s, the hangar was converted from its original use to house additional automobile repair and automobile hobby shop facilities. UST T-2039-A was installed in 1979 about 17 feet north of Yakutat Hangar and contained used oil generated by auto repairs at Building T-2039.

The general topography of the Yakutat Hangar area slopes downward slightly to the north and west. The area surrounding the UST is paved with asphalt and has been used for vehicle parking and storage. South Sweeper Creek, which lies approximately 370 feet northeast and downgradient of the former UST, is the closest downgradient surface water body.

When UST T-2039-A was removed in September 1993, it showed no minor signs of corrosion. No records of spills or leaks from UST T-2039-A were found. Groundwater that accumulated in the excavation had a petroleum odor and sheen. The maximum DRO concentration reported in samples collected from the bottom of the excavation was 350 mg/kg. The excavation was backfilled. The source of the material used to backfill the excavation is variously reported as either a clean source, or a contaminated soil stockpile generated at the time UST T-2039-A was removed.

In 1996, the Navy discovered free product in a drainage ditch northwest of Yakutat Hangar. Seven test pits were excavated upgradient of the drainage ditch by Navy personnel to assess the source of the petroleum fuel. Free product was observed on the shallow water table in four of seven test pits (Foster Wheeler 1997b). Temporary well points were installed in 1997 to evaluate the extent of free product and identify the source. The source of the free-product plume was attributed to leaks from the underground heating fuel pipeline that connects the AST located west of the hangar to the heating system in the hangar. Four recovery wells were installed at the site. The maximum areal extent of free product in 1996 was between the AST west of Yakutat Hangar, the northwestern edge of the hangar (well 05-244), and the recovery trench. No samples were collected during this investigation. An aesthetic action was taken at the site in 1998. The drainage ditch was replaced with a French drain, which consists of a perforated pipe placed in gravel backfill. The new drain pipe was connected to an existing culvert. The culvert and drainage ditch were parts of the same drainage system. The drainage from the culvert enters another ditch, which eventually connects to South Sweeper Creek.

Two 2-inch-diameter monitoring wells, two 4-inch-diameter recovery wells, three 0.5-inch Geoprobe wells, and four Geoprobe borings were installed between 1996 and 1997 as part of the Yakutat Hangar UST T-2039-A investigation. Four of eight soil samples collected yielded DRO concentrations greater than the Alaska DEC soil cleanup criterion. In 1998 and 1999, four more soil samples were collected from three locations. DRO was not reported in any of these samples at concentrations greater than the Alaska DEC soil cleanup criterion. DRO concentrations in groundwater samples collected from three of seven wells were equal to or greater than the Alaska DEC groundwater cleanup criterion for groundwater used as drinking water, and benzene concentrations exceeded groundwater as drinking water cleanup criterion in two of seven wells sampled. When one of these wells was resampled in 1997, concentrations were below the groundwater as drinking water cleanup criterion. Two monitoring wells (05-250 and 05-801) were installed in 1998, and well 05-389 was installed in 1999. No detections of petroleum compounds have been reported in well 05-250 from samples collected in 1998. Wells 05-389 and 05-801 were sampled twice annually as part of the monitoring program from 1998 to 2002. Well 05-389 had low detections of DRO and GRO from the sample collected in 1999. While several samples collected from this site since 1996 contained DRO in concentrations greater than groundwater as drinking water cleanup criterion, groundwater is not considered a potential future drinking water source at this site. No detections of DRO at this site exceeded the Alaska DEC cleanup criterion for groundwater not used as a drinking water source.

As discussed in Section 6.4, monitoring wells installed at the site have been gauged for free product. Section 6.4 discusses the results of the product monitoring activities conducted at the site since 2001. A free-product recovery system consisting of an interceptor trench located immediately upgradient of the former ditch was installed in January 1997. The system operated from February 1997 through November 2000. During this period, approximately 690 gallons of free product were recovered. The Navy contends that free product has been recovered at this site to the maximum extent practicable as required by 18 AAC 75.325(f)(1)(B). Product recovery efforts were discontinued at this site during November 2000.

Free-product recovery conducted as an interim remedial action has met the practicable endpoint established for the shut down of product recovery as specified in the OU A ROD (Tetra Tech 2006). Alaska DEC approved the interim action free-product recovery closure report for this site in January 2006. The Yakutat Hangar, UST T-2039-A site is one of the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment. A human health and ecological risk assessment was completed for this site in 2004. Results of this risk assessment identified human health risk and ecological hazard levels below target health goals. A decision document for final remedial action for the petroleum sites with no unacceptable risk was signed May 20, 2005 (U.S. Navy and Alaska DEC 2005a). The 2005 decision document identified limited groundwater monitoring as the final remedy selected for this site. Monitoring activities required for implementation of this remedy commenced during 2005 monitoring activities.

Yakutat Hangar, USTs T-2039-B and T-2039-C

The Yakutat Hangar site is located approximately 1,800 feet west of Runway 18-36 and approximately 1,500 feet south of the west end of Runway 5-23 (Figure 2-4). Building T-2039 was built in the 1940s as an airplane hangar. It is unknown when the automobile repair garage was constructed. Sometime in the late 1970s, the hangar was converted from its original use to house additional automobile repair and automobile hobby shop facilities. UST T-2039-B was installed in 1979 at the south end of the garage and supplied JP-5 to a heating boiler inside. UST T-2039-C was installed in 1981 directly beneath the south wall grade beam of the garage. The tank was connected to floor drains inside the garage and was used to collect and store used oil and any spilled fluids from the floor.

The general topography of the Yakutat Hangar area slopes downward slightly to the north and west. The area surrounding the UST is paved with asphalt and has been used for vehicle parking and storage. South Sweeper Creek, which lies approximately 370 feet northeast and downgradient of the former UST, is the closest downgradient surface water body.

A 2-inch-diameter steel vent pipeline and 2-inch-diameter remote fill pipeline for tank T-2039-B were removed in May 1995. Since groundwater was encountered in the excavation at 2.5 feet bgs, the UST was not removed, because plans for controlling groundwater during removal activities had not been made. When tank removal activities resumed in October 1995, UST T-2039-B was found to be full of oily water. About 2,500 gallons were pumped from the tank before it was removed. UST T-2039-B was observed to be in good condition when it was removed, with only minor surface rust on the top. However, two 2-inch-diameter openings were noted on the tank where the fill and vent pipes, removed in May 1995, had been located. The concrete ballast for the tank was not removed, since it was too close to the building.

There were about 50 gallons of oily water in UST T-2039-C prior to its removal in October 1995. The water was pumped out before removal activities began, but the tank refilled with water. The six pipe connection points observed on the tank were found to be loose and were believed to have allowed the tank to refill with groundwater. Because of the limited work area and the high water table, the tank was removed by excavating outside the building and pulling the tank laterally from underneath the building. Underground piping was cut and capped. None of the soil samples collected from the two excavations had DRO concentrations above the Alaska soil matrix level.

The chemical analyses conducted on nine soil samples collected from the limits of this excavation reported concentrations of petroleum-related chemicals below the most stringent Alaska DEC Method Two soil cleanup criteria established for each chemical tested.

DRO was reported at a concentration of 14,000 mg/kg in a surface soil sample (0 to 2 feet bgs) collected during installation of downgradient monitoring well 05-241. Because this concentration is reported in a surface soil sample located approximately 150 feet downgradient from USTs T-2039-B and -C, and because groundwater samples from well 05-241 reported concentrations of petroleum-related chemicals below Alaska DEC groundwater cleanup criteria, it appears that the DRO concentrations in surface soil at this location may be a result of careless disposal practices at the automotive hobby garage. Limited soil removal at this location was identified as the preferred remedy for this site in the OU A ROD (U.S. Navy, USEPA, and Alaska DEC 2000).

Approximately 30 cubic yards of soil were removed from a 20-foot-square area surrounding well 05-241 during July 1999. Two confirmational soil samples collected from the northern and southern limits of the excavation contained DRO at concentrations of 24 (estimated) and 3,200 mg/kg, respectively.

The site remedy shifted from limited soil removal to limited groundwater monitoring with Alaska DEC concurrence in 1999 (Agency comments to the Draft Limited Soil Removal Report, dated September 21, 1999). To evaluate whether petroleum hydrocarbons remaining in soil at this location are partitioning into groundwater at concentrations above Alaska DEC groundwater cleanup criteria, the Navy subsequently conducted quarterly groundwater sampling from three monitoring wells (02-241, 05-389, and 05-802) during four consecutive quarters. Results of monitoring activities identified concentrations of petroleum-related chemicals in groundwater below Alaska DEC cleanup criteria. The site met the endpoint criteria with 1999 and 2000 analytical results, and groundwater monitoring was stopped in 2000.

As discussed in Section 4.1.3, the site status changed to NFRAP in 2005 with Alaska DEC concurrence (Alaska DEC 2005b).

3.2 OPERABLE UNIT B

Overall, OU B addresses ordnance explosive safety hazards and human health and ecological risks associated with ordnance-related chemicals. Because CERCLA does not include specific provisions associated with explosive hazards related to ordnance, the OU B Project Team was created to develop an investigation and cleanup approach for OU B consistent with the CERCLA process and acceptable to Adak stakeholders. The OU B Project Team consists of representatives from the Navy, EPA, Alaska DEC, U.S. Fish and Wildlife Service (USFWS), TAC, and the Aleutian/Pribilof Island Association (A/PIA). The Project Team was tasked to design an Adak-unique, CERCLA-consistent approach to identify, evaluate, and remediate sites potentially contaminated with ordnance.

The Project Team developed a two-part evaluation of risk, based on an evaluation of hazard assessment approaches. Part 1 was considered the preliminary assessment, an initial screening to determine if potential sites should be retained for evaluation through the RI/FS process or designated as sites requiring no further action (NOFA) and elimination from the RI/FS process. NOFA is different from NFA as discussed for OU A sites. NOFA includes the continuation of the Adak Ordnance and Explosives/Unexploded Ordnance (OE/UXO) Awareness Program and the inclusion of a deed notice pursuant to CERCLA 120(h)(3)(A)(i) or other suitable information on OE/UXO in the Bureau of Land Management's permanent file concerning the conveyance. Under Part 1, 183 ordnance sites were initially evaluated, and 78 of the sites were given a NOFA designation, as reported in the preliminary assessment report (U.S. Navy 2000e). During the preliminary assessment process, four new sites were added to the overall list (see Figure 3-1).

Part 2 was the development of a site-specific explosives safety hazard assessment (ESHA) methodology to evaluate data provided by the RI process. The ESHA methodology is qualitative in nature, but makes use of both qualitative and quantitative inputs in a framework that results in a relative-risk ranking ranging from low risk (A) to extreme risk (E). Sites scored as an "A" or "B" were recommended for NOFA. Those scored with a "C" or "D" were recommended for further investigation or remediation. No sites received a score of "E." In addition to potential explosive safety hazards, an evaluation of risk-based screening criteria for ordnance-related chemicals in soils was developed for sites on Adak where limited releases of ordnance-related chemicals may have occurred.

In 2001, OU B was subdivided into OU B-1 and OU B-2 to expedite transfer of real estate by placing a higher priority on completing the investigation and remediation of OU B-1 sites located within real estate planned for transfer to TAC (OU B-1 sites are shown on Figure 3-2 and OU B-2 further action sites on Figure 3-3). As shown on Figure 3-1, 155 sites are addressed under OU B-1, 6 sites will be addressed under the formerly used defense site program, and the remainder are being evaluated as part of OU B-2.

3.2.1 Operable Unit B-1

The sites in OU B-1 include the Downtown and Remote Exchange Areas identified for land transfer. Of the 183 sites identified in the preliminary assessment, 118 were designated as OU B-1 sites (see Figure 3-1). In addition, 14 new sites were added to OU B-1 after completion of the preliminary assessment. Therefore, a total of 132 were originally designated as OU B-1 sites. Twenty-three sites were later transferred from OU B-2 to OU B-1. Therefore, the OU B-1 ROD included 155 sites (U.S. Navy, USEPA, and Alaska DEC 2001). Table 3-1 presents the results of the preliminary assessment for all the OU B-1 sites that were included in the ROD. Two sites, MM-22 and MM-23, were incorporated into MM-04, reducing the number of OU B-1 sites to 153. During the 2004 field season, the Navy established two new sites (MM-10F and MM-10G) within MM-10E. In addition, a new site (MM-10H) was established adjacent to the eastern border of MM-10E during a site certification meeting on December 8, 2004. As a result, the final count of OU B-1 sites is 156.

The preliminary assessment determined that 44 sites required investigation under an RI/FS. Following the preliminary assessment, an additional 14 sites were added to OU B-1, and these sites also required investigation under an RI/FS. However, some sites that were originally categorized as NOFA were determined to require further investigation, and some sites that were originally categorized as requiring further investigation were determined to be NOFA. As a result, 59 sites were investigated in the RI/FS (U.S. Navy 2001d).

Table 3-2 presents site background, removal actions (if any), and RI/FS results for the 50 sites that required further action in the OU B-1 ROD. Selected remedies, implementation, and operation and maintenance for the sites are presented in Section 4.

3.2.2 Operable Unit B-2

OU B-2 addresses ordnance explosive safety hazards and human health and ecological risks associated with ordnance-related chemicals in areas identified for retention by the Navy. Of the 183 sites identified in the preliminary assessment, 59 were originally designated as OU B-2 sites (see Figure 3-1). In addition, two new sites JM-01 and MM-23 were added after completion of the preliminary assessment. Therefore, a total of 61 sites were originally designated as OU B-2 sites. Twenty-three of these 61 sites were later transferred to OU B-1. A listing of the transferred sites is included in Table 3-1. Therefore, 38 sites are currently designated as OU B-2. These sites are listed in Table 3-3, and site background information is provided for each site. Of the 38 sites, 16 sites were identified as NOFA sites in the preliminary assessment and thus did not require further evaluation in the RI. The remaining 22 OU B-2 sites are in the RI/FS stage of the CERCLA process (U.S. Navy 2004h). The 22 OU B-2 sites that are undergoing the RI/FS process are shown on Figure 3-3 and are within land transfer Parcel 4. During this 5-year review period the Navy and regulatory agencies worked to develop a consensus remedial approach for OU B-2. Several drafts of the RI/FS document were produced during this period for review and discussion. The draft final RI/FS for OU B-2 was submitted in June of 2004 and has been reviewed and commented on by the regulatory agencies. The Navy has submitted written responses to these comments. The Navy continues to monitor and maintain access barriers, signs, and fences as interim engineering controls to limit access to OU B-2 sites.

3.3 OTHER ENVIRONMENTAL CONCERNS

As part of the base-closure process in 2001, the Navy demolished certain structures and/or performed building cleanup. The Navy demolished 15 building structures and one marine dock in project areas, including at Zeto Point, Contractor’s Camp, Downtown Area, Happy Valley, White Alice Landfill, and the Loran Station. The Navy also cleaned up miscellaneous debris in and around two buildings. Asbestos, lead-based paint, hazardous materials surveys, and structural engineering inspections were completed at each of the buildings prior to demolition. All demolition and cleanup material was disposed of properly at Roberts Landfill or at an off-site landfill as necessary (U.S. Navy 2001c).

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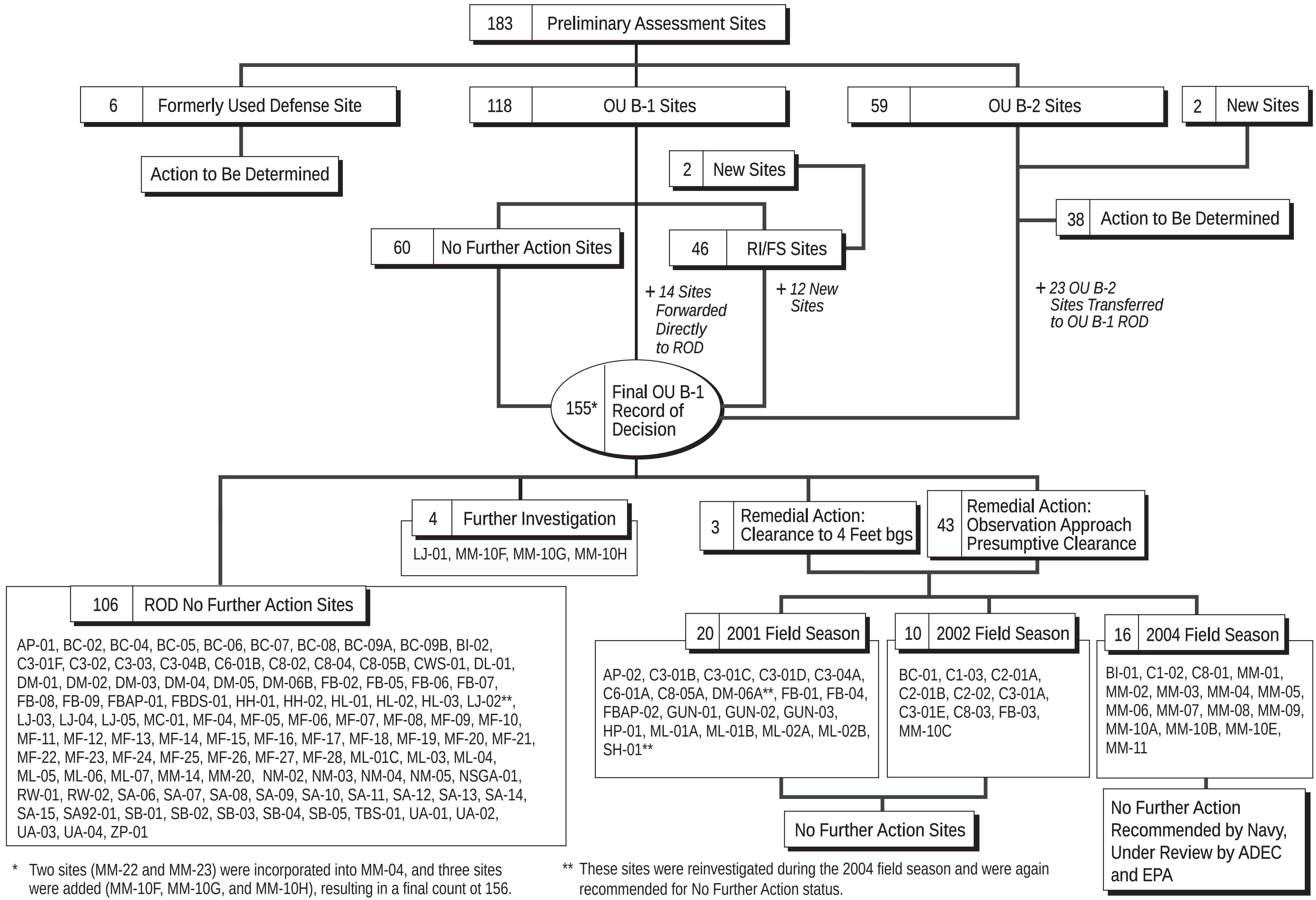


* Two sites (MM-22 and MM-23) were incorporated into MM-04, and three sites were added (MM-10F, MM-10G, and MM-10H), resulting in a final count ot 156.

** These sites were reinvestigated during the 2004 field season and were again recommended for No Further Action status.

U.S.NAVY

Figure 3-1
Summary of OU B-1 Site Process at Former Adak Naval Complex

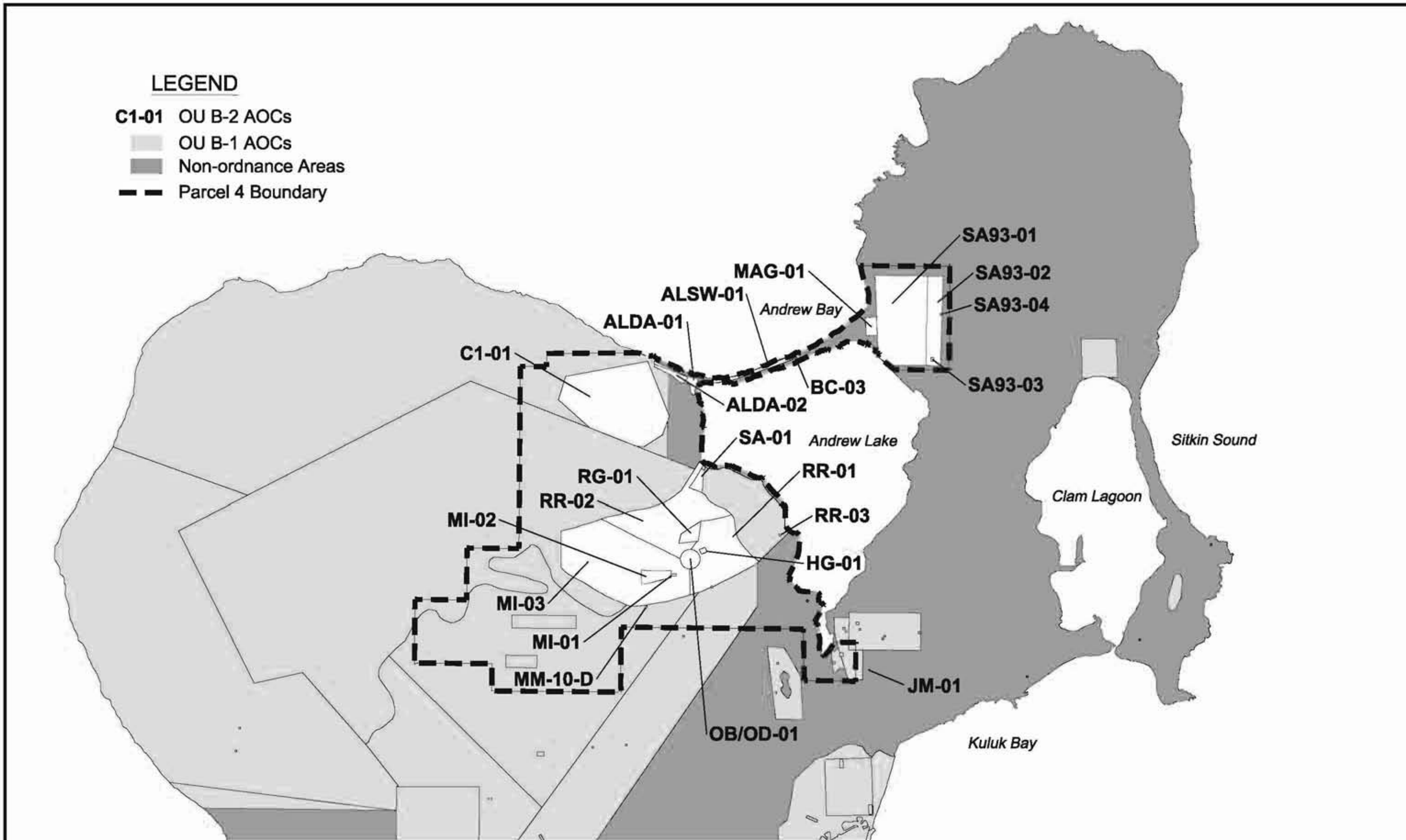
Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

U.S. NAVY

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW
RECORDS OF DECISION REPORT

Figure 3-2
Operable Unit B-1 Sites

November 10, 2006 \\Seagis\gis\ADAK\IDIQ\Sub-Tasks\DO 1\ROD\Figure 3-2 OUB-1 Sites.mxd



U.S. NAVY

N

0 3,500 7,000
SCALE IN FEET

Figure 3-3
Operable Unit B-2 Futher Action Sites

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF
RECORDS OF DECISION REPORT

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Table 3-1
OU B-1 Sites

		Results of Preliminary Assessment[f]		
Candidate Site Name	**Site Identifier/Name**	**NOFA**	**RI/ Inspect**	**FS**
Bay of Islands	BI-01[a]		√	
Bay of Islands Impact Area	BI-02	√		
Blind Cove/Campers Cove Impact Area	BC-01, BC-05, BC-06, BC-07, BC-08, BC-09A		√	
	BC-02, BC-04, BC-09B	√		
Chemical Warfare Materials Warehouses	CWS-01	√		
Combat Range #1	C1-02[a]		√	
	C1-03[a]	√		
Combat Range #2	C2-01A[a], C2-01B[a]		√	
	C2-02[a]	√		
Combat Range #3	C3-01 (C3-01A, C3-01B, C3-01C, C3-01D, C3-01E), C3-04 (C3-04A)	See Note[b]		
	C3-01 (C3-01F), C3-02, C3-03, C3-04 (C3-04B)		√	
Combat Range #6	C6-01 (C6-01A)	See Note[b]		
	C6-01B		√	
Combat Range #8	C8-01, C8-02, C8-03, C8-04, C8-05 (C8-05B)		√	
	C8-05 (C8-05A)	See Note[b]		
Davis Lake Ordnance Warehouses	DL-01	√		
Finger Bay Ammunition Pier	FBAP-01	√		
	FBAP-02		√	
Finger Bay Dynamite Storage	FBDS-01	√		
Finger Bay Impact Area	FB-01, FB-02, FB-04, FB-05		√	
	FB-03[c], FB-06, FB-07, FB-08, FB-09		√	
Gun Emplacements	GUN-01, GUN-02, GUN-03		√	
Gun Emplacement	Shagak Bay (SH-01)			√
Hammer Head Cover Impact Area	HH-01, HH-02	√		
Haven Lake Ordnance Area	HL-01, HL-02		√	
	HL-03	√		
Lake DeMarie Impact Area	DM-01, DM-02, DM-03, DM-04, DM-05, DM-06B		√	
	DM-06 (DM-06A)	See Note[b]		
Lake Jean Ammunition Complex	LJ-01, LJ-02, LJ-03, LJ-04		√	
	LJ-05	√		
MAUW Complex	MC-01	√		

Table 3-1 (Continued)
OU B-1 Sites

Candidate Site Name	Site Identifier/Name	Results of Preliminary Assessment[f]		
		NOFA	RI/ Inspect	FS
Minefields	Candlestick East (MF-04), Candlestick West (MF-05), Clam Lagoon Spit (MF-06), Finger Bay North Road (MF-07), Finger Bay NW (MF-08), Finger Bay SE (MF-09), Finger Bay SW (MF-10), Husky Pass (MF-11), Kuluk Bay (MF-12), Kuluk Bay South (MF-13), Lake Bonnie Rose (MF-14), NAVFAC (MF-15), Palisades (MF-16), Shagak Bay NE (MF-17), Shagak Bay NW (MF-18), Shagak Bay SE (MF-19), Shagak Bay SW (MF-20), Sweeper Cove North (MF-22), Sweeper Cove NW (MF-23), Sweeper Cove South (MF-26), Sweeper Cove SW (MF-25), Sweeper Cove West (MF-24), Yakutat (MF-27), Zeto Point (MF-28)	√		
	SWMU 2 Clam Lagoon (MF-21)			√
Mount Moffett	MM-01[a], MM-02[a], MM-03[a], MM-04[a] (encompasses MM-22[a] and MM-23[a,d]), MM-05[a], MM-06[a], MM-07[a], MM-08[a], MM-09[a], MM-10A[a] (includes two chemical sampling targets), MM-10B[a], MM-10C[a], MM-10E[a], MM-11[a], MM-14, MM-20		√	
	MM-10F, MM-10G, MM-10H	See Note[e]		
Husky Pass	a.k.a., Husky Pass Training (HP-01)			√
Mitt Lake Impact Area	ML-01 (ML-01A, ML-01B), ML-02 (ML-02A)	See Note[b]		
	ML-01 (ML-01C), ML-02 (ML-02B), ML-03, ML-04, ML-05		√	
	ML-06, ML-07	√		
NAF Adak/Lake DeMarie Ammunition Complex	NM-02, NM-03, NM-04		√	
	NM-05	√		
NSGA Magazine Complex	NSGA-01	√		
Scabbard Bay Impact Area	SB-01, SB-02, SB-03, SB-04, SB-05		√	
Small Arms Ranges	Finger Bay Pistol Range (SA-06), Finger Bay Rifle Range (SA-07), Finger Bay Submachine Gun Range (SA-08), Lake DeMarie Rifle Range (SA-09), Mitt Lake Sportsman's Pistol Range (SA-10), Mitt Lake Sportsman's Rifle Range (SA-11), NSGA Rifle Range (SA-13), NAF Trap and Skeet Range (SA-12), Nurses Creek Rifle Range (SA-14), Radar Hill Rifle Range (SA-15)	√		

Table 3-1 (Continued)
OU B-1 Sites

Candidate Site Name	Site Identifier/Name	Results of Preliminary Assessment[f]		
		NOFA	RI/ Inspect	FS
Urban Area	UA-01, UA-02		√	
	UA-03, UA-04	√		
WWII Ammunition Pier (Sweeper Cove)	AP-01	√		
	AP-02		√	
WWII (Near Runways)	RW-01			
	RW-02	√		
WWII Temp Bomb Storage (Kuluk Beach)	TBS-01	√		
Finn Field Bomb Burn Pile	SA92-01	√		
Zeto Point Impact Area	ZP-01[a]		√	

[a]Sites that were added to OU B-1 from OU B-2 include C1-02, C1-03, C2-01A, C2-01B, C2-02, BI-01, MM-01, MM-02, MM-03, MM-04 (encompasses MM-22 and MM-23), MM-05, MM-06, MM-07, MM-08, MM-09, MM-10A (includes two chemical sampling targets), MM-10B, MM-10C, MM-10E, MM-11, and ZP-01.
[b]Twelve sites that did not undergo preliminary assessment, but were evaluated in the RI include C3-01 (C3-01A, C3-01B, C3-01C, C3-01D, C3-01E); C3-04 (C3-04A); C6-01 (C6-01A); C8-05 (C8-05A); DM-06 (DM-06A); ML-01 (ML-01A, ML-01B); and ML-02 (ML-02A).
[c]FB-03 was transferred from NOFA to Final Characterization, based on the discovery of additional archival information following completion of the Proposed Plan.
[d]MM-23 did not undergo preliminary assessment.
[e]During the 2004 field season, the Navy established two new sites (MM-10F and MM-10G) within MM-10E. In addition, a new site (MM-10H) was established adjacent to the eastern border of MM-10E during a site certification meeting on December 8, 2004.
[f]Many of the sites identified for further investigation in the preliminary assessment were subsequently investigated and given a NOFA designation in the OU B-1 Record of Decision.

Notes:
FS - A feasibility study has been completed
MAUW - modified advance underwater weapons
NAF - Naval Air Facility
NSGA - Naval Security Group Activity
NOFA - no further action
OU - operable unit
RI/Inspect - A remedial investigation and/or site inspection has been completed
WWII - World War II

Table 3-2
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Bay of Island Impact Area	BI-01	The Bay of Island Impact Area is located southwest of downtown Adak on Expedition Harbor. The circular area was identified from a single archive record that identifies the weapon system as a 155-mm gun located on the lower southeastern flanks of Mt. Moffett. This site includes the firing point on Mt. Moffett and the safety range fan for the impact area. BI-01 Firing Point surrounds the former location of the 155-mm gun battery and is a documented defensive gun position.	BI-01 was evaluated in the preliminary assessment process; however, the site was not investigated during the 1999 field season. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding that BI-01 should be referred for further inspection and characterization. This site was not investigated or evaluated in the ESHA process in the RI in 2000.
Blind Cove/ Campers Cove Impact Area	BC-01	The Blind Cove/Campers Cove Impact Area is located southeast of downtown Adak along the eastern shoreline of Adak Island. This sector is approximately 4,469 acres, including the area outside the military reservation. Terrain and vegetation vary significantly, from the coastal lowlands to the steep, rocky peaks along the western boundary of the sectors. Based upon historical records, this site includes two firing points and associated range safety fans, gun battery firing area and associated impact zone, and a land-based scouting problem maneuver area.	BC-01 was screened to the RI in the preliminary assessment and investigated in the 2001 RI/FS for OU B-1. No OE/MEC was found in this AOC. Five OE scrap items were found in the 2000 investigation. BC-01 was submitted to the ESHA process to determine in a qualitative manner whether the site should advance to the FS or required further investigation. BC-01 initially received an ESHA score of "A." However, it was determined that additional investigation was warranted in (near) BC-01, because the frag was located just outside the area.
Combat Range #1	C1-02	Combat Range #1 is located northwest of downtown Adak, encompassing the land area on the northern flank of Mt. Moffett. A portion of this sector coincides with the northern portion of the Mt. Moffett Impact Area. The Mt. Moffett Impact Area was anticipated to have been subjected to different, and more intense, ordnance-related land use than Combat Range #1. Therefore, the portion of land that is common to both areas has been evaluated within the	C1-02 was evaluated in the preliminary assessment process. A single fragment of a mechanical time fuse was found in the 1999 SI. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #1 (Continued)		Mt. Moffett Impact Area. The remainder of Combat Range #1 is approximately 4,400 acres in size and has varied terrain and vegetation. The entire sector is composed of rocky steep slopes separated by deep near-vertical ravines continuing down to the water's edge. A small rocky beach is present at the base of mostly vertical cliffs.	
	C1-03	Combat Range #1 is located northwest of downtown Adak, encompassing the land area on the northern flank of Mt. Moffett. A portion of this sector coincides with the northern portion of the Mt. Moffett Impact Area. The Mt. Moffett Impact Area was anticipated to have been subjected to different, and more intense, ordnance-related land use than Combat Range #1. Therefore, the portion of land that is common to both areas has been evaluated within the Mt. Moffett Impact Area. The remainder of Combat Range #1 is approximately 4,400 acres in size and has varied terrain and vegetation. The entire sector is composed of rocky steep slopes separated by deep near-vertical ravines continuing down to the water's edge. A small rocky beach is present at the base of mostly vertical cliffs. The Mortar Target Area (C1-03) encompasses the northern side of Mt. Moffett and is characterized by steep terrain and inaccessible slopes.	C1-03 was evaluated in the preliminary assessment process. No MEC/OE or related items were identified in the 1999 SI. The site received a NOFA determination in the preliminary assessment process. The site was not investigated or evaluated in the ESHA process in the 2001 RI/FS. Although this site was not investigated in the 2001 RI/FS, the site was added back into the OU B-1 ROD for remedial action including characterization and clearance to facilitate land transfer.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #2	C2-01A	Combat Range #2 is located northwest of downtown Adak, encompassing the land area on the western flank of Mt. Moffett. A portion of this sector coincides with the southern portion of the Mt. Moffett Impact Area. The Mt. Moffett Impact Area was anticipated to have been subjected to different, and more intense, ordnance-related land use than Combat Range #2. The remainder of Combat Range #2 is approximately 3,401 acres in size and has varied terrain and vegetation. This sector is mainly composed of large sloping plateaus on the side of Mt. Moffett between moderately steep drainages. Fragmented area C2-01A is located at the northwestern end of Combat Range #2 and encompasses 0.2 acre. C2-01A area, on the lower flanks of Mt. Moffett, lies within a small patch of rolling terrain surrounded on the north and south by inaccessible terrain.	C2-01A was evaluated in the preliminary assessment process. Metal fragments were found in the 1999 SI. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process. Metal fragments identified in 1999 SI were removed
	C2-01B	See C2-01A for Combat Range #2 site description. Fragmented area C2-01B is located at the northwestern end of Combat Range #2 and encompasses 0.2 acre. C2-01B area, on the lower flanks of Mt. Moffett, lies within a small patch of rolling terrain surrounded on the north and south by inaccessible terrain.	C2-01B was evaluated in the preliminary assessment process. Metal fragments were found in the 1999 SI. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2001 RI/FS for OU B-1. Therefore, this site was not evaluated in the ESHA process. Metal fragments identified in 1999 SI were removed.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #2 (Continued)	C2-02	See C2-01A for Combat Range #2 site description. Combat Range area C2-02 encompasses the western side of Mt. Moffett and is characterized by steep terrain and inaccessible slopes.	C2-02 was evaluated in the preliminary assessment process. No MEC/OE or related items were identified in the 1999 SI. The site received a NOFA determination in the preliminary assessment process. The site was not investigated or evaluated in the ESHA process in the 2001 RI/FS. Although this site was not investigated in the 2001 RI/FS, the site was added back into the OU B-1 ROD for remedial action including characterization and clearance to facilitate land transfer.
Combat Range #3	C3-01A	Combat Range #3 is a trapezoidal area southwest of downtown Adak adjacent to Combat Range #6 on the north. The area stretches between Mt. Reed and Shagak Bay and encompasses the Lake DeMarie Impact Area, which is evaluated separately. Combat Range #3 is approximately 6,124 acres (excluding the Lake DeMarie Impact Area) and has a variety of terrain and vegetation. This area is divided north to southeast by the Mt. Reed mountain range. The Eastern Disposal Site (C3-01) is located in the northeastern corner of the Combat Range #3 site and extends eastward out into the area between Combat Range #3 and the NAF Adak/Lake DeMarie Ammunition Complex. ESHA Area C3-01A, the Cove Disposal Area, is a portion of the larger rectangular area of C3-01. The area measures about 95 by 315 meters, encompassing 10.5 acres along the eastern shoreline of Heart Lake.	C3-01 was investigated in the 2001 RI/FS for OU B-1. The investigation identified several pieces of MEC and AO, along with multiple pieces of OE scrap. Prior to the RI, C3-01 was thought to be one large contiguous disposal site. Based upon the results of the RI and the 1999 SI, C3-01 appeared to contain areas that had different levels of ordnance-related historical land use and that have different ordnance characteristics from other portions of the AOC. Therefore, the AOC was segregated into areas suspected of having unique characteristics or qualities. C3-01 was segregated into 6 AOCs (C3-01A through C3-01F). C3-01A is an area that clearly appeared to have been extensively used for ordnance disposal. Numerous AO, OE scrap and MEC items were identified in this AOC during both the 1999 SI and the 2001 RI/FS. C3-01A was submitted to the ESHA process. C3-01A received an ESHA score of “D” and was forwarded to the FS.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #3 (Continued)	C3-01B	See C3-01A for Combat Range 3 site description and C3-01 general area description. ESHA area C3-01B (Mortar #1) is a 30-by-30-meter square encompassing 0.2 acre.	This AOC was originally investigated as part of the total C3-01 AOC, as discussed above for C3-01A. The single mortar found in C3-01B was suspected of being a lone item. C3-01B was submitted to the ESHA process to determine in a qualitative manner whether the site should advance to the FS or required further investigation. The RI determined that insufficient data were available to adequately score C3-01B according to the ESHA process. The RI recommended the site for further investigation during remedial action. A single mortar identified in the 1999 SI was removed in 2000 RI field activities.
	C3-01C	See C3-01A for Combat Range #3 site description and C3-01 general area description. ESHA area C3-01C (Mortar #2) is a 30- by 30-meter square encompassing 0.2 acre. C3-01C is considered to be in the core development area for Adak.	This AOC was originally investigated as part of the total C3-01 AOC, as discussed above for C3-01A. The single mortar found in C3-01C was suspected of being a lone item. C3-01C was submitted to the ESHA process to determine in a qualitative manner whether the site should advance to the FS or required further investigation. The RI determined that insufficient data were available to adequately score C3-01C according to the ESHA process. The RI recommended the site for further investigation during remedial action.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #3 (Continued)	C3-01D	See C3-01A for Combat Range #3 site description and C3-01 general area description. ESHA area C3-01D (Mortar #3) is a 30-by-30-meter square encompassing 0.2 acre. C3-01D is considered to be in the core development area for Adak.	This AOC was originally investigated as part of the total C3-01 AOC, as discussed above for C3-01A. The single mortar found in C3-01D was suspected of being a lone item. C3-01D was submitted to the ESHA process to determine in a qualitative manner whether the site should advance to the FS or required further investigation. The RI determined that insufficient data were available to adequately score C3-01D according to the ESHA process. The RI recommended the site for further investigation during remedial action. Single mortar identified in the 1999 SI was removed in 2000 RI field activities
	C3-01E	See C3-01A for Combat Range #3 site description and C3-01 general area description. ESHA area C3-01E (Mortar #1) is a 30-by-30-meter square encompassing 0.2 acre. C3-01E is considered to be in the core development area for Adak.	This AOC was originally investigated as part of the total C3-01 AOC, as discussed above for C3-01A. The single bomb tail fuse found in C3-01E was suspected of being a lone item. C3-01E was submitted to the ESHA process to determine in a qualitative manner whether the site should advance to the FS or required further investigation. The RI determined that insufficient data were available to adequately score C3-01E according to the ESHA process. The RI recommended the site for further investigation during remedial action.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #3 (Continued)	C3-04A	See C3-01A for Combat Range #3 site description and C3-01 general area description. C3-04 encompasses the areas of Combat Range #3 not removed to the Lake De Marie Impact Area. The terrain of C3-04 is characterized as rugged and steep. ESHA area C3-04A (Bomb Booster) is a small 30- by 30-meter square encompassing 0.2 acre.	C3-04 was evaluated in the preliminary assessment process. The 1999 SI identified two pieces of MEC, along with multiple pieces of OE scrap. The site was screened to the RI in the preliminary assessment process. The two areas of C3-04 containing the lone pieces of MEC were separated into two AOCs in the 2001 RI/FS, C3-04A and C3-04B. C3-04A was submitted to the ESHA process. However, the RI determined that insufficient data were available to adequately score C3-04A according to the ESHA process. The RI recommended the site for further investigation during remedial action. Single bomb tail fuse identified in the 1999 SI was removed.
Combat Range #6	C6-01A	Combat Range #6 is a triangular area that stretches across the entire width of Adak (east to west) near the military reservation boundary. The orientation is such that a portion of Combat Range #6 is in the military reservation and a portion of the range is located outside the military reservation in the wildlife refuge. Only the portion of Combat Range #6 located in the military reservation was included in the RI/FS investigation. This portion of the sector is approximately 6,820 acres and has a variety of terrain and vegetation. The majority of the topographic formations noted in Combat Range #6 consist of high mountains separated by large wide valleys. Area C6-01A is a 1-acre portion of the Military Reservation Area (C6-01) located in Combat Range #6 on the southwest slope of Mt. Reed.	C6-01 was investigated in the 2000 RI investigation, and it was determined that C6-01 contained two separate areas that had different levels of ordnance-related historical land use. Therefore, C6-01 was divided into two AOCs and evaluated separately, C6-01A and C6-01B. The 2001 RI/FS identified MEC items (clustered mortars) and mortar frag in AOC C6-01A, indicating the presence of a mortar impact area. C6-01A was submitted to the ESHA process, received an ESHA score of “C,” and was forwarded to the FS. Four MEC and 9 pieces of OE scrap were removed in 2000 RI field activities

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #8	C8-01	Combat Range #8 is located near the southern tip of Andrew Lake, a short distance east of the lake. The range is approximately 158 acres and encompasses a wide range of terrain and vegetation for a small area. A very large steep ravine bisects the area from north to south near the eastern side. At the head of this ravine, there is a small lake and associated wetlands. Near the southern border of the sector is a larger lake and another wetland. This sector also contains a manmade rock quarry in the southeastern corner. Near the east end of Combat Range #8, above the rock quarry, there are numerous foundations, piles of wood debris, and trash associated with former Quonset huts or other small buildings. These buildings may have been used to house troops. There is also a cabin located in the western portion of this sector. The Eastern Disposal Site (C8-01) is located on the eastern boundary of the Combat Range #8 site midway along the boundary in the north/south direction. The terrain is characterized by rolling steep hills and ravines.	The 1999 investigation of AOC C8-01 identified two pieces of AO. The 2001 RI/FS identified four more pieces of AO. Because the prescribed methodology for this area was 100 percent geophysical survey and intrusive investigation, C8-01 was considered to have been remediated during the RI investigation. C8-01 was submitted to the ESHA process, and it received an ESHA score of "A," which qualified the site for a NOFA designation. However, chemical sampling of this site was recommended in the RI. Two pieces of AO identified in the 1999 SI were removed; four additional pieces of AO identified in the 2000 RI were removed.
	C8-03	See C8-01 for Combat Range #8 site description. The Western Disposal Site (C8-03) is located in the northwestern portion of Combat Range #8, about 300 feet northwest of C8-02. The C8-03 terrain is characterized by rolling steep hills and deep ravines.	AOC C8-03 was investigated in both 1999 and 2000. AOC C8-03 contained multiple OE/MEC items, including armed hand grenades, 20-mm and 40-mm projectiles, and small arms ammunition. Because the prescribed methodology for this area was 100 percent geophysical survey and intrusive investigation, C8-03 is considered to have been remediated during the RI. However, because there were OE/MEC items found near the boundaries of the AOC and a lone piece of MEC found nearby in C8-05, additional investigation work

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #8 (Continued)	C8-03		was determined to be needed to properly bound this AOC. C8-03 was submitted to the ESHA process. However, the RI determined that insufficient data were available to adequately score C8-03 according to the ESHA process. The RI recommended the site for further investigation during remedial action to properly bound AOC C8-03. Three pieces of AO identified in the 1999 SI were removed; 22 additional pieces of AO and single MEC item identified in the 2000 RI were removed.
	C8-05A	See C8-01 for Combat Range #8 site description. C8-05 encompasses remaining Combat Range #8 areas and is a relatively small area characterized by terrain ranging from steep hills and ravines to flat, marshy wetland areas. There are also several small lakes located in the area.	C8-05 was investigated during the 1999 SI and the 2001 RI/FS. C8-05 contained three isolated AO finds and two pieces of inert ordnance. The bound-and-characterize methodology for lone pieces of AO was not applied to the individual pieces of AO found in C8-05. One of the items was in close proximity to C8-03, and it was recommended that the item be included in the supplemental work at C8-03. One single AO find appeared to be a single lone item. This area was investigated as C8-05A. The remainder of the AOC formed C8-05B, discussed below. As discussed previously, the bound-and-characterize methodology for lone pieces of AO was not applied to the individual pieces of AO found in C8-05, including C8-05B. Therefore, the RI recommended that additional investigation is necessary for C8-05B to verify that the item found is a lone piece of AO and not an indicator of a disposal site. C8-05A was submitted to the ESHA process. However, the RI determined that insufficient data were available to adequately score C8-05B according to the

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Combat Range #8 (Continued)	C8-05A		ESHA process. The RI recommended the site for further investigation during remedial action. The single AO item identified in the 2000 RI investigation was removed.
Finger Bay Ammunition Pier	FBAP-02	This area is located along the northern shoreline of Finger Bay, south of downtown Adak. It consisted of a large L-shaped, wooden pier where ordnance was off loaded during the World War II era. The terrain in the area where the pier met the shoreline is relatively flat and somewhat rocky. There is little or no vegetation along the shore, due to rocky terrain with no soil. The pier has been dismantled, basically eliminating the terrestrial site as a potentially ordnance-contaminated site. However, ordnance may potentially have been dropped from the pier during off-loading or handling.	FBAP-02 is the area underlying the location of the former Finger Bay Ammunition Pier. The preliminary assessment referred FBAP-02 for further inspection to fully characterize the conditions beneath the water. This AOC was not evaluated in either the 2001 RI/FS for OU B-1 or OU B-2 and was not evaluated in the ESHA process. However, dive operations were completed in 2001 and no OE-related materials were observed.
Finger Bay Impact Area	FB-01	Finger Bay Impact Area is located southeast of downtown Adak and upgradient from the head of Finger Bay. This sector is about 446 acres and has a variety of terrain and vegetation. A large stream running north between Lake Betty and Finger Bay bisects the area. Some structural remnants are visible in the Finger Bay Impact Area. West of the stream basin, fence poles and small wooden foundations are visible. FB-01, Mortar Firing Point, is a circular area, approximately 200 feet in diameter, which has been identified from historical photographs as the firing point for the mortar target area within the Finger Bay Impact Area.	FB-01, Mortar Firing Point, was evaluated in the preliminary assessment process. No ordnance or OE scrap were identified in the 1999 field investigation. This site was screened to the RI in the preliminary assessment process. However, this AOC was not investigated or evaluated in the ESHA process in the 2001 RI/FS for OU B-1. While this site was not evaluated in the FS, the FS identified this site as one that requires additional investigation and potential remedial action, based on historical use of the site.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Finger Bay Impact Area (Continued)	FB-03	See FB-01 for Finger Bay Impact Area site description. FB-03, Mortar Impact Area, begins about 1,000 feet from the Mortar Firing Point site and continues out to a distance of about 2,500 feet. FB-03 begins on the east side of the creek, central to the Finger Bay Impact Area.	FB-03, the Mortar Impact Area, associated with mortar firing point (FB-01) and Mortar Range Safety Fan (FB-02), was screened to the RI in the preliminary assessment process and investigated in the 2001 RI/FS for OU B-1. During the 1999 investigation, no OE/MEC was found; however, several pieces of frag associated with mortars were located. During the RI in 2000, the area was investigated a second time, and 71 targets were identified as OE scrap. FB-03 was submitted to the ESHA process, and it received an ESHA score of “A” and a NOFA designation. Although the site received an “A” score, it was identified for additional investigative work. Frag and scrap identified in the 1999 and 2000 field activities were removed. In 2002 the Navy performed a removal action for the removal and disposal of six drums and one tank (suspected septic tank) (U.S. Navy 2003f).
	FB-04	See FB-01 for Finger Bay Impact Area site description. FB-04 is a narrow rectangular area identified as the firing point for projectiles in the Finger Bay Impact Area. Unfired ordnance may have been stored, dropped, discarded, or disposed of during WWII, but the ordnance used would not have been carried long distances because of its heavy weight.	FB-04, the projectile firing point, was evaluated in the preliminary assessment process. No ordnance or OE scrap was identified in the 1999 field investigation. This site was screened to the RI in the preliminary assessment process. However, this AOC was not investigated in the 2001 RI/FS for OU B-1. Therefore, this site was not evaluated in the ESHA process. While this site was not evaluated in the FS, the FS identified this site as one that requires additional investigation and potential remedial action based on historical use of the site.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Gun Emplacements	GUN-01	20-mm Gun Emplacements (GUN-01)—These weapons were mounted on fixed gun mounts in relatively small gun emplacements with protective berms. Four general locations for 20-mm Gun Emplacements have been identified on Adak using the historical data available. No 20-mm gun locations were investigated during any of the past ordnance investigations conducted on Adak prior to 1999. Based upon the information available and the fact that it is not possible to identify exact locations where these guns were set up, the 20-mm Gun Emplacements were evaluated as a whole and were not considered separately. It was assumed that the area of interest for each potential location would be a 30- by 30-meter square surrounding the gun that would represent the likely area for storage or disposal of ammunition.	GUN-01 was evaluated in the preliminary assessment. The 1999 investigation resulted in a finding that the 20-mm Gun Emplacements should be inspected and then rescreened to determine the need for further action. However, because the location data for the gun emplacements is imprecise, the sites should only be investigated if, through reconnaissance, the sites can be located with reasonable effort. This AOC was not investigated in the 2001 RI/FS for OU B-1. Therefore, this site was not evaluated in the ESHA process.
	GUN-02	37-mm Gun Emplacements (GUN-02)—These weapons were mounted on fixed gun mounts in relatively small gun emplacements with protective berms. Two general locations for 37-mm Gun Emplacements have been identified on Adak using the historical data available. No 37-mm gun locations were investigated during any of the past ordnance investigations conducted on Adak prior to 1999. Based upon the information available and the fact that it is not possible to identify exact locations where these guns were set up, the 37-mm Gun Emplacements were evaluated as a whole and were not considered separately. It was assumed that the area of interest for each potential location would be a 30- by 30-meter square surrounding the gun that would represent the likely area for storage or disposal of ammunition.	GUN-02 was evaluated in the preliminary assessment. The 1999 investigation resulted in a finding that the 37-mm Gun Emplacements should be inspected and then rescreened to determine the need for further action. However, because the location data for the gun emplacements is imprecise, the sites should only be investigated if, through reconnaissance, the sites can be located with reasonable effort. This AOC was not investigated in the 2001 RI/FS for OU B-1. Therefore, this site was not evaluated in the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Gun Emplacements (Continued)	GUN-03	40-mm Gun Emplacements (GUN-03)—These weapons were placed on fixed locations that had specially constructed protective berms and nearby ammunition storage trenches. Twenty-nine potential locations for 40-mm Gun Emplacements were identified on Adak using historical aerial photography and available data. Two 40-mm gun locations were identified in the field and investigated during the 1998 investigation of the Priority II Area of Adak. A third site was investigated during the 1999 investigation, but the remaining 26 sites were not investigated unless they happened to fall within or near the randomly selected grids in the 1997 and 1998 investigations. Based upon the data available, the anticipated consistency of ordnance-related land use, and the fact that it is not possible to identify exact locations where these guns were set up, the 40-mm Gun Emplacements were evaluated as a whole and not considered separately. Area assumed to be a 30- by 30-meter square surrounding the gun that would represent the storage or disposal area for ammunition.	GUN-03 was evaluated in the preliminary assessment. The 1999 investigation resulted in a finding that the 40-mm Gun Emplacements should be inspected, if located, and then rescreened to determine the need for further action. However, because the location data for the gun emplacements are imprecise, the sites should only be investigated if, through reconnaissance, the sites can be located with reasonable effort. This AOC was not investigated in the 2001 RI/FS for OU B-1. Therefore, this site was not evaluated in the ESHA process.
Lake DeMarie Impact Area	DM-06A	The Lake DeMarie Impact Area is located west/southwest of downtown Adak near Shagak Bay. It is located within the boundaries of Combat Range #3, but was investigated separately. This sector is approximately 1,314 acres and has a variety of terrain and vegetation. The majority of the area's topography consists of rolling hills, lakes, and valleys, all sloping down to the north from the Mt. Reed range. The southern portion of the sector borders the mountain range and becomes extremely steep and impassible. The area includes	DM-06 was investigated in the 1999 SI. DM-06 was screened to the RI in the preliminary assessment process and was investigated in the RI. During the 2001 RI/FS, a single abandoned mortar was found at this site and is suspected to be a lone piece of ordnance. This site was separated from DM-06 as DM-06A, because of the lone mortar. DM-06A was submitted to the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Lake DeMarie Impact Area (Continued)	DM-06A	two firing points, one near the southern tip of Andrew Lake and one near the north end of the NAF Adak/Lake De Marie Ammunition Complex. DM-06A area is a portion of the DM-06 remaining area and is a 30- by 30-meter square encompassing 0.2 acre.	However, the RI determined that insufficient data were available to adequately score DM-06A according to the ESHA process. The RI recommended the site for further investigation using the prescribed investigation methodology for a lone item. The single AO item identified in the 2000 RI field activities was removed.
Husky Pass	HP-01	This area consisted of two 81-mm firing points and three impact areas, all in the vicinity of Lake Bonnie Rose and Husky Pass. Although bounded by some of the most rugged terrain on Adak Island, the terrain in these areas is relatively flat near the lake, rising to steep hills and ravines. The firing points are northwest of Husky Pass and west of Lake Bonnie Rose. The impact areas are located on top of the peaks that comprise Mt. Reed.	This site was not investigated in the preliminary assessment process or in the 2001 RI/FS. However, a reconnaissance survey was performed during the 2001 field season where small arms ammunition casings in the .30 and .308 caliber were found at the site. No geophysical data was collected because of the inaccessibility of the site.
Lake Jean Ammunition Complex	LJ-01	This area is located north of downtown Adak along the eastern shoreline of Lake Jean. The area is roughly rectangular measuring about 55m by 60 m (approximately 0.8 acre) and consists of three closely spaced areas used for the storage, handling, and distribution of ordnance.	LJ-01 was evaluated in the preliminary assessment process. Four flares and a practice grenade were identified in the 1999 SI. The site was screened to the RI in the preliminary assessment. During the 2000 RI, 21 targets were identified as UXO, primarily MK2 hand grenades, and 72 targets were identified as AO, small arms ammunition, PD fuzes, 37-mm projectiles, 50-mm mortar rocket flares, and practice ordnance. Because of the large number of ordnance items, the RI recommended expansion of the area and further evaluation during the Remedial Action. The site was not evaluated in the ESHA process because of insufficient data and site investigation was not complete.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mount Moffett	MM-01	This site is located near the base of Mt. Moffett just northeast of Shagak Bay. It is identified as an impact area for 155-mm projectiles fired from the Andrew Bay seawall and as a portion of a potential impact area for direct fire weapons ranges along the southeastern flanks of Mt. Moffett. During the 1999 field investigation, no ordnance or OE scrap was found in this area. However, little field data was collected in the area due to steep terrain.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated or evaluated in the ESHA process in the 2001 RI/FS.
	MM-02	This area is located southeast of the peak of the mountain adjacent to the 155-mm impact area (MM-01). The area is identified in historical firing orders as part of two impact areas; however, the area is located near the outer limits of these impact areas. During the 1999 field investigation, no ordnance or OE scrap was found in this area.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
	MM-03	This small area encompasses a single metallic fragment found in the southwestern portion of the candidate site near MM-01. During the 1999 field investigation, a single fragment was found. It was not possible to discern the type of projectile from which the fragment originated.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
	MM-04	This area is located along the southeastern flanks of Mt. Moffett and includes the firing points for five direct fire and indirect weapons ranges in this area. During the 1999 field investigation, no ordnance or OE scrap was found in this area.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mount Moffett (Continued	MM-05	This small area encompasses two metallic fragments found in the southern portion of the candidate site. During the 1999 field investigation, two metallic fragments were found. It was not possible to discern the type of projectile from which the fragment originated.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
	MM-06	This small area encompasses a single piece of fragment found in the southeastern portion of the candidate site. This site is located in between the general location given for the mortar and artillery firing points. During the 1999 field investigation, a single piece of fragment was found. It was not possible to discern the type of projectile from which the fragment originated.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
	MM-07	This small area encompasses a single find consisting of an M-46 fuze in the eastern portion of the candidate site. During the 1999 field investigation, a single M-46 fuze was found in this area.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
	MM-08	This small area encompasses a single metallic fragment found in the eastern portion of the candidate site. During the 1999 field investigation a single metallic fragment was found. It was not possible to discern the type of projectile from which the fragment originated.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mount Moffett (Continued	MM-09	This small area encompasses a single metallic fragment found in the eastern portion of the candidate site. Historical documents and photos identified this site as part of the direct and indirect fire weapons ranges on Mt. Moffett, or the buffer area between ranges.	This site was included in the 1999 preliminary assessment process. The inconsistency of the fragment found, the suggested historical use of MM-09, and field data resulted in a finding of referral to the RI/field inspection. This site was not investigated in the 2001 RI/FS nor evaluated in the ESHA process.
Mount Moffett: Central Impact Area – 37mm Projectile Zone 1	MM-10A	This site is in a bowl-shaped area near the upper flanks of Mt. Moffett on the front (southeast) side. It is located within a large area generally identified as an impact area for 90-mm and 155-mm projectiles fired from six separate locations on the northern end of Adak Island. Several types of ordnance and OE scrap were discovered in this overall area on Mt. Moffett, and it appears that the front face on the mountain was heavily used as an impact zone. Surrounding areas contained scrap or other OE-related items indicative of projectiles of various sizes, including 75 mm and 90 mm, as well as fragment from a 155-mm projectile. Mortars were found at lower elevations together with PD557 fuzes, which are commonly used on large-caliber projectiles.	MM-10A was evaluated in the preliminary assessment process. A fired 37-mm projectile and OE scrap were identified in the 1999 SI. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.
Mount Moffett: Central Impact Area – 60mm Mortar Zone	MM-10B	This site encompasses 22.5 acres and is in a bowl-shaped area near the upper flanks of Mt. Moffett on the front (southeast) side, directly south of MM-10A. It is located within a large area generally identified as an impact area for 90-mm and 155-mm projectiles fired from six separate locations on the northern end of Adak Island. See MM-10A for ordnance items found in the Mt. Moffett area.	MM-10B was evaluated in the preliminary assessment process. Ordnance and OE scrap related to the use of 60-mm mortars (mortar scrap and fins) were identified in the 1999 SI. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mount Moffett: Central Impact Area – 37mm Projectile Zone 2	MM-10C	This site encompasses 1.73 acres and is located in the southwestern corner of the candidate site near the WWII Ski Lodge on the southeastern flanks of Mt. Moffett. It is located within a large area generally identified as an impact area for 90-mm and 155-mm projectiles fired from six separate locations on the northern end of Adak Island. See MM-10A for ordnance items found in the Mt. Moffett area.	This site was included in the 1999 preliminary assessment process. During the 1999 field investigation, two 37-mm projectiles (fired) and OE scrap were found in this area. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.
Mount Moffett: Central Impact Area Remainder	MM-10E	This site originally consisted of 2,127 acres and is in a bowl-shaped area near the upper flanks of Mt. Moffett on the front (southeast) side. It is located within a large area generally identified as an impact area for 90-mm and 155-mm projectiles fired from six separate locations on the northern end of Adak Island. During the 2004 field season, the area was reduced to 1,764 acres by establishing two new AOCs, MM-10F and MM-10G. See MM-10A for ordnance items found in the Mt. Moffett area.	This site was included in the 1999 preliminary assessment process. During the 1999 field investigation, several types of ordnance and OE scrap were discovered in this area, and it appears that the area was heavily used as an impact zone. Projectiles of various sizes were found, including 37 mm, 75 mm, and 90 mm, as well as a fragment from a 155-mm projectile. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.
Mount Moffett	MM-10F[a]	This area consists of 320 acres of land within MM-10E. See MM-10A for ordnance items found in the Mt. Moffett area and MM-10E for additional site information.	This AOC was established after the RI/FS process.
	[a]	This area consists of 43 acres of land within MM-10E. See MM-10A for ordnance items found in the Mt. Moffett area and MM-10E for additional site information.	This AOC was established after the RI/FS process.

MM-10G

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mount Moffett (Continued)	MM-10H[a]	This area consists of 2.6 acres of land on the eastern border of MM-10E. This AOC was created because of concerns about the close proximity of three 90-mm projectiles found on the eastern border of MM-10E. See MM-10A for ordnance items found in the Mt. Moffett area.	This AOC was established after the RI/FS process.
Mount Moffett: Northwestern Sector	MM-11	This area is located northwest of the peak of the mountain adjacent to the most remote portions of Combat Range #1 and Combat Range #2. The area is identified in historical firing orders as part of three impact areas: one 90-mm impact area, one 155-mm impact area, and one area identified only as a large-caliber impact area.	This site was included in the 1999 preliminary assessment process. During the 1999 field investigation, this area was not investigated due to lack of access and safety issues. However, during transit across the northwestern saddle toward Combat Range #1, field staff noted an area that contained fragment and OE scrap. Two fired 90-mm projectiles were also found on the surface in this area. The site was screened to the RI in the preliminary assessment. However, this AOC was not investigated in the 2000 RI for OU B-1. Therefore, this site was not evaluated in the ESHA process.
Mitt Lake Impact Area	ML-01A	The Mitt Lake Impact Area is located southwest of downtown Adak adjacent to the Naval Magazine sector. This sector is approximately 482 acres and has a variety of terrain and vegetation. The 60-mm Mortar Impact Area (ML-01) is located in the southeast corner of the Mitt Lake Impact Area. The terrain of ML-01 is characterized by steep rolling hills with rocky outcrops on the hilltops. ESHA area ML-01A is a portion of the 60-mm Mortar Impact Area encompassing 3.5 acres.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI. This site was investigated in the 2001 RI/FS. In the 1999 and 2000 surveys, the investigations identified eight items of OE scrap and nine MEC items. The MEC were 60-mm mortars. ML-01 was segregated into three areas because of different levels of ordnance-related historical land use. The RI concluded the site should be evaluated in the FS, based on an ESHA score of “C.”

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mitt Lake Impact Area (Continued)	ML-01B	See ML-01A for Mitt Lake Impact Area site description and ML-01 area description. ESHA area ML-01B is a portion of the 60-mm Mortar Impact Area and encompasses 0.2 acre, with a screening area of 30- by-30-meters squared.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI. This site was investigated in the 2001 RI/FS. In the 1999 and 2000 surveys, the investigations identified eight items of OE scrap and nine MEC items. The MEC were 60-mm mortars. ML-01 was segregated into three areas, because of different levels of ordnance-related historical land use. ESHA scoring could not be determined during the RI because of insufficient data.
	ML-02A	See ML-01A for Mitt Lake Impact Area site description and ML-01 area description. The 20/40-mm Impact Area (M2-02) is located centrally about 4,500 feet south of the historical firing point for the Mitt Lake Impact Area. The ML-02 area terrain is characterized by steep ridges and deep ravines. ESHA area ML-02A, the Single 20-mm Projectile Site, is a portion of the 20/40-mm Impact Area (ML-02), encompassing 0.2 acre and a screening area of 30- by 30-meter squared.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI. This site was investigated in the 2001 RI/FS. In the 1999 and 2000 surveys, the investigations identified one AO item, 17 items of OE scrap, and seven MEC items. ML-02 was segregated into two areas, because of different levels of ordnance-related historical land use. ESHA scoring could not be determined during the RI because of insufficient data.
	ML-02B	See ML-01A for Mitt Lake Impact Area site description. See ML-02A for ML-02 area description. ESHA area ML-02B is the remainder area of ML-02 after removal of the lone 20-mm projectile site (ML-02A).	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to the RI.

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

Candidate Site Name	Area of Concern	Description	Remedial Investigation/ Feasibility Study Results
Mitt Lake Impact Area (Continued)	ML-02B		This site was investigated in the 2001 RI/FS. In the 1999 and 2000 surveys, the investigations identified one AO item, 17 items of OE scrap, and seven MEC items. ML-02 was segregated into two areas, because of different levels of ordnance-related historical land use. During the RI process, ML-02B received an ESHA score of "A" and a NOFA designation. However, the RI/FS indicated that chemical sampling was required at this site.
Shagak Bay Gun Emplacement	SH-01	This area supported four 155-mm Howitzer gun emplacements on the far west side of the hills west of downtown Adak and northeast of Shagak Bay. This area was first investigated during the 2001 field season after its discovery in archival data.	The site was not investigated in the 1999 preliminary assessment process or the 2001 RI/FS. However, a reconnaissance survey was performed in 2001, and no ordnance-related items were found.
WWII Ammunition Pier (Sweeper Cove)	AP-02	This area has been identified as the area underlying the location of the former ammunition pier in Sweeper Cove. The area beneath the former pier is generally rocky near the shoreline. The boundary for this area is the footprint of the pier, plus a 30-foot zone outside the footprint and a 10-foot zone inside the footprint.	This site was included in the 1999 preliminary assessment process. The parameters used to conduct the screening evaluation in the preliminary assessment process resulted in a finding of referral to further field inspection. This site was not investigated or evaluated in the ESHA process in the 2001 RI/FS. However, dive operations were completed in 2001, and one piece of OE scrap (a spent .50-caliber casing) was observed.

[a]These sites were not identified in the OU B-1 ROD. However, during 2004, these sites were identified as separate sites within or immediately adjacent to the boundaries of MM-10E, which was identified in the OU B-1 ROD.

Notes:
AAR - after action report
AO - abandoned ordnance
AOC - area of concern

Table 3-2 (Continued)
Background on OU B-1 Sites Requiring Further Action Under the ROD

AOPC - area of potential concern
bgs - below ground surface
BLM - Bureau of Land Management
EOD - explosive ordnance disposal
ESHA - explosive safety hazard assessment
FS - feasibility study
MEC - munitions explosives of concern
NOFA - no further action
OE - ordnance and explosives
OU - Operable Unit
recon - reconnaissance
ROD - Record of Decision
SI - site investigation
TAC - The Aleut Corporation
WWII - World War II

Table 3-3
OU B-2 Sites

Site Designation	Site Name	Site Description
ALDA-01	Andrew Lake Disposal Area – Landfill Area	This site is located northwest of Andrew Lake and covers 6.7 acres. It is the suspected site of a former landfill used for disposal of ordnance. The terrain is relatively flat except for a steep bank on the western edge of the site and several craters possibly associated with the ordnance disposal/demolition or the bombing run associated with ALDA-02. Cobbles and boulders are prevalent in this area, making it difficult to walk or dig.
ALDA-02[a]	Andrew Lake Disposal Area – Beach Crater Area	This site is located adjacent to and northeast of ALDA-01 and covers 9.5 acres. It is the suspected site of one or more “Rolling Thunder” bombing runs using large munitions (i.e., 500- to 1,000-pound bombs). A relatively straight line of deep craters marches through the middle of the site, suggestive of a bombing run. The terrain (rolling and irregular) transitions from a cobble beach in the north to a rocky cliff in the south with a relatively narrow strip of land in between.
ALSW-01	SWMU 8, Andrew Lake Seawall	This site is a natural seawall located along the north shoreline of Andrew Lake, separating the freshwater lake from Andrew Bay. The seawall is narrow and elongated, similar to a dike, and covers 10 acres. Of natural origin, the seawall consists of boulders, cobbles, and gravel with a single-lane dirt road running along the top. Significant wave action and storm surge impact the northern face of the seawall and continue to deposit ordnance regularly due to suspected historical dumping of ordnance in Andrew Bay.
BC-03[a]	Blind Cove/ Campers Cove – Firing Point #1	This site is located near the east end of the seawall on the north side of Andrew Lake. The area is square, encompassing 0.02 acre of land. The terrain is relatively flat and is characterized by cobbles, boulders, and coarse gravel intermixed with relatively small amounts of fine-grained materials. Access to this site is provided by a gravel road running along the western shoreline of Andrew Lake to the seawall and then east across the seawall to the site. However, this roadway is cut by a natural spillway for Andrew Lake and access must be gained on foot by walking around the spillway on the beach.
C1-01	Combat Range #1 – Mortar Target Area	This site is located north of the historical Andrew Lake Range Complex in the northwestern corner of Combat Range 1, described in the preliminary assessment. It is one of three sites created from the large historical combat range covering the northern and western slopes of Mount Moffett. This site is a large, roughly elliptical area encompassing 387 acres. The terrain at the site is moderately steep and rocky in most areas; however, along the northern boundary of the site the terrain is very steep and inaccessible. The amount and type of ordnance found indicates that the area may have served as an impact area for mortars. Access to this site is limited. Steep to very steep slopes surround the site, and there are no roads or trails leading into the area.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
HG-01	Andrew Lake Hand Grenade Range	This site is a small square area of about 2 acres located within the Andrew Lake Range Complex. The terrain is relatively flat with tall tundra growth. Remnants of a berm and trench are located in the center of the range, which at one time offered protection from exploding grenades during training exercises. Access to the area is from an existing gravel road leading southwest, away from Andrew Lake.
JM-01[a]	Candidate Chemical Weapons Disposal Site	JM-01 was thought to be within the Lake Jean area, located just west of C8, between the range and the south end of Andrew Lake. The center of the region is a relatively flat meadow-like area cut by several meandering streams which form deeply cut winding ravines from 3 to 20 feet wide. On three sides of the flatland area (north, east, and south), the terrain rises in a series of ridges and ravines. Some areas remain flat enough to traverse on foot, while others rise too steeply to be accessible. To the west of the flat area, the terrain falls steeply towards an access road nearby. It then continues toward Andrew Lake at a more gentle slope.
MAG-01	WWII Magazine – Andrew Lake Seawall	This site is located at the eastern end of the Andrew Lake Seawall in the north central portion of Adak Island. The area is a small rectangle that encompasses 10.7 acres of land. The terrain is relatively flat in the western portion of the site and very steep (cliff-like) in the eastern portion. Access to the magazine area is provided by a gravel road running along the western shoreline of Andrew Lake to the seawall and then east across the seawall to the magazine area. However, this roadway is cut by a natural spillway for Andrew Lake and access must be gained on foot by walking around the spillway on the beach.
MF-01	Andrew Lake East Minefield	The Andrew Lake East Minefield Site is located north of downtown Adak at the eastern end of the Andrew Lake Seawall. The area is characterized by a steep cobbly beach fronting rolling hills. The Andrew Lake East Minefield has not been intrusively investigated for mine-related debris; however, a historical pistol/rifle range and magazine nearby were investigated by URS during the preliminary source evaluation (PSE) for chemical contamination. Based upon the data available and the intense utilization of this area, it is not realistic to conclude that this minefield was ever installed. The Andrew Lake East Minefield met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MF-02	Andrew Lake Seawall Minefield	The Andrew Lake Seawall Minefield Site is located north of downtown Adak, along the entire length of the Andrew Bay Seawall. The area is best described as a large natural berm consisting primarily of cobbles and gravel. The seawall also has a dirt/gravel roadway running along the top and there is a very narrow sand beach on the seaward side of the seawall. The Andrew Lake Seawall Minefield has not been intrusively investigated for mine-related debris; however, the site was visited during the preliminary source evaluation performed by URS and periodic sweeps have been conducted along the seawall to remove ordnance washed up by frequent

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
MF-02 (Cont.)	Andrew Lake Seawall Minefield	violent storms. Based on the field data and the extensive historical use of this area for daily/routine activities, it is not realistic to conclude that this minefield was ever installed. The Andrew Lake Seawall Minefield met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MF-03	Andrew Lake West Minefield	The Andrew Lake West Minefield Site is located north of downtown Adak within the Andrew Lake Disposal Site at the northwest corner of the lake. The terrain in the area is characterized by small rolling hills or mounds, except for the roadway access which is flat. The Andrew Lake West Minefield has not formally been intrusively investigated for mine related debris; however, the site was investigated during the 1999 field season in areas which overlap the Andrew Lake Disposal Site. No mines or related wastes were found. The Andrew Lake West Minefield met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MI-01	Andrew Lake Mortar Impact Area – Rocket Disposal Area	This site is centrally located (north to south) near the eastern boundary of MI-02 and covers 0.7 acre. The terrain is generally flat, but can be uneven and marshy. A single dirt road provides access to the Open Burn/Open Detonation (OB/OD) Disposal Range located just east of this site. However, there is no direct road access to MI-01.
MI-02	Andrew Lake Mortar Impact Area – 40-mm Projectile Impact Area	This site is located along the southern side of the mortar impact valley adjacent to the rocket disposal site (MI-01) and covers 19 acres. The terrain is relatively flat, rising moderately to the west toward Mount Moffett. The area is bordered on the south by steep terrain that becomes inaccessible near the top of the ridge delineating the southern boundary of MI-02 and the Andrew Lake Range Complex. A single dirt road provides access to the OB/OD range to the east; however, there is no direct road access to MI-02.
MI-03	Andrew Lake Mortar Impact Area – Mortar Impact Area	This site consists of the remainder of the Mortar Impact Area Candidate Site defined in the preliminary assessment, after MI-01 and MI-02 were separated out. It covers approximately 425 acres and consists of two steep valleys extending east to west from the OB/OD Disposal Range adjacent to Andrew Lake west to the flanks of Mount Moffett. The terrain ranges from being relatively flat in the eastern portion nearest Andrew Lake, to steep and inaccessible at the western end and along a central ridgeline between the two valleys. The area is bordered on the north, south, and west by very steep, inaccessible slopes. A single dirt road provides access to the OB/OD Disposal Range to the east; however, there is no direct road access to MI-03.
MM-10D[a]	Mt. Moffett Impact Area – Central Impact Area Lone 81-mm Mortar	This site is located just south of the historical Andrew Lake Range Complex on the west side of Andrew Lake within the Navy Exclusion Zone. The area encompasses 0.02 acre of land. The terrain is relatively flat. Indirect access to this site is provided by a gravel road running up to the OB/OD area in the range; however, a steep embankment separates the site from this roadway.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
MM-12	Mt. Moffett Impact Area – Range Safety Fan #1	This roughly triangular area represents the range safety fan for the historical southwestern 155mm Impact Area on Mt. Moffett. It passes over Andrew Lake and then across the Parcel 4 range areas and on across the lower flanks of Mt. Moffett to the impact area. The terrain in this area varies a great deal and includes relatively flat areas and areas where rolling hills and ravines dominate. Near the impact area, the terrain becomes quite steep and inaccessible. Many portions of the range safety fan area were investigated during the 1999 field season as part of the investigation in the Andrew Lake Range Complex areas and the Mt. Moffett Impact Area Sector over which the fan passes. No ordnance consistent with the 155mm guns was found in any of the fan areas examined. MM-12 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-13	Mt. Moffett Impact Area – Range Safety Fan #2	This roughly triangular area represents the range safety fan for Firing Point #2 for the Mt. Moffett Impact Area. It passes over open country between Firing Point #1 at Andrew Lake and the impact area. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the impact area at the western end of the fan. A portion of the range safety fan area was investigated during the 1999 field season as part of the investigation in the Andrew Lake Range Complex west of Andrew Lake and the overall Mt. Moffett Impact Area over which the fan passes. No ordnance consistent with the 90mm guns was found in the fan area examined. MM-13 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-15	Mt. Moffett Impact Area – Range Safety Fan #3	The area represents the range safety fan for Firing Point #3 for the Mt. Moffett Impact Area. It passes over open country between Firing Point #3 on the shoreline of Kuluk Bay and the 90mm Impact Area at the crest of Mt. Moffett. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the impact area at the western end of the fan. About half of the range fan area overlaps Range Safety Fan #2. A portion of the range safety fan area was investigated during the 1999 field season as part of the investigation in the Lake Jean Ammunition Complex, the Haven Lake Ordnance Storage Area and the overall Mt. Moffett Impact Sector over which the fan passes. No ordnance consistent with the 90mm guns was found in the fan area examined. MM-15 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-16	Mt. Moffett Impact Area – Range Safety Fan #4	This roughly triangular area represents the range safety fan for Firing Point #4 for the historical Mt. Moffett Impact Area. It passes over open country between Firing Point #4 near downtown Adak and the 90mm Impact Area. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
MM-16 (Cont.)	Mt. Moffett Impact Area – Range Safety Fan #4	impact area at the western end of the fan. It should be noted that about half of the range fan area overlaps Range Safety Fans #2 and #3. A portion of the range safety fan area was investigated during the 1999 field season as part of the investigation in the overall Mt. Moffett Impact Sector over which the fan passes. No ordnance consistent with the 90mm guns was found in the fan area examined. MM-16 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-17	Mt. Moffett Impact Area – Firing Point #5	Firing Point #5 for the Mt. Moffett Impact Area is situated in the eastern central portion of downtown Adak near the shoreline of Kuluk Bay. The firing point was also used during training exercises shot at Scabbard Bay. This area is currently the location of abandoned housing units. This rectangular area surrounds the former location of a 90mm gun battery which is documented to have been fired into the 90mm Impact Area on Mt. Moffett. It roughly represents the area where unfired ordnance may have been stored, dropped, discarded, or disposed of during World War II-era military operations. The terrain in this area is characterized by rolling hills and ravines. This firing point was not investigated during the 1999 field effort; however, it was part of the investigation area in 1997 when the Priority I and II Areas of downtown Adak were evaluated. At that time, 100 percent of the accessible Priority I and II Areas was successfully cleared and geophysically evaluated, including this firing point. There has also been a great deal of construction activity in this area, including the installation of utilities and the construction of streets and housing. It is highly unlikely that any ordnance that may have been left at this site remains undiscovered. No ordnance has been found at this site. MM-17 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-18	Mt. Moffett Impact Area – Range Safety Fan #5	This roughly triangular area represents the range safety fan for Firing Point #5 for the historical Mt. Moffett Impact Area. It passes over open predominantly developed areas of Adak between Firing Point #5 in downtown and the 90mm Impact Area. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the impact area at the western end of the fan. It should be noted that about two-thirds of the range fan area overlaps Range Safety Fans #2, #3, and #4. A large portion of the range safety fan area was investigated during the 1997 and 1998 field season as part of the investigation in the Priority I, II and III Areas over which the fan passes. No ordnance consistent with the 90mm guns was found in the fan area examined. MM-18 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
MM-19	Mt. Moffett Impact Area – Range Safety Fan #6	This roughly triangular area represents the range safety fan for Firing Point #6 for the historical Mt. Moffett Impact Area. It passes over open country between NAF Adak/Lake De Marie Ammunition Complex and the impact area. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the impact area at the western end of the fan. It should be noted that about half of the range fan area overlaps Range Safety Fans #2, #3, #4, and #5. A portion of the range safety fan area was investigated during the 1999 field season as part of the investigation in the NAF Adak/Lake De Marie Ammunition Complex and the overall Mt. Moffett Impact Sector over which the fan passes. No ordnance consistent with the 90mm guns was found in the fan area examined. MM-19 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
MM-21	Mt. Moffett Impact Area – Range Safety Fan #7	This roughly triangular area represents the range safety fan for Firing Point #7 for the historical Mt. Moffett Impact Area. It passes over open country between Clam Lagoon and the 155mm Impact Area. The terrain in this area varies a great deal and includes relatively flat areas near the firing point and very steep, inaccessible rocky areas toward the impact area at the western end of the fan. A portion of the range fan also passes over Clam Lagoon. A large portion of the range safety fan area was investigated during the 1999 field season as part of the investigation in Combat Range #8, the Lake Jean Ammunition Complex and the overall Mt. Moffett Impact Area Sector over which the fan passes. MM-21 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
OB/OD-01	Andrew Lake Open Burn/Open Detonation Disposal Range	This site is an 18-acre circular area located at the end of the road within the Andrew Lake Range Complex investigation area. The terrain is flat and covered in knee-high, grassy tundra. A creek runs from southwest to northeast through the sector, dividing the northern one-third of the site from the remaining area.
RG-01	Andrew Lake 40-mm Rifle Grenade Range	This site is located on a hillside northwest of the hand grenade range. It is 16 acres, forming a trapezoid with the wider end situated at the historical firing area on the east side of range. The west end of the site, where the targets were located, encompasses a relatively steep hillside serving as a backstop for the range. This site was a 40mm rifle grenade firing target, offering good visibility of impact because of its steep slope and proximity to the roadway.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
RR-01	Andrew Lake Range Remainder – Hand Grenade/40-mm Area	This site is centrally located within the large valley containing the Andrew Lake Range Complex and covers 182 acres. It includes the buffer areas between the 40mm Rifle Grenade Range, the OB/OD Disposal Range, the Hand Grenade Range, and a portion of the southern flank of the valley. The terrain is generally flat, but can be uneven and marshy. The steep slopes on the south sides are difficult to access, with a small portion being inaccessible; therefore, only 132 of the total 182 acres are considered accessible to motivated hikers. A single dirt road provides vehicle access to RR-01.
RR-02	Andrew Lake Range Remainder – Mortar Impact Area	This site is located along the northern side of the Andrew Lake Valley containing the Andrew Lake Range Complex and covers 231 acres. It is located north of the 40mm Rifle Grenade Range and east of the Mortar Impact Area. RR-02 is a narrow valley that rises to the west toward Mount Moffett. The valley is bounded by steep hillsides to the north and south resulting in only 120 accessible acres within the site.
RR-03[a]	Andrew Lake Range Remainder – Flare Site	This site is located near the western boundary of the historical Andrew Lake Range Complex on the west side of Andrew Lake within the Navy Exclusion Zone. The area encompasses 0.2 acre of land. The terrain is relatively flat. Indirect access to this site is provided by a gravel road entering the range area from the south.
RR-04	Andrew Lake Range Remainder – Remainder	This area encompasses most of the lower valley at the Andrew Lake Range Complex. The terrain in this site is generally flat, except along the southern side of the range complex where a steep hillside forms the southern valley wall. During the 1999 investigation, no ordnance was found in this area. A single piece of ordnance scrap (a lifting plug) was found. This item is inert and did not contain any energetic material. This is consistent with the historical use of this area as a buffer for the individual range areas at Andrew Lake. RR-04 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
SA-01	Andrew Lake Machine Gun and Sub-Caliber Training Range	This site is located at the northern edge of the historical Andrew Lake Range Complex on the west side of Lake Andrew. The area encompasses a small triangle of property approximately 10.2 acres in size. The terrain is relatively flat and the vegetation consists primarily of tall, lush grasses ranging in height from 6 to 18 inches. Access to this site is provided indirectly by a gravel road running along the western shoreline of Andrew Lake to the seawall northeast of the site.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
SA-02	Andrew Lake Pistol Range	This range area is located north of the small bore rifle range along the northern hillside which defines the valley containing the range complex. The site was identified as a pistol range and .22 caliber anti-aircraft and anti-tank weapons training area. This range is described as a 1000-inch range, which indicates that it was scaled down to allow training using full-size weaponry firing small caliber munitions. A site inspection was performed by Foster Wheeler Environmental on October 27, 1999. No live ordnance was located during the site visit. SA-02 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
SA-03	Andrew Lake Seawall Pistol Range	The pistol range is located near the southwest corner of the rifle range and is oriented east to west at the eastern end of the Andrew Lake Seawall. The range consisted of two firing lines and one target line. The target line was at the eastern end of the range located at the base of a small hill. A site visit was conducted on March 14, 1997. The wooden walkways and the target posts are still visible. An investigation of the backstop located .45 caliber bullets down to a depth of 14 inches below ground surface. Bullet scarring was still evident behind the target posts. No live ordnance was located at the site. SA-03 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
SA-04	Andrew Lake Seawall Rifle Range	The rifle range is oriented southwest to northeast at the eastern end of the Andrew Lake Seawall and is approximately 300 yards long. The range had a single firing line at the western end. There were three target lines at 100, 200, and 300 yards to the east of the firing line. The range had both fixed targets and raised targets. A site visit was conducted on March 14, 1997. The range area is still littered with range debris and the target lines are still visible. Small caliber rifle slugs were located in the subsurface soils at all three target lines. Bullet scarring at this range was minimal in comparison to other ranges located on Adak. No live ordnance was located during the visit. SA-04 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.
SA-05	SWMU 9, Black Powder Sportsman's Club	The Black Powder Sportsman's Club, also known as SWMU 9, is located along the southwest shore of Andrew Lake. The site was used by the Black Powder Sportsman's Club for recreational target practice. Prior to its use as a firing range, the site was used as a disposal area for metal debris (1970s and 1980s). The area also may have been used for small arms training in the late 1970s. The site is 200 feet by 100 feet. A site visit performed in 1993 by URS located steel drums perforated with bullet holes. No live ordnance or bullet slugs were noted during the visit. SA-05 met the requirements for NOFA in the preliminary assessment and did not require further evaluation in the remedial investigation.

Table 3-3 (Continued)
OU B-2 Sites

Site Designation	Site Name	Site Description
SA93-01	Source Area #93 – Multiple Ordnance Impact Area	This site encompasses part of a steep ridgeline running along its western edge and lower flanks of the SA93 parcel that was defined in the preliminary assessment. The SA93 parcel is located to the northeast and adjacent to Andrew Lake. SA93-01 covers 263 acres. To the east the terrain is relatively flat, but to the west an inaccessible ridgeline separates this site from Andrew Lake. Because of the amount of ordnance found, the area may have served as an impact area.
SA93-02	Source Area #93 – Eastern Impact Area	This site consists of the area between the eastern boundary of SA93-01 and a dirt road forming its western boundary and providing access to the site. The site covers 78 acres. The terrain is generally rolling with the exception of a very steep stream ravine running along the entire western edge of the site, limiting ingress from the roadway to the impact area farther to the west (SA93-01). During the 1999 field season, no ordnance or ordnance scrap was found at this site, only metal scrap. Given its proximity to the bordering access road, SA93-02 was possibly a staging area or provided an ordnance buffer zone.
SA93-03	Source Area #93 – Firing Point	This site encompasses a small 0.6 acre area in the southern portion of SA93-02. The terrain is generally flat and accessible by a dirt road.
SA93-04	Source Area #93 – Eastern Disposal Site	This site consists of a small 0.25 acre area, centrally located on the western border of SA93-02. A dirt road along the western site boundary provides access. The terrain is generally rolling. During the 1999 field season, no ordnance or typical ordnance scrap was found. However, a trash pile was found containing metal banding, metal crates, and a lid from an ordnance crate that originally contained 155mm projectiles.

[a]These five sites are currently proposed as NOFA in the 2004 OU B-2 RI/FS.

Notes:
mm - millimeter
NOFA - no further action
OB/OD - ordnance burning/ordnance disposal
OU - operable unit
RI/FS - remedial investigation/feasibility study
SA - source area
SWMU - solid waste management unit
WWII - World War II

4.0 REMEDIAL ACTIONS

The ROD for interim remedial actions (U.S. Navy, USEPA, and Alaska DEC 1995) and the OU A ROD (U.S. Navy, USEPA, and Alaska DEC 2000) for Adak required remedial actions for 66 OU A sites (20 CERCLA sites, which include three water bodies and three state-permitted landfills [SWMU 18, 19 and 25], three combined CERCLA and petroleum sites [SWMU 14, 15, and 17], one combined RCRA and petroleum site [SA 77] and 42 petroleum sites [counting the two NMCB sites as separate sites]). Remedial actions were required in accordance with State of Alaska or RCRA requirements at five of the OU A sites and were included in the OU A ROD (U.S. Navy, USEPA, and Alaska DEC 2000). Landfill closures were required at three landfills as part of the permit conditions enforced by the State of Alaska [SWMU 18, 19 and 25], and two sites were closed under RCRA [SWMU 24 and SA 77]. (Note that SWMU 24 and SA 77 were both no further action sites under RCRA). The OU B-1 ROD (U.S. Navy, USEPA, and Alaska DEC 2001) required remedial actions for 40 OU B-1 sites. This section provides a brief description of the remedial action objectives (RAOs), the selected remedy, and the remedial actions for these sites.

4.1 OU A

4.1.1 OU A Remedial Action Objectives

The 23 CERCLA sites (which includes four combined CERCLA and petroleum sites) and 46 petroleum sites (which includes three combined CERCLA and petroleum sites and one combined RCRA and petroleum site) where the 2000 OU A ROD and the 1995 ROD required some type of response action can be grouped into four major categories of sites, each with different primary RAOs. These categories include:

- Landfills where landfill covers were installed (six sites: SWMUs 4, 11, 13, 18, 19 and 25)

- CERCLA sites with long-term monitoring and/or ICs only (15 sites: SWMUs 2, 10, 14, 15, 16, 20, 21A, 23, 29, 52, 55, and 67, SA 76, Sweeper Cove, and Kuluk Bay)

- CERCLA sites where soil and/or sediment were removed (two sites: SWMU 17 and South Sweeper Creek)

- Petroleum sites where remedial actions were required including the two NMCB sites as separate sites and SWMUs 14, 15, and 17 (46 sites)

The RAOs for each of these categories are described in the subsections below.

Landfills With Covers

Landfill covers have been installed at the following sites: SWMUs 4, 11, 13, 18/19, and 25. Landfill covers were constructed as required under the 1995 interim action ROD for SWMUs 11 and 13 and under the 2000 OU A final ROD for SWMU 4. SWMUs 18/19 and 25 were covered as requirements of permit conditions for landfills permitted by the State of Alaska and not under the OU A ROD. The RAOs for the sites that required landfill covers under the OU A ROD are the following:

- Prevent ingestion of and contact with chemically affected subsurface soils within the landfill debris and protect ecological receptors that may ingest on-site plants. (The plants may uptake subsurface chemicals.)

- Limit off-site migration of chemicals and materials from the landfill.

CERCLA Sites With Institutional Controls Only

The following chemical-release sites administered under CERCLA require ICs only under the OU A ROD: former landfills at SWMUs 2 and 29; the water bodies Sweeper Cove and Kuluk Bay; and SWMUs 10, 14, 15, 16, 20, 21A, 23, 52, 55, 67, and SA 76. Two additional sites, SWMU 24 and SA 77, were closed under RCRA and have ongoing ICs as required in the RCRA closure plan. (Note that ICs are also required at the landfills and SWMU 17 [see Section 4.1.2].)

- The RAOs for the landfills at SWMUs 2 and 29 are to protect human or ecological receptors (or both) from exposure to landfill debris and soil that could result in a cancer risk greater than 1×10^{-5} or a noncancer risk above a hazard risk (HI) of 1.0.

- The RAOs for Sweeper Cove and Kuluk Bay consist of the protection of subsistence fishers from ingestion of fish (rock sole) and shellfish (blue mussel) containing Aroclors 1260 and 1254, respectively, that could result in a cancer risk greater than 1×10^{-5} or a noncancer risk above a HI of 1.0.

- The RAOs for the remaining SWMUs and SAs consist of protection of human or ecological exposure to soil or groundwater. This exposure could result in a cancer risk greater than 1×10^{-5}, or a noncancer risk above a HI of 1.0 under a conservative residential risk exposure scenario for these commercial/industrial sites.

CERCLA Soil and Sediment Removal Sites – SWMU 17 and South Sweeper Creek

The RAOs at the SWMU 17 waste oil and retention ponds are to prevent uptake of and contact with impacted freshwater sediments by benthic infauna and impacted surface water by birds.

The RAO at South Sweeper Creek is to protect benthic infauna from contacting and ingesting sediments affected by COCs.

Petroleum Sites

Remedial action objectives for media impacted by petroleum releases are based on 18 AAC 75. The RAOs for petroleum sites are:

- Reduce petroleum concentrations in soil
- Reduce volume of petroleum free product
- Mitigate potential for downgradient migration
- Reduce potential for direct exposure

One or more of these RAOs is applicable to each of the 46 petroleum sites that required remedial action. A listing RAOs applicable to the sites that required remedial action is provided in Table 4-1.

4.1.2 OU A Remedy Selection

Remedy Selected for CERCLA Sites

To achieve RAOs, the remedial action components for CERCLA sites specified in the interim action ROD for SWMUs 11 and 13 and the OU A ROD (including the OU A water bodies and downtown groundwater) included the following:

- Placement of landfill covers

- Implementation of ICs to prohibit unacceptable exposure to residual hazardous substances left on site. Institutional controls include a combination of restrictions on land use, and groundwater use, soil excavations; deed restrictions; fishing advisories; and educational orientation. The ICs program requires annual visual inspections; sample collection and analysis; and periodic site reviews to ensure the protectiveness of the controls.

- Excavation and treatment by thermal desorption of contaminated sediments and use of treated sediments as daily cover material at the on-island Roberts Landfill

The specific remedial actions selected for each CERCLA site are listed in Table 4-2. Institutional controls were selected as the primary remedy or as a part of the remedy for most sites that required a remedy. Details of institutional control requirements for all OU A sites are shown in Table 4-3.

Remedy Selection for Petroleum Sites

To achieve RAOs, the remedial action components for petroleum sites specified in the OU A ROD included the following:

- Free-product recovery to the maximum extent practicable as an interim remedial measure, followed by an evaluation of remedial alternatives per the focused feasibility study to achieve final cleanup levels under 18 AAC 75 for soils and groundwater
- Monitored natural attenuation of petroleum chemicals in soil and groundwater
- Limited soil removal, including treatment of petroleum-contaminated soils to meet 18 AAC 75 requirements and use of the treated soil as daily cover material at the on-island Roberts Landfill
- Institutional controls to minimize the potential for direct contact, to restrict groundwater use, or to restrict excavation until remedial objectives have been met
- Limited groundwater monitoring at sites where hydrocarbon concentrations in soil exceed Alaska DEC soil cleanup levels (18 AAC 75.340), but where concentrations in groundwater do not exceed Alaska 18 AAC 75.345 Table C values

The remedy selection for each petroleum site is included in Table 4-4. The ICs are for all OU A sites where ICs are required are described in Table 4-3.

In the 2003 OU A ROD Amendment No. 1 (U.S. Navy, USEPA, and Alaska DEC 2003), there were two significant revisions to the OU A ROD (U.S. Navy, USEPA, and Alaska DEC 2000). The first was the replacement of subsistence fish advisory signs along Kuluk Bay and Sweeper Cove with fish advisory fact sheets provided to Adak residents. The fishing advisory signs were removed at the request of the property owner with the concurrence of the Navy and regulatory agencies. The Navy issued and distributed the Fact Sheet to Adak residents in October 2003. The second was the removal of 62 petroleum sites from the OU A ROD to streamline regulatory oversight of the petroleum cleanup and to expedite the partial delisting of the Downtown Area from the NPL. Of the 62 sites removed from the OU A ROD, 46 sites were further action sites and 16 were no further actions sites. Three sites do not have final remedies selected. These three sites are:

- South of Runway 18-36 Area
- SWMU 17, Power Plant 3
- SWMU 62, New Housing Fuel Leak

4.1.3 OU A Remedy Implementation

Remedy Components Required by the OU A ROD

Most of the physical remedy construction required by the ROD was completed at OU A by 2003 with the closure of Roberts Landfill. The OU A remedy construction will be complete after soil is removed in 2008 as planned from ASR-8 Facility, UST 42007-B and SA-77, Fuels Facility Refueling Dock, Small Drum Storage Area. The dates of the implementation of the selected remedial actions for each CERCLA site are included in Table 4-2.

As discussed in Section 3.1, additional action was required by the OU A ROD at 46 petroleum sites. The dates of the implementation of the selected remedial actions for each petroleum site are included in Table 4-4. Product recovery was required, as an interim remedial action, at 14 sites with limited soil removal, limited groundwater monitoring, or monitored natural attenuation specified for the remaining sites. Although the remedies have been implemented at most sites, operation, maintenance, and monitoring may be required, as described in Section 4.1.4.

During the 2001 to 2005 review period, data from 46 petroleum sites were evaluated to assess the effectiveness of the site-specific remedies and evaluate the current site status. The informal review concluded that 19 sites were candidates for NFA or NFRAP consideration. The rationale for the recommended status was provided in the *Cleanup Report, 19 Sites* (U.S. Navy 2005b). Under SAERA, Alaska DEC and EPA concurred with NFA status for the following sites:

- Girl Scout Camp (UST GS-1)
- Officer and Amulet Housing (UST 31047-A)
- Quarters A

Alaska DEC and EPA concurred with NFRAP status at the following sites (Alaska DEC 2005b):

- Amulet Housing, Well AMW-706 Area
- Amulet Housing, Well AMW-709 Area
- Boy Scout Camp, West Haven Lake (UST BS-1)
- Contractor's Camp Burn Pad
- Finger Bay Quonset Hut (UST FBQH-1)

- MAUW Compound (UST 24000-A)
- Mount Moffett Power Plant 5 (USTs 10574 through 10577)
- NAVFAC Compound (USTs 20052 and 20053)
- Navy Exchange Building (UST 30027-A)
- New Roberts Housing (UST HST-7C)
- Officer Hill and Amulet Housing (UST 31049-A)
- Officer Hill and Amulet Housing (UST 31052-A)
- ROICC Contractor's Area (UST ROICC-8)
- ROICC Warehouse (UST ROICC-2)
- ROICC Warehouse (UST ROICC-3)
- Yakutat Hangar (USTs T-2039-B and T-2039-C)

Post-OU A ROD Remedy Components Under SAERA

Of the 46 petroleum sites that required action under the OU A ROD, only the 14 free-product recovery sites required final remedy evaluation and selection under SAERA (U.S. Navy, USEPA, and Alaska DEC 2003). For these sites, the free-product recovery remedy component in the OU A ROD was an interim action. Evaluation of final remedial alternatives for 11 of these 14 sites was completed during this 5-year review period under a focused feasibility process, and remedies were selected (U.S. Navy and Alaska DEC 2005a, 2006). These 11 sites are the following:

- GCI Compound, UST GCI-1
- NORPAC Hill Seep Area
- SA 78, Old Transportation Building
- SA 80, Steam Plant 4, USTS 27089 and 27090
- SA 82, P-80/81 Buildings
- SA 88, P-70 Energy Generator (UST 10578)
- SWMU 58 and SA 73, Heating Plant 6
- Tanker Shed, UST 42494
- Yakutat Hangar
- NMCB Building Expanded Area

SWMU 58 and SA 73 are two sites combined into one action.

Selected remedies at these sites are either limited groundwater monitoring or monitored natural attenuation. In addition, free-product recovery was selected as a remedy component for Tanker Shed, UST 42494 and NMCB Building Expanded Area. Free-product recovery conducted as a final remedial action at the Tanker Shed site has met the practicable endpoint established for the shut down of product recovery as specified in the OU A ROD (Tetra Tech 2006). Alaska DEC approved the free-product recovery closure report for Tanker Shed in January 2006.

Final remedies at the remaining three sites (South of Runway 18-36 Area, SWMU 17, Power Plant No. 3, and SWMU 62, New Housing Fuel Leak) and NMCB Building Expanded Area will be executed in 2006.

As part of the remedial process, the Navy decided that additional sampling was necessary at SWMU 17. In 2005, sediment samples were collected in and near Yakutat Creek, which is a stream that runs along the downgradient portion of SWMU 17 and drains into South Sweeper Creek. Sediment samples were collected to allow evaluation of ecological risk using current data as part of the focused feasibility study for SWMU 17. The draft version of that study indicates that there is no unacceptable human health or ecological risk.

4.1.4 OU A Operation, Maintenance, and Monitoring

Since the first 5-year review in 2001 (U.S. Navy 2001b), the Navy has continued operation, maintenance, and monitoring of the OU A remedies. The Navy has operated, maintained, monitored, or inspected 50 OU A sites since 2001.

Table 4-5 summarizes the location-specific monitoring from 2001 to 2005 for the sites that required action under the OU A ROD and where monitoring has not yet been completed. As the table shows, monitoring has been discontinued or has started in various wells during that time, with the concurrence of Alaska DEC and EPA. The table also shows the analytes tested in samples from each location by year.

The Navy has performed free-product monitoring and free-product recovery at the 14 free-product recovery sites from 2001 through 2005. The activities performed at these 14 sites are summarized in Table 4-6 for this period. Free-product monitoring has occurred at all 14 sites. However, only limited monitoring was performed at GCI Compound, SA 80, SA 78, SA 82, SA 88, SWMU 58/SA 73, and Yakutat Hangar. At these sites, free-product monitoring was performed only infrequently in a small subset of wells at the site. More extensive monitoring was performed at Tanker Shed, NMCB, South of Runway, SWMU 62, and SWMU 17. Free-product recovery has been performed at 5 of the 14 free-product recovery sites from 2001 through 2005. Passive recovery was performed at Tanker Shed, NORPAC Hill, NMCB, and South of Runway. A combination of active and passive recovery was performed at SWMU 17.

The Navy maintains the ICMP to ensure the reliability and effectiveness of the ICs as required by the OU A ROD. This document is updated about every two years. When the property was transferred to TAC, land use restrictions and excavation prohibitions were included in the Interim Conveyance. The land use restrictions and excavation prohibitions “run with the land”

and are binding on all subsequent owners. Annual ICs inspections (and a summary report) are completed.

Navy has provided fact sheets on a regular basis to provide updated information on ICs. In addition, the Navy maintains a complete inventory of ordnance education and awareness training information (hiking maps, DVDs, brochures, and posters) on Adak Island. These materials are provided on request by Charles Lyon (City of Adak employee). Additional hiking maps and other educational materials are maintained at USFWS's seasonal office on Adak. These materials are provided with Special Use Permits for Adak Island which are issued by USFWS to guides who may be engaged in commercial recreational use of refuge and nonrefuge lands on Adak Island.

The results of the 2005 IC inspection interviews with on-island residents (Section 6.5.4) indicate that many people are not aware of the consumption advisory for Sweeper Cove and Kuluk Bay. Fact sheets concerning the fish consumption advisory and detailing sampling results from 1999 through 2003 were posted on AdakUpdate.com in October 2003 and July 2004, respectively. The Navy has published a fact sheet that explains the advisory and summarizes the results of the 2005 marine sampling results.

The vegetation on the landfill caps at Roberts and White Alice Landfills is not growing in places. Vegetation on the landfills is a requirement of the State-issued permits for both of these landfills. In July and August of 2005, the Navy reseeded approximately 6.5 acres of SWMU 25, Roberts Landfill. These restoration activities were conducted as part of ongoing measures to maintain the integrity and effectiveness of the final cover in compliance with the post-closure requirements (see also Section 6.5).

4.2 OU B-1

4.2.1 OU B-1 Remedial Action Objectives

The goal of the OU B-1 investigation and remediation activities on Adak Island was to take steps to effectively reduce and manage potential explosive hazards and risks posed by MEC, to protect human health and the environment for current and reasonably expected future land use. The RAOs were intended to support an unrestricted (i.e., residential) future land use that included the possibility of activity that could disturb subsurface MEC. Two RAOs were established: one addressed explosive safety issues, and the other addressed the chemical residues in soil resulting from past ordnance use.

The RAO pertaining to the explosive safety aspect of the ordnance is to reduce any remaining potential explosive safety hazards throughout OU B-1 through the application of the explosives safety hazard assessment (ESHA) process and subsequent clearance of MEC, as necessary, to support current and reasonably expected future land use. Cleanup levels are typically numeric expressions of RAOs. However, for explosive hazards associated with the OU B-1 sites, the cleanup level goal entails removing all known MEC items to a depth of 4 feet bgs that is located in reasonably accessible areas, using an ordnance detection system that meets performance criteria established for Adak.

The RAO for potential ordnance-related chemical risks is to prevent future residents and recreational users from being exposed to explosives-related contamination in soils above the cleanup levels. The cleanup levels established in the ROD are the EPA Region 9 preliminary remediation goals (PRGs) for residential soil. This chemical-risk RAO is applicable at the seven locations identified in the ROD as having potential chemical risks and at the additional locations where subsequent field investigations indicated the potential for chemical residues.

4.2.2 OU B-1 Remedy Selection

Some action was required at 47 sites by the OU B-1 ROD to meet the RAOs. (The OU B-1 ROD did not include remedies for MM-10F, MM-10G, and MM-10H, because these sites were not identified until 2004.) The actions required by the OU B-1 ROD fall into two categories:

- Three sites were to be cleared of ordnance and explosives MEC to a depth of 4 feet bgs (C3-01A, C6-01A, and ML-01A).

- Forty-four sites were to be investigated to identify locations of MEC contamination and, if necessary, remove potential MEC anomalies to a depth of 4 feet below ground surface. Nine locations were selected in the OU B-1 ROD for Alternative 4, soil samples collected and analyzed for munitions constituents.

The number of sites listed in the bullets above does not equal 47, because more than one action was selected for some of the sites. In addition to the actions listed above, maintenance of the facility-wide ordnance awareness program is also applicable to the 47 sites.

As indicated above, during 2004, three new sites were identified within or immediately adjacent to the boundaries of MM-10E. These three sites are MM-10F, MM-10G, and MM-10H. Based on the addition of these three sites, the total number of OU B-1 sites requiring actions is 50. Because these three sites are within or immediately adjacent to the boundaries of MM-10E, remedial actions specified in the OU B-1 ROD for MM-10E are applicable to MM-10F, MM-10G, and MM-10H.

For the remaining OU B-1 sites, the selected remedy was No Further Action (abbreviated as "NOFA" in the OU B-1 ROD) with maintenance of a facility-wide ordnance awareness program. The NOFA selection for these sites was considered protective of human health and the environment based, on the evaluation processes developed and implemented during the preliminary assessment and site investigation process that resulted in determinations of little or no MEC hazards, or the results of RI and ESHA evaluations that resulted in similar determinations. The process of intrusive investigation and clearance of MEC during field activities associated with one of these steps resulted in the effective clearance of MEC at the site, thereby supporting the NOFA selection.

4.2.3 OU B-1 Remedy Implementation

Remedial action selection and implementation at OU B-1 is summarized by site in Table 4-7. The selected remedies have been completed at 30 of the 50 action sites during the 2001 and 2002 field seasons (Navy 2002b and 2003h). Alaska DEC and EPA have not yet concurred with the remedial actions documented in the 2004 after action report (U.S. Navy 2005j), and therefore the remedy cannot be considered complete at the sites addressed during the 2004 field season. Sites addressed during the 2004 field season include sites within and outside of Parcel 4. OU B-1 sites within the boundaries of Parcel 4 are no longer planned for transfer by the Navy to TAC or USFWS, and remedial requirements for OU B-1 sites within the boundaries of Parcel 4, where remedial actions have not yet been completed, are under review by the Navy, EPA, and Alaska DEC. The Navy has recommended no further actions for the OU B-1 sites outside of Parcel 4 addressed during the 2004 field season, and these recommendations are under review by Alaska DEC and EPA. Alaska DEC and EPA have agreed that site C1-02 does not require further action (due to remoteness/impracticability). However, the documented OU B-1 ROD remedy for this site is not complete. In the interim, the engineering controls (including access barriers, signs, and fences) that are in place for OU B-2 sites are also being used to limit access to the OU B-1 sites located in Parcel 4 that have not been cleared to 4 feet bgs.

4.2.4 OU B-1 Operation, Maintenance, and Monitoring

The Navy maintains the ICMP to ensure the reliability and effectiveness of the ICs as required by the OU B-1 ROD. This document is updated about every two years (or more frequently, if necessary). When the property was transferred to TAC, land use restrictions and excavation prohibitions were included in the Interim Conveyance. The land use restrictions and excavation prohibitions "run with the land" and are binding on all subsequent owners. Annual ICs inspections (and a summary report) are completed.

Navy has provided fact sheets on a regular basis to provide updated information on ICs. In addition, the Navy maintains a complete inventory of ordnance education and awareness training information (hiking maps, DVDs, brochures, and posters) on Adak Island. These materials are provided on request by Charles Lyon (City of Adak employee). Additional hiking maps and other educational materials are maintained at USFWS's seasonal office on Adak. These materials are provided with Special Use Permits for Adak Island which are issued by USFWS to guides who may be engaged in commercial recreational use of refuge and nonrefuge lands on Adak Island.

Table 4-1
Remedial Action Objectives for the Petroleum Sites

Site Name	Remedial Action Objective			
	Reduce Petroleum Concentrations in Soil	**Reduce Volume of Petroleum Free Product**	**Mitigate Potential for Downgradient Migration**	**Reduce Potential for Direct Exposure**
Amulet Housing, Well AMW-706 Area	X			
Amulet Housing, Well AMW-709 Area			X	
Antenna Field (USTs ANT-1, ANT-2, ANT-3, and ANT-4)	X			
ASR-8 Facility (UST 42007-B)			X	
Boy Scout Camp, West Haven Lake (UST BS-1)	X			
Contractor’s Camp Burn Pad	X			
Finger Bay Quonset Hut (UST FBQH-1)	X			
Former Power Plant Building (T-1451)	X			X
GCI Compound (UST GCI-1)		X		
Girl Scout Camp (UST GS-1)	X			
Housing Area (Arctic Acres)	X			
MAUW Compound (UST 24000-A)	X			
Mount Moffett Power Plant 5 (USTs 10574 through 10577)	X			
NAVFAC Compound (USTs 20052 and 20053)	X			
Navy Exchange Building (UST 30027-A)	X			
New Roberts Housing (UST HST-7C)	X		X	
NMCB Building Area, T-1416 Expanded Area		X		
NMCB Building (UST T-1416-A)	X			
NORPAC Hill Seep Area		X		
Officer Hill and Amulet Housing (UST 31047-A)	X			
Officer Hill and Amulet Housing (UST 31049-A)			X	
Officer Hill and Amulet Housing (UST 31052-A)	X			
Quarters A	X			
ROICC Contractor's Area (UST ROICC-7)	X			
ROICC Contractor's Area (UST ROICC-8)	X			
ROICC Warehouse (UST ROICC-2)	X			

Table 4-1 (Continued)
Remedial Action Objectives for the Petroleum Sites

Site Name	Remedial Action Objective			
	Reduce Petroleum Concentrations in Soil	Reduce Volume of Petroleum Free Product	Mitigate Potential for Downgradient Migration	Reduce Potential for Direct Exposure
ROICC Warehouse (UST ROICC-3)	X			
Runway 5-23 Avgas Valve Pit	X			
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area	X			
SA 78, Old Transportation Building		X		
SA 79, Main Road Pipeline, North End (MRP-MW15) and South End	X			
SA 80, Steam Plant 4		X		
SA 82, P-80/P-81 Buildings		X		
SA 88, P-70 Energy Generator		X		
South of Runway 18-36 Area		X		
SWMU 14, Old Pesticide Disposal Area	X			
SWMU 15, Future Jobs/DRMO			X	
SWMU 17, Power Plant 3 Area		X		
SWMU 58 and SA 73, Heating Plant 6		X		
SWMU 60, Tank Farm A	X			
SWMU 61, Tank Farm B			X	
SWMU 62, New Housing Fuel Leak		X	X	
Tanker Shed (UST 42494)		X		
Yakutat Hangar (UST T-2039-A)		X		
Yakutat Hangar (USTs T-2039-B and T-2039-C)	X			

Table 4-2
Selected Remedy and Implementation for CERCLA Sites

Site Name	Selected Remedy	Remedy Implementation
SWMU 2, Causeway Landfill and Minefield	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began in 1999.
SWMU 4, South Davis Road Landfill	Install 4-foot-thick landfill cover. Implement institutional controls (see Table 4-3).	Cover was completed in 1998. The implementation of institutional controls began following execution of the ROD in April 2000.
SMWU 10, Old Baler Building	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began in 1999.
SWMU 11, Palisades Landfill	Install landfill cover consisting of a surficial jute mat and seed layer underlain by a 2-foot-thick layer of compacted soil, underlain by a 6-inch leveling soil layer. Implement institutional controls (see Table 4-3).	The landfill was recontoured and capped in 1996. The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 13, Metals Landfill	Installed landfill cover consisting of a surficial jute mat and seed layer underlain by a 2-foot-thick layer of compacted soil, underlain by a 6-inch leveling soil layer. Implement institutional controls (see Table 4-3).	The landfill was recontoured and capped in 1996. The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 14, Old Pesticide Storage and Disposal Area	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 15, Future Jobs/DRMO	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 16, Former Firefighting Training Area	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 17, Power Plant 3 Area	Drain surface water from retention pond; remove affected sediments from retention pond and waste oil pond; replace dredged material with clean substrate; restore the waste oil pond area to its native habitats. Implement institutional controls (see Table 4-3).	In 1999, oil/water separators O/W 1 and O/W 2 were removed and their inflows were rerouted directly to the sanitary sewer system for treatment. In 1999, contaminated soil from the waste oil pond and water retention pond was removed and treated by thermal desorption on-island. Following thermal desorption, the material was used as daily cover at Roberts Landfill. The implementation of institutional controls began following execution of the ROD in

Table 4-2 (Continued)
Selected Remedy and Implementation for CERCLA Sites

Site Name	Selected Remedy	Remedy Implementation
		April 2000.
SWMUs 18 and 19, White Alice Landfill (South Sector Drum Disposal Area/ Quarry Metal Disposal Area)[a]	Install 2-foot-thick soil cover. Close landfill pursuant to the State of Alaska Solid Waste Management Regulations Title 18 Alaska Administrative Code Chapter 60 for landfill closures. Implement institutional controls (see Table 4-3).	Landfill was capped in 1997. The implementation of institutional controls began in 1996.
SWMU 20, White Alice/Trout Creek Disposal Area	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 21A, White Alice Upper Quarry	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 23, Heart Lake Drum Disposal Area	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 24, Hazardous Waste Container Storage Facility (HWSF)[b]	Close site under RCRA. Implement institutional controls as part of the RCRA closure and the sites location in the downtown area (see Table 4-3), restricting land use to commercial/industrial and requiring excavation notification prior to a non-emergency intrusive activity being conducted.	The site was closed under RCRA in 1995. Institutional controls began after site closure in 1995.
SWMU 25, Roberts Landfill	Install 3-foot-thick soil cover. Close landfill pursuant to the State of Alaska Solid Waste Management Regulations Title 18 Alaska Administrative Code Chapter 60 for landfill closures. Implement institutional controls (see Table 4-3.	Landfill was capped and closed in 2000. Portions of the landfill were reopened for disposal of demolition debris in 2001 (U.S. Navy 2002a) and in 2002 for the demolition and disposal of 52 cabins (U.S. Navy 2003e) and closed again in 2002. Institutional controls, engineering controls, and annual monitoring have been ongoing since 1996.
SWMU 29, Finger Bay Landfill	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 52, Former Loran Station (including SWMUs 53 and 59)	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.

Table 4-2 (Continued)
Selected Remedy and Implementation for CERCLA Sites

Site Name	Selected Remedy	Remedy Implementation
SWMU 55, Public Works Transportation Department Waste Storage Area	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SWMU 67, White Alice PCB Spill Site	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SA 76, Old Line Shed Building	Implement institutional controls (see Table 4-3).	The implementation of institutional controls began following execution of the ROD in April 2000.
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area[b]	Close site under RCRA. Implement institutional controls as part of the RCRA closure and the sites location in the downtown area (see Table 4-3), restricting land use to commercial/industrial and requiring excavation notification prior to a non-emergency intrusive activity being conducted.	The site was closed under RCRA in 1995. Institutional controls began after site closure in 1995.
South Sweeper Creek	Removal of sediment; replace with clean fill.	Sediment was removed and treated in 1999. No institutional controls or long-term monitoring are required, because remedial actions for South Sweeper Creek have met the remedial goals. All ROD-required actions are complete (U.S. Navy 2004g).
Sweeper Cove	Implement institutional controls (see Table 4-3).	Annual monitoring began in 1999 and continued through 2003. Since 2003, monitoring has been conducted on an every other year bases. The remainder of the institutional controls was implemented following execution of the ROD in April 2000.
Kuluk Bay	Implement institutional controls (see Table 4-3).	Annual monitoring began in 1999 and continued through 2003. Since 2003, monitoring has been conducted on an every other year bases. The remainder of the institutional controls was implemented following execution of the ROD in April 2000.

Table 4-2 (Continued)
Selected Remedy and Implementation for CERCLA Sites

[a]SWMUs 18 and 19 combined into one site.
[b]Although RCRA closure at SWMU 24 and SA 77 is complete and these sites are therefore considered RCRA NFA sites (see Figure 2-1), institutional controls restricting land use to commercial/industrial reuse remain in place.

Notes:
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
RCRA - Resource Conservation and Recovery Act
ROD - Record of Decision
SA - source area
SWMU - solid waste management unit

Table 4-3
Institutional Controls, Engineering Controls, and Operations and Maintenance for OU A Sites

	Institutional Controls					Engineering Controls		Operations and Maintenance					
Site Name	**Land Use Restrictions[a]**	**Equitable Servitude[b]**	**Groundwater Restrictions[c]**	**Soil Excavation Restrictions[d]**	**Fishing Advisory[e]**	**Comprehensive Monitoring[j]**	**Signage**	**Education[g,f]**	**Site/Remedy Condition Inspections and Reporting[e,g]**	**Sign Inspection[h]**	**Soil Cover Inspections[i]**	**Free-Product Monitoring and Recovery[p]**	**Visual Inspection[q]**
CERCLA Sites													
Kuluk Bay					X	X		X	X				
SA 76, Old Line Shed Building	X	X	X	X		X			X				
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area[r]	X	X	X	X					X				
Sweeper Cove					X	X		X	X				
SWMU 2, Causeway Landfill**	X	X		X			X		X	X	X		
SWMU 4, South Davis Road Landfill**	X	X		X			X		X	X	X		
SWMU 10, Old Baler Building	X	X	X	X					X				
SWMU 11, Palisades Landfill**	X	X		X		X	X		X	X	X		
SWMU 13, Metals Landfill**	X	X	X	X		X	X		X	X	X		
SWMU 14, Old Pesticide Disposal Area*	X	X	X	X		X			X				
SWMU 15, Future Jobs/DRMO*	X	X	X	X		X			X				
SWMU 16, Former Firefighting Training Area	X	X	X	X					X				
SWMU 17, Power Plant 3 Area*	X	X	X	X		X			X				
SWMU 18, South Sector Drum Disposal Area (White Alice Landfill) and SWMU 19, Quarry Metal Disposal Area (White Alice Landfill)**	X	X		X		X	X		X	X	X		
SWMU 20, White Alice/Trout Creek Disposal Area	X	X		X					X				
SWMU 21A, White Alice Upper Quarry	X	X		X					X				

Table 4-3 (Continued)
Institutional Controls, Engineering Controls, and
Operations and Maintenance for OU A Sites

	Institutional Controls					Engineering Controls		Operations and Maintenance					
Site Name	**Land Use Restrictions[a]**	**Equitable Servitude[b]**	**Groundwater Restrictions[c]**	**Soil Excavation Restrictions[d]**	**Fishing Advisory[e]**	**Comprehensive Monitoring[j]**	**Signage**	**Education[g,f]**	**Site/Remedy Condition Inspections and Reporting[e,g]**	**Sign Inspection[h]**	**Soil Cover Inspections[i]**	**Free-Product Monitoring and Recovery[p]**	**Visual Inspection[q]**
SWMU 23, Heart Lake Drum Disposal Area	X	X		X					X				
SWMU 24, Hazardous Waste Storage Facility[r]	X	X	X	X					X				
SWMU 25, Roberts Landfill	X	X	X	X		X	X		X	X	X		
SWMU 29, Finger Bay Landfill**	X	X		X			X		X	X	X		
SWMUs 52, 53, 59, Former Loran Station	X	X		X					X				
SWMU 55, Public Works Transportation Department Waste Storage Area	X	X	X	X		X			X				
SWMU 67, White Alice PCB Spill Site	X	X		X			X		X	X	X		
Petroleum Sites													
Amulet Housing, Well AMW-706 Area	X	X	X	X		X			X				
Amulet Housing, Well AMW-709 Area	X	X	X	X		X			X				
Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4	X	X	X	X		X			X				
Finger Bay Quonset Hut, UST FBQH-1						X							
Former Power Plant, Building T-1451	X	X	X	X		X			X				
GCI Compound, UST GCI-1[m]	X	X	X	X		X			X			X	
Housing Area (Arctic Acres)	X	X	X	X		X			X				

Table 4-3 (Continued)
Institutional Controls, Engineering Controls, and Operations and Maintenance for OU A Sites

	Institutional Controls					Engineering Controls		Operations and Maintenance					
Site Name	**Land Use Restrictions[a]**	**Equitable Servitude[b]**	**Groundwater Restrictions[c]**	**Soil Excavation Restrictions[d]**	**Fishing Advisory[e]**	**Comprehensive Monitoring[j]**	**Signage**	**Education[g,f]**	**Site/Remedy Condition Inspections and Reporting[e,g]**	**Sign Inspection[h]**	**Soil Cover Inspections[i]**	**Free-Product Monitoring and Recovery[p]**	**Visual Inspection[q]**
MAUW Compound, UST 24000-A						X							
New Roberts Housing						X							
NMCB Building Area, T-1416 Expanded Area[k,o]	X	X	X	X					X			X	
NORPAC Hill Seep Area[k]	X	X	X	X		X			X			X	X
Officer Hill and Amulet Housing, UST 31052-A						X							
ROICC Contractor's Area (UST ROICC 7)						X							
ROICC Contractor's Area (UST ROICC 8)	X	X	X	X		X			X				
Runway 5-23 Avgas Valve Pit	X	X	X	X		X			X				
SA 73/SWMU 58, Heating Plant 6[m]	X	X	X	X		X			X			X	
SA 78, Old Transportation Building USTs[m]	X	X	X	X		X			X			X	
SA 79, Main Road Pipeline						X							X
SA 80, Steam Plant 4, USTs 27089 and 27090[m]	X	X	X	X		X			X			X	
SA 82, P-80/P-81 Buildings[m]	X	X	X	X		X			X			X	
SA 88, P-70 Energy Generator, UST 10578[m]	X	X	X	X		X			X			X	
South of Runway 18-36 Area[k,o]	X	X	X	X		X			X			X	X
SWMU 14, Old Pesticide Disposal Area*	X	X	X	X		X			X				
SWMU 15, Future Jobs/DRMO*	X	X	X	X		X			X				

Table 4-3 (Continued)
Institutional Controls, Engineering Controls, and Operations and Maintenance for OU A Sites

	Institutional Controls					Engineering Controls		Operations and Maintenance					
Site Name	**Land Use Restrictions[a]**	**Equitable Servitude[b]**	**Groundwater Restrictions[c]**	**Soil Excavation Restrictions[d]**	**Fishing Advisory[e]**	**Comprehensive Monitoring[j]**	**Signage**	**Education[g,f]**	**Site/Remedy Condition Inspections and Reporting[e,g]**	**Sign Inspection[h]**	**Soil Cover Inspections[i]**	**Free-Product Monitoring and Recovery[p]**	**Visual Inspection[q]**
SWMU 17, Power Plant 3 Area*[n]	X	X	X	X		X			X			X	
SWMU 60, Tank Farm A	X	X	X	X		X			X				X
SWMU 61, Tank Farm B	X	X	X	X		X			X				X
SWMU 62, New Housing Fuel Leak[n,o]	X	X	X	X		X			X			X	
Tanker Shed, UST 42494[l]	X	X	X	X		X			X			X	
Yakutat Hangar, UST T-2039-A[k]	X	X	X	X		X			X			X	
Downtown Exchange Area Groundwater*	X	X	X	X		X		X	X				

[a]Land Use Restrictions are required to ensure that the land will never be used in a way inconsistent with the land use assumptions set forth in the Adak Island RODs.
[b]Land use restrictions/prohibitions have been included in the Interim Conveyance.
[c]The Downtown groundwater is restricted from domestic use.
[d]Excavation notification is required at all sites. Excavation is prohibited at the landfills and sites with a soil cover.
[e]Fishing advisory to recommend limiting subsistence consumption of bottom fish and mussels; fact sheets on the advisory available to City of Adak residents.
[f]Education Program (required for shellfish/fishery advisory and for ordnance hazards).
[g]Inspection and reporting of institutional controls annually, or as necessary as appropriate. Assess the need to take additional action or to reduce controls, as appropriate. A review of these sites will be reported every five years. The Downtown Exchange Area Groundwater will be inspected by driving existing roads for evidence of domestic wells in use.
[h]Place and annually inspect signage for ordnance (at Parcel 4) and landfill hazards.
[i]Annually inspect soil covers to ensure they remain intact.
[j]Comprehensive monitoring is conducted annually. Details of the comprehensive monitoring program provided in Table 4-5.
[k]Site has met endpoint criteria for interim free-product recovery and received Alaska DEC concurrence via approval of the final closure report (Tetra Tech 2006).

Table 4-3 (Continued)
Institutional Controls, Engineering Controls, and Operations and Maintenance for OU A Sites

[l]Site has met endpoint criteria for final free-product recovery and received Alaska DEC concurrence via approval of the final closure report (Tetra Tech 2006).
[m]Site has met endpoint criteria for interim free-product recovery. Alaska DEC concurred via approval of the final decision document for the site (U.S. Navy and Alaska DEC 2005).
[n]Site has met endpoint criteria for interim free-product recovery. Final closure for interim free-product recovery has not yet been approved by Alaska DEC.
[o]Free-product recovery is part of the proposed final remedy for South of Runway, SWMU 62, and the NMCB Building Expanded Area
[p]Details of the free-product monitoring and recovery activities provided on Table 4-6.
[q]Visual inspection of adjacent shoreline and surface water for petroleum seeps and sheens.
[r]Although this site is a RCRA NFA site, institutional controls remain in place to restrict land use to commercial/ industrial in accordance with the RCRA closure report. The remaining institutional controls are applicable due to the location of these sites in the downtown area.

Notes:
*CERCLA and petroleum institutional controls apply
**CERCLA landfill closures
avgas - aviation gasoline
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
DRMO - Defense Reutilization Marketing Office
GCI - General Communication Inc.
PCB - polychlorinated biphenyl
ROICC - resident officer in charge of construction
SA - source area
SWMU - solid waste management unit
UST - underground storage tank

Table 4-4
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
Amulet Housing, Well AMW-706 Area	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and was completed in 2002. ICs were implemented in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Amulet Housing, Well AMW-709 Area	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and was completed in 2002. ICs were implemented in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Antenna Field (USTs ANT-1, ANT-2, ANT-3, and ANT-4)	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
ASR-8 Facility (UST 42007-B)	Limited Soil Removal	Soil removal planned for 2008.
Boy Scout Camp, West Haven Lake (UST BS-1)	Limited Groundwater Monitoring Remedy	Soil was removed in 1999. Limited groundwater monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Contractor's Camp Burn Pad	Limited Soil Removal	Soil was removed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Downtown Exchange Area[a]	ICs	ICs were implemented in 2000 and have been maintained since that time.
Finger Bay Quonset Hut (UST FBQH-1)	Limited Soil Removal was followed by the Limited Groundwater Monitoring Remedy	Soil was removed in 1999. Monitoring began in 1999 and was completed in 2002. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
Former Power Plant Building (T-1451)	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
GCI Compound (UST GCI-1)	Interim Remedy is Free-Product Recovery/ICs Final Remedy is MNA/ICs	Interim free-product recovery conducted in 1997. ICs were implemented in 2000. MNA began in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a)
Girl Scout Camp (UST GS-1)	Limited Soil Removal	Soil was removed in 1999. Alaska DEC approved site closure (NFA) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Housing Area (Arctic Acres)	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
MAUW Compound (UST 24000-A)	Limited Groundwater Monitoring Remedy	Monitoring began in 1999 and was completed in 2001. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Mount Moffett Power Plant 5 (USTs 10574 through 10577)	Limited Soil Removal	Soil was removed in 1999. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
NAVFAC Compound (USTs 20052 and 20053)	Limited Groundwater Monitoring Remedy	Limited groundwater monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Navy Exchange Building (UST 30027-A)	Limited Soil Removal was followed by the Limited Groundwater Monitoring	Soil was removed in 1999. Monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
New Roberts Housing (UST HST-7C)	Limited Groundwater Monitoring	Monitoring began in 1999 and was completed in 2001. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
NMCB Building Area, T-1416 Expanded Area	Interim Remedy is Free-Product Recovery/ICs Final Remedy is Free-Product Recovery/MNA/ICs	Free-product recovery from 1997-2005. ICs were implemented in 2000. Final remedy implementation to occur in 2006.
NMCB Building (UST T-1416-A)	Combined with NMCB Building Area, T-1416 Expanded Area	Not applicable
NORPAC Hill Seep Area	Interim Remedy is Free-Product Recovery/ICs Final Remedy Is Limited Groundwater Monitoring/ICs	Interim free-product recovery from 1998-2001. ICs were implemented in 2000. Limited groundwater monitoring began in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a).
Officer Hill and Amulet Housing (UST 31047-A)	Limited Soil Removal	Soil was removed in 1999. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Officer Hill and Amulet Housing (UST 31049-A)	Limited Soil Removal	Soil was removed in 1999. Alaska DEC approved site closure (NFA) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Officer Hill and Amulet Housing (UST 31052-A)	Limited Soil Removal was followed by Limited Groundwater Monitoring	Soil was removed in 1999. Monitoring began in 2001 and was completed in 2002. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Quarters A	Limited Soil Removal	Soil was removed in 1999. Alaska DEC approved site closure (NFA) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
ROICC Contractor's Area (UST ROICC-7)	Limited Groundwater Monitoring	Monitoring began in 1999 and is ongoing. Limited groundwater monitoring did not achieve endpoints. As a result, the site was reverted to a monitored natural attenuation remedy.
ROICC Contractor's Area (UST ROICC-8)	Monitored Natural Attenuation Groundwater/ICs	Monitoring began in 1999 and was completed in 2002. ICs were implemented in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
ROICC Warehouse (UST ROICC-2)	Limited Groundwater Monitoring	Monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
ROICC Warehouse (UST ROICC-3)	Limited Groundwater Monitoring	Monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).
Runway 5-23 Avgas Valve Pit	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area	Limited Soil Removal/ICs	Soil removal planned for 2006.
SA 78, Old Transportation Building	Interim Remedy is Free-Product Recovery/ICs Final remedy is MNA/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. MNA will begin in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a)
SA 79, Main Road Pipeline, North End (MRP-MW15) and South End	Limited Groundwater Monitoring	Monitoring began in 1999 and is ongoing. Limited groundwater monitoring did not achieve endpoints. As a result the site was reverted to a monitored natural attenuation remedy.

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
SA 80, Steam Plant 4	Interim Remedy is Free-Product Recovery/ICs Final remedy is MNA/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. MNA will begin in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a)
SA 82, P-80/P-81 Buildings	Interim Remedy is Free-Product Recovery/ICs Final remedy is Limited Groundwater Monitoring/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. Limited groundwater monitoring will being in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a)
SA 88, P-70 Energy Generator	Interim Remedy is Free-Product Recovery/ICs Final remedy is Limited Groundwater Monitoring/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. Limited groundwater monitoring will begin in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a)
South of Runway 18-36 Area	Interim Remedy is Free-Product Recovery/ICs Anticipated Final remedy is Free-Product Recovery and Containment/MNA/Natural Recovery for surface water and sediment/ICs	Free-product recovery from 1997-2005. ICs were implemented in 2000. Decision document for the final remedy for this site anticipated in 2006. Implementation of final remedy to begin in 2006.
SWMU 14, Old Pesticide Disposal Area	Monitored Natural Attenuation Groundwater/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
SWMU 15, Future Jobs/DRMO	Monitored Natural Attenuation Groundwater/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
SWMU 17, Power Plant 3 Area	Interim Remedy is Free-Product Recovery/ICs Final remedy under SAERA	Free-product recovery from 1996-2002. ICs were implemented in 2000. Decision document for the final remedy for this site anticipated in 2006. Implementation of final remedy to begin in 2006.
SWMU 58 and SA 73, Heating Plant 6[b]	Interim Remedy is Free-Product Recovery/ICs Final remedy is MNA/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. MNA began in 2005, as final remedy (U.S. Navy and Alaska 2005a).
SWMU 60, Tank Farm A	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

Site Name	Selected Remedy	Remedy Implementation
SWMU 61, Tank Farm B	Monitored Natural Attenuation Groundwater Remedy/ICs	Monitoring began in 1999 and is ongoing. ICs were implemented in 2000.
SWMU 62, New Housing Fuel Leak	Interim Remedy is Free-Product Recovery/ICs Anticipated Final remedy is Free-Product Recovery and Containment/Surface Soil Excavation/MNA/ICs	Interim free-product recovery (dual pump and total fluids) 1989-2000. ICs were implemented in 2000. Decision document for the final remedy for this site anticipated in 2006. Implementation of final remedy to begin in 2006.
Tanker Shed (UST 42494)	Interim Remedy is Free-Product Recovery/ICs Final remedy is Free-Product Recovery/MNA/ICs	Interim and final free-product recovery from 1997-2005. ICs were implemented in 2000. MNA began in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a).
Yakutat Hangar (UST T-2039-A)	Interim Remedy is Free-Product Recovery/ICs Final remedy is Limited Groundwater Monitoring/ICs	Interim free-product recovery from 1997-2000. ICs were implemented in 2000. LM began in 2005, as final remedy (U.S. Navy and Alaska DEC 2005a).
Yakutat Hangar (USTs T-2039-B and T-2039-C)	Limited Soil Removal was followed by Limited Groundwater Monitoring	Soil was removed in 1999. Monitoring began in 1999 and was completed in 2000. Alaska DEC listed as NFRAP (Conditional Closure) on November 23, 2005, based on 2005 Final Cleanup, 19 Sites Report (Alaska DEC 2005b).

[a]Downtown exchange area is listed as a separate site on this table, but is not included in site counts.
[b]SWMU 58 and SA 73 are combined into one site on this table.

Notes:
AST - aboveground storage tank
avgas - aviation gasoline
DEC - Department of Environmental Conservation
DRMO - Defense Reutilization Marketing Office
GCI - General Communications, Inc.
ICs - institutional controls
LM - limited monitoring
Loran - long-range navigation
MAUW - modified advanced underwater weapons
MNA - monitoring natural attenuation
NAVFAC - Naval Facility

Table 4-4 (Continued)
Selected Remedial Actions and Implementation for Petroleum Sites

NFA - no further action
NFRAP - no further remedial action planned, defined by Alaska DEC as conditional closure for sites that have met the remedial action objective of protection of human health and the environment, but have not yet met final closure standards.
NMCB - Naval Mobile Construction Battalion
NORPAC - North Pacific
PCB - polychlorinated biphenyl
ROICC - resident officer in charge of construction
SA - source area
SWMU - solid waste management unit
TBD - to be determined
UST - underground storage tank

Table 4-5
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
Amulet Housing, Well AMW-706							
AMW-706	MNA[a]	GW	Total and dissolved lead	GRO, BTEX, DRO, RRO, NAPs, total and dissolved lead	Met endpoint criteria; monitoring discontinued	NA	NA
Amulet Housing, Well AMW-709							
AMW-709	MNA[a]	GW	Total and dissolved lead	GRO, BTEX, DRO, RRO, NAPs, total and dissolved lead	Met endpoint criteria; monitoring discontinued	NA	NA
Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4							
ANT-601	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, and NAPs	DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO
Finger Bay Quonset Hut, UST FBQH-1							
FB-101	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
FB-206	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, total and dissolved lead, and NAPs	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
Former Power Plant Building T-1451							
01-118	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, NAPs, and total and dissolved lead	DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO and RRO
01-150	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
Former Power Plant Building T-1451 (Continued)							
01-151	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO
E-701	NAP Background	GW	Sampling not planned	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	NAPs
GCI Compound, UST GCI-1							
03-895	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	Discontinued monitoring this background well	NA	NA	NA
04-100	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
04-202	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	GRO and BTEX
04-210	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	GRO and BTEX
04-701	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX
Housing Area (Arctic Acres)							
03-416	MNA[b]	GW	Not sampled	Sampling not planned	DRO, RRO, and NAPs	DRO, RRO, and NAPs	Sample for DRO every other year with next sample in 2006
03-420	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO, RRO, and NAPs	DRO
03-421	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, RRO, and NAPs	Sampling not planned	Sampling not planned	DRO

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
Housing Area (Arctic Acres) (Continued)							
03-422	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
03-890	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, RRO, and NAPs	Discontinue due to potential product	NA	DRO
AA-01	MNA[b]	GW	Sampling not planned	DRO, DRO fractions, RRO, and NAPs	DRO, RRO, and NAPs	DRO, RRO, and NAPs	Sample for DRO every other year with next sample in 2006
AA-02	MNA[a]	GW	Sampling not planned	DRO, DRO fractions, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
AA-05	MNA[a]	GW	Sampling not planned	DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
AA-06	MNA[a]	GW	Sampling not planned	DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
MAUW Compound, UST24000-A							
07-103	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA	NA
07-140	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA	NA
Kuluk Bay							
Each	BM - LTM	MT	≈ 90 PCB congeners	≈ 90 PCB congeners	209 PCB congeners	Sampling not planned	209 PCB Congeners
Each	RS - LTM	MT	≈ 90 PCB congeners	≈ 90 PCB congeners	209 PCB congeners	Sampling not planned	209 PCB Congeners

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
New Roberts Housing							
06-101	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	Met endpoint criteria; monitoring discontinued	NA	NA	NA
06-300	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	Met endpoint criteria; monitoring discontinued	NA	NA	NA
06-302	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	Met endpoint criteria; monitoring discontinued	NA	NA	NA
06-301	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	Met endpoint criteria; monitoring discontinued	NA	NA	NA
NORPAC Hill Seep Area							
04-145	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-403	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-405	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
NS-2	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-146	SWP	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-147	SWP	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
Officer Hill & Amulet Housing, UST 31052-A							
05-372	LM[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring	NA	NA
ROICC Contractor's Area, UST ROICC-7							
08-175	MNA[b]	GW	Sampling not planned	Sampling not planned	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	Sample for BTEX every other year with next sample in 2006

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
ROICC Contractor's Area, UST ROICC-7 (Continued)							
08-200	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, VOCs, and NAPs	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, and NAPs	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX
08-201	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, VOCs, and NAPs	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria except methylene chloride	NA	NA
08-202	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, VOCs, and NAPs	GRO, GRO fractions, BTEX, DRO, DRO fractions, RRO, and NAPs	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX
ROICC Contractor's Area, UST ROICC-8							
08-153	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
08-160	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
Runway 5-23 Avgas Valve Pit							
14-100	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, GRO fractions, BTEX, and NAPs	GRO, GRO fractions, BTEX, and NAPs	GRO annually and sample for BTEX every other year with next sample in 2006
14-110	MNA[b]	GW	Sampling not planned	Sampling not planned	GRO, GRO fractions, BTEX, and NAPs	GRO, GRO fractions, BTEX, and NAPs	GRO and BTEX

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SA 76, Old Line Shed Building							
76-147	Compliance[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, VOCs, total and dissolved lead, and NAPs	GRO, GRO fractions, BTEX, DRO fractions, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
76-148	Compliance[a]	GW	total and dissolved lead	total and dissolved lead	Met endpoint criteria; monitoring discontinued	NA	NA
SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs							
12-145	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-152	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
MW-116	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
MW-117	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-801	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX
12-802	SWP, NAP Background	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs
SA 79, Main Road Pipeline, North End and South End							
02-230	SWP/MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	DRO and NAPs	DRO, visual inspections
MRP-MW8	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	DRO and NAPs	DRO, visual inspections
MRP-MW15	Compliance	GW	Sampling not planned	Sampling not planned	Total and dissolved lead	Total and dissolved lead	Met endpoint criteria; monitoring discontinued

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SA 80, Steam Plant 4, USTs 27089 and 27090							
04-103	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO and NAPs	DRO and NAPs	DRO
04-158	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-159	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-173	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
04-801	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	NS	DRO, GRO, and BTEX	DRO
SP4-3	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO and NAPs	DRO and NAPs	DRO
SA 82, P-80/P-81 Buildings, UST 10587 and AST 10333							
12-170	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-172	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-180	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-401	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO	DRO	DRO
SA 88, P-70 Energy Generator, UST 10578							
12-162	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-163	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-197	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-198	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-253	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
12-701	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO	DRO	DRO

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
South of Runway 18-36 Area							
E-208	SWP	GW	GRO, GRO fractions, BTEX, DRO, and RRO	NAPs	DRO	DRO	DRO
E-216	SWP	GW	Sampling not planned	DRO, DRO fractions, and NAPs	DRO	Not sampled – free-product observed in well	DRO
E-218	SWP	GW	Sampling not planned	NAPs	DRO	DRO	DRO, visual inspection
02-231	SWP	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, DRO fractions, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX, visual inspection
02-232	SWP	GW	GRO, GRO fractions, BTEX, DRO, and RRO	DRO, DRO fractions, RRO, and NAPs	DRO	DRO	DRO
MRP-12	SWP	GW	Sampling not planned	DRO, RRO, and NAPs	DRO	DRO	DRO
Sweeper Cove							
Each	BM - LTM	MT	≈ 90 PCB congeners	≈ 90 PCB congeners	209 PCB congeners	Not Sampled	209 PCB Congeners
Each	RS - LTM	MT	≈ 90 PCB congeners	≈ 90 PCB congeners	209 PCB congeners	Not Sampled	209 PCB Congeners
SWMU 11, Palisades Landfill							
101	PCM	SW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN	PCBs, TIN and DIN	PCBs, DIN, TIN	DIN, TIN
		SD	SVOCs, Pesticides/PCBs, and TIN	SVOCs, Pesticides/PCBs, TOC, and grain size	SVOCs, PCBs, TIN, TOC, Grain size	SVOCs, PCBs, TIN, TOC, Grain size	TIN, SVOCs, Grain size, TOC

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 11, Palisades Landfill (Continued)							
102	PCM	SW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN	PCBs, TIN and DIN	PCBs, DIN, TIN	DIN, TIN
	PCM	SD	SVOCs, Pesticides/PCBs, and TIN	SVOCs, Pesticides/PCBs, TOC, and grain size	SVOCs, PCBs, TIN, TOC, Grain size	SVOCs, PCBs, TIN, TOC, Grain size	TIN, SVOCs, Grain size, TOC
103	PCM	SD	SVOCs, Pesticides/PCBs, and TIN	SVOCs, Pesticides/PCBs, TIN, TOC, and grain size	SVOCs, PCBs, TIN, TOC, Grain size	DIN, TIN	DIN, TIN
SWMU 13, Metals Landfill							
MW13-1	PCM	GW	SVOCs, Pesticides/PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-2	PCM	GW	SVOCs, Pesticides/PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-3	PCM	GW	SVOCs, Pesticides/PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-4	PCM	GW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-5	PCM	GW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-603	PCM	GW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 13, Metals Landfill (Continued)							
MW13-604	PCM	GW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
MW13-605	PCM	GW	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, Pesticides/ PCBs, TIN, DIN	VOCs, SVOCs, TIN, DIN, and WQP	VOCs, SVOCs, DIN, TIN, WQP, and TDS	DIN, TIN
SWMU 14, Old Pesticide Disposal Area							
01-153	MNA[b]	GW	Sampling not planned	Sampling not planned	DRO, GRO, GRO fractions, BTEX, and NAPs	DRO, GRO, GRO fractions, BTEX, and NAPs	GRO and BTEX annually, sample for DRO every other year with next sample in 2006
	Compliance	GW	Sampling not planned	Sampling not planned	Total and dissolved lead Total thallium Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Total and dissolved lead Total thallium Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Total and dissolved lead Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate
MW14-5	MNA[b]	GW	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	DRO, GRO, GRO fractions, BTEX, and NAPs	DRO, GRO, GRO fractions, BTEX, and NAPs	DRO, GRO, BTEX

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 14, Old Pesticide Disposal Area (Continued)							
	Compliance	GW	VOCs, SVOCs, total and dissolved lead	VOCs, SVOCs, total and dissolved lead	Total and dissolved lead Total thallium Trichloroethene Tetrachloroethene 1,1-dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Total and dissolved lead Total thallium Trichloroethene Tetrachloroethene 1,1-dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Total and dissolved lead Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Methylene chloride Vinyl chloride
MW14-423	MNA[a]	GW	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	Damaged well could not be sampled.	Removed from monitoring program. Well is damaged.	NA	NA
	Compliance[a]	GW	VOCs, SVOCs, Total and dissolved lead, and NAPs	Damaged well could not be sampled.	Removed from monitoring program. Well is damaged.	NA	NA
SWMU 15, Future Jobs/DRMO							
15-1	MNA[a]	GW	GRO, GRO fractions, BTEX, DRO, RRO, total and dissolved lead, VOCs, SVOCs, and NAPs	GRO, GRO fractions, BTEX, DRO, RRO, VOCs, TIN, and NAPs	No additional monitoring recommended	NA	NA
MW15-3	MNA[b]	GW	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	DRO, RRO, GRO, BTEX, and NAPs	DRO, GRO, GRO fractions, BTEX, and NAPs	Met endpoint criteria; monitoring discontinued	NA

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 15, Future Jobs/DRMO (Continued)							
	Compliance	GW	VOCs	VOCs	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride
MW15-424	MNA[b]	GW	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	DRO, RRO, GRO, GRO fractions, BTEX, and NAPs	DRO, GRO, GRO fractions, BTEX, and NAPs	Met endpoint criteria; monitoring discontinued	NA
MW15-424 (Cont.)	Compliance	GW	VOCs	VOCs and TIN	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride	Met endpoint criteria; monitoring discontinued	NA
SWMU 17, Power Plant Area							
05-375	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, VOC, SVOC, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX
05-735	Compliance	GW	VOCs and SVOCs	VOC, SVOC, NAPs	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 17, Power Plant Area (Continued)							
05-810	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, VOCs, SVOCs, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
05-811	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, VOCs, SVOCs, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
05-815	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, VOCs, SVOCs, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
HC-03	Compliance[a]	GW	Sampling not planned	VOCs, SVOCs, and NAPs	Monitoring discontinued	NA	NA
R-1	TBD for Petroleum and Compliance	GW	Sampling not planned	Sampling not planned	DRO and RRO Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	DRO and RRO Bis(2-ethylhexyl)phthalate	DRO and Bis(2-ethylhexyl)phthalate
R-6	TBD for Petroleum and Compliance	GW	VOCs and SVOCs	Sampling not planned	DRO and RRO Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	DRO and RRO Bis(2-ethylhexyl)phthalate	DRO and Bis(2-ethylhexyl)phthalate

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 18/19, White Alice Landfill							
21-3	PCM	GW	VOC, TIN, and WQP	VOC, TIN, DIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	Not sampled
21-4	PCM	GW	VOC, TIN, and WQP	VOC, TIN, DIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	Not sampled
WASW01	PCM	SW	VOC, TIN, and WQP	VOC, TIN, DIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	Not sampled
WASW02	PCM	SW	VOC, TIN, and WQP	VOC, TIN, DIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	Not sampled
WASW03	PCM	SW	VOC, TIN, and WQP	VOC, TIN, DIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	Not sampled
SWMU 25, Roberts Landfill							
A-2	PCM	GW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
A-3	PCM	GW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
A-5	PCM	GW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
B-1	PCM	GW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
RLSW01	PCM	SW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
RLSW02	PCM	SW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
RLSW03	PCM	SW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 25, Roberts Landfill (Continued)							
RLSW04	PCM	SW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs, and WQP
RLSW05	PCM	SW	VOC, TIN, and WQP	VOC, TIN, and WQP	VOCs, TIN, DIN, and WQP	VOCs, TIN, DIN, WQP, and TDS	DIN, TIN, VOCs
SWMU 55, Public Works Transportation Department Waste Storage Area							
55-145	Compliance	GW	VOCs, SVOCs, and total and dissolved inorganics	VOCs, SVOCs, TIN, and DIN	Dissolved antimony Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride
55-146	Compliance	GW	VOCs, SVOCs, and total and dissolved inorganics	VOCs, SVOCs, total and dissolved lead, TIN, and DIN	Dissolved antimony Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Trichloroethene Tetrachloroethene 1,1-Dichloroethene cis-1,2-Dichloroethene trans-1,2-Dichloroethene Vinyl chloride Methylene chloride Bis(2-ethylhexyl)phthalate	Tetrachloroethene and daughter products to be monitored every other year with next sample in 2006 Methylene chloride and Bis(2-ethylhexyl)phthalate annually
SWMU 58/SA 73, Heating Plant 6							
12-101	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-110	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-114	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-120	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 58/SA 73, Heating Plant 6 (Continued)							
12-121	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-203[c]	MNA[b]	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
12-601	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX
12-604	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX
12-610	SWP[a]	GW	Well was dry.	Sampling discontinued. Well has been dry for last four sampling events. Replacement well installed.	NA	NA	NA
12-611	SWP	GW	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO, GRO, and BTEX
SWMU 60, Tank Farm A							
LC5A	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	DRO and NAPs	DRO, visual inspection
MW E006	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	BTEX and NAPs	BTEX
MW E501	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, BTEX, and NAPs	Met endpoint criteria; monitoring discontinued	NA

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 61, Tank Farm B							
14-113	MNA[b]/SWP	GW	Sampling not planned	Sampling not planned	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX, visual inspection
14-210	MNA[b]/SWP	GW	GRO, GRO fractions, BTEX, DRO, and RRO	GRO, BTEX, DRO, RRO, and NAPs	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX, visual inspection
TFB-MW-4A	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	GRO, BTEX, and NAPs	Met endpoint; criteria monitoring discontinued	
TFB-MW-4B	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	GRO, BTEX, and NAPs	GRO, BTEX, and NAPs	GRO and BTEX
SWMU 62, New Housing Fuel Leak							
03-012	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
03-109	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, total and dissolved lead, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
03-155	TBD	GW	Sampling Not Planned	Sampling Not Planned	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
03-619	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; DRO detected above criteria; use another sentinel well	NA	NA
03-695	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
SWMU 62, New Housing Fuel Leak (Continued)							
03-696	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
03-697	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
03-895	FFS	GW	Sampling Not Planned	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
03-896	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
03-897	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
03-898	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Discontinued monitoring; no exceedances of criteria	NA	NA
MW 134-11	TBD	GW	Sampling Not Planned	Sampling Not Planned	Sampling Not Planned	Sampling Not Planned	DRO, GRO, and BTEX
AMW-704	FFS	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	Met endpoint criteria; monitoring discontinued	NA	NA
Tanker Shed, UST 42494							
04-175	MNA[b]	GW	Sampling Not Planned	Sampling Not Planned	Sampling Not Planned	Sampling not planned	DRO, GRO, and BTEX
04-290	MNA[b]	GW	Sampling Not Planned	Sampling Not Planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

Location Cross-Reference	Monitoring Type	Medium Tested	2001 Analyte Sampling Program	2002 Analyte Sampling Program	2003 Analyte Sampling Program	2004 Analyte Sampling Program	2005 Analyte Sampling Program
Tanker Shed, UST 42494 (Continued)							
04-306	MNA[b]	GW	Sampling Not Planned	Sampling Not Planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
04-601	MNA[b]	GW	GRO, GRO fractions, BTEX, DRO, and RRO	DRO, RRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
04-602[d]	SWP	GW	Sampling Not Planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO, GRO, and BTEX
TS-01	SWP	GW	Sampling Not Planned	Sampling not planned	DRO, GRO, BTEX, and NAPs	DRO, GRO, BTEX, and NAPs	DRO, GRO, and BTEX
Yakutat Hangar, UST 2039-A							
05-221	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
05-244	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
05-250	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
MW-2	LM	GW	Sampling not planned	Sampling not planned	Sampling not planned	Sampling not planned	DRO
05-389	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, DRO, RRO, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO
05-801	SWP	GW	GRO, GRO fractions, BTEX, DRO, RRO, and NAPs	GRO, BTEX, and NAPs	DRO, GRO, and BTEX	DRO, GRO, and BTEX	DRO

[a]Monitoring at this site has been discontinued.
[b]Natural attenuation parameters to be monitored every five years with next planned monitoring in 2009
[c]A 2-inch diameter replacement well is planned for well 12-203.
[d]The designated monitoring well has not yet been installed as of April 2005. The well will be scheduled for sampling once installation and development are completed.

Notes:
The matrix for sampling is groundwater unless specified differently under Current Monitoring Type.
≈ - nearly equal to
AST - aboveground storage tank

Table 4-5 (Continued)
Location-Specific Summary of Comprehensive Monitoring Program Since 2001

BM - blue mussel
BTEX - benzene, toluene, ethylbenzene, and total xylenes
DIN – dissolved inorganics
DRO - diesel-range organics
DRMO - Defense Reutilization Marketing Office
FFS - focused feasibility study
GCI - General Communications, Inc.
GRO - gasoline-range organics
LM - limited groundwater monitoring
LTM - long-term monitoring
MNA - monitored natural attenuation
MT - marine tissue
NA - not analyzed
NAE - natural attenuation evaluation
NAPs - natural attenuation parameters
NORPAC - North Pacific
PCB - polychlorinated biphenyls
PCM - post closure monitoring
ROICC - resident officer in charge of construction
RRO - residual-range organics
RS - rock sole
SA - source area
SD - sediment
SVOCs - semivolatile organic compounds
SW - surface water
SWMU - solid waste management unit
SWP - surface water protection
TBD - to be determined
TDS - total dissolved solids
TIN - total inorganics
TOC - total organic carbon
UST - underground storage tank
VOCs - volatile organic compounds
WQP - water quality parameters

Table 4-6
Free-Product Monitoring and Recovery Activities Performed Between January 2001 and December 2005

Site	Dates of Free-Product Monitoring	Dates of Free-Product Recovery	Type of Recovery	Monitoring Frequency
GCI Compound	Oct 2001- Sept 2005	NA	NA	Monitored infrequently[a]
SA 80	Oct 2001- Sept 2005	NA	NA	Monitored infrequently[a]
Tanker Shed	May 2001 - Nov 2001, Aug 2004 - Sept 2005	May 2001 - Nov 2001, Aug 2004 - Jul 2005	Passive recovery	Monitored multiple times[b]
SA 78	Sept 2001 - Sept 2005	NA	NA	Monitored infrequently[a]
SA 82	Sept 2001 - Sept 2005	NA	NA	Monitored infrequently[a]
SA 88	Aug 2002 - Sept 2005	NA	NA	Monitored infrequently[a]
SWMU 58/SA 73	Sept 2001 - Sept 2005	NA	NA	Monitored infrequently[a]
Yakutat Hangar, UST T-2039-A	Oct 2001 - Sept 2005	NA	NA	Monitored infrequently[a]
NORPAC Hill	May 2001 - Sept 2005	Jun 2001 - Nov 2001	Passive recovery	Monitored multiple times[b]
NMCB	May 2001 - Sept 2005	May 2001 - Nov 2001, May 2002 - Oct 2002, Aug 2004 - Jul 2005	Passive recovery	Monitored multiple times[b]
South of Runway	May 2001 - Sept 2005	May 2001 - Nov 2001, May 2002 - Nov 2002, Aug 2004 - Jul 2005	Passive recovery	Monitored multiple times[b]
SWMU 62	May 2001 - Sept 2005	NA	NA	Monitored infrequently[a]
SWMU 17	May 2001 - Sept 2005	Jan 2001 - Jul 2002	Active and passive recovery	Monitored multiple times[b]

[a]Wells located at this site were monitored for the presence of free product less than 15 times between January 2001 and December 2005.
[b]Selected wells at this site were monitored for the presence of free product more than 100 times between January 2001 and December 2005.

Note:
NA - not applicable

Table 4-7
Selected Remedial Actions and Implementation for OU B-1 Sites

Site Name	Area of Concern	Selected Remedy	Remedy Implementation
Bay of Island Impact Area	BI-01	Additional site identified for remedial action under OU B-1. The ROD states that BI-01 was reckoned in the 2000 field season and recommended NOFA.	No documentation of initial recon activity has been located. The site was investigated in the 2004 field season. No MEC or related items were identified, and the site was again recommended for NOFA. However, ADEC and EPA have not concurred.
Blind Cove/ Campers Cove Impact Area	BC-01	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
Combat Range #1	C1-02	Observation approach presumptive clearance.	ROD remedy has not been completed. Navy recommends NOFA designation based on inaccessibility.
	C1-03	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
Combat Range #2	C2-01A	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	C2-01B	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	C2-02	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
Combat Range #3	C3-01A	Clearance to 4 feet bgs and chemical sampling, removal, and onsite/offsite treatment and disposal of soils.	The ROD remedy was completed in 2002.
	C3-01B	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	C3-01C	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	C3-01D	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	C3-01E	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	C3-04A	Observation approach presumptive clearance, and chemical sampling, removal, and on-site/off-site treatment and disposal of soils.	The ROD remedy was completed in 2001.
Combat Range #6	C6-01A	Clearance to 4 feet bgs and chemical sampling, removal, and on-site/off-site treatment and disposal of soils.	The ROD remedy was completed in 2001.

Table 4-7 (Continued)
Selected Remedial Actions and Implementation for OU B-1 Sites

Site Name	Area of Concern	Selected Remedy	Remedy Implementation
Combat Range #8	C8-01	Observation approach presumption clearance and chemical sampling, removal, and on-site/off-site treatment and disposal of soils.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	C8-03	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	C8-05A	Observation approach presumptive clearance and chemical sampling, removal, and on-site/off-site treatment and disposal of soils.	The ROD remedy was completed in 2001.
Finger Bay Ammunition Pier	FBAP-02	Observation approach presumptive clearance. Final characterization by underwater survey.	The ROD remedy was completed in 2001.
Finger Bay Impact Area	FB-01	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	FB-03	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	FB-04	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
Gun Emplacements	GUN-01	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	GUN-02	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	GUN-03	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
Lake DeMarie Impact Area	DM-06A	Observation approach presumptive clearance.	The ROD remedy was completed in 2001. The site was reinvestigated in 2004 to verify as NOFA.
Lake Jean Ammunition Complex	LJ-01	Observation approach presumptive clearance and chemical sampling, removal, and on-site/off-site treatment and disposal of soils.	The ROD remedy has not yet been completed.
Husky Pass	HP-01	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
Mount Moffett	MM-01	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-02	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.

Table 4-7 (Continued)
Selected Remedial Actions and Implementation for OU B-1 Sites

Site Name	Area of Concern	Selected Remedy	Remedy Implementation
Mount Moffett (Continued)	MM-03	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-04	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-05	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-06	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-07	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-08	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-09	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-10A	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-10B	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-10C	Observation approach presumptive clearance.	The ROD remedy was completed in 2002.
	MM-10E	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
	MM-10F	Observation approach presumptive clearance.	The ROD remedy has not yet been completed pending a Navy proposed ROD amendment.
	MM-10G	Observation approach presumptive clearance.	The ROD remedy has not yet been completed pending a Navy proposed ROD amendment.

Table 4-7 (Continued)
Selected Remedial Actions and Implementation for OU B-1 Sites

Site Name	Area of Concern	Selected Remedy	Remedy Implementation
Mount Moffett (Continued)	MM-10H	Observation approach presumptive clearance.	The ROD remedy has not yet been completed pending a Navy proposed ROD amendment.
	MM-11	Observation approach presumptive clearance.	The ROD remedy was implemented in 2004. However, ADEC and EPA have not concurred with the remedial actions.
Mitt Lake Impact Area	ML-01A	Clearance to 4 ft bgs.	The ROD remedy was completed in 2001.
	ML-01B	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	ML-02A	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
	ML-02B	Chemical sampling, removal and onsite/offsite treatment and disposal of soils.	The ROD remedy was completed in 2001.
Shagak Bay Gun Emplacement	SH-01	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.
WWII Ammunition Pier (Sweeper Cove)	AP-02	Observation approach presumptive clearance.	The ROD remedy was completed in 2001.

Notes:
ADEC - Alaska Department of Environmental Conservation
bgs - below ground surface
EPA - U.S. Environmental Protection Agency
ft. - foot
MEC - munitions explosives of concern
OU - operable unit
NOFA - no further action
ROD - Record of Decision
WWII - World War II

5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW

During this 5-year review period, actions were taken to resolve the issues listed in the first 5-year review. Table 5-1 lists the issues and resolutions. In addition, the overall progress of the program is discussed in this section. Monitoring progress is described in Section 6.4.

Also during this 5-year review period, significant progress was made on final remedy selection for the 14 interim remedial action free-product recovery sites removed from the OU A ROD via the 2003 ROD amendment following implementation of the OU A ROD interim action remedy. A decision document addressing 10 of these sites was signed in 2005 (U.S. Navy and Alaska DEC 2005a). In addition, a decision document addressing one of these sites (NMCB Building Expanded Area) was signed in early 2006 (U.S. Navy and Alaska DEC 2006). Final remedies at the remaining three sites will be memorialized in decision documents in 2006.

During the review period, data from numerous sites collected prior to 2001 were evaluated to determine if NFA or NFRAP was appropriate. The evaluation resulted in a recommendation for NFA or NFRAP at 19 sites, as discussed in Section 4.1.3.

In 2005, the Navy prepared the necessary information regarding completion of response actions in preparation for requesting that soil and fresh surface water at OU A and OU B-1 be removed from the NPL (U.S. Navy, 2005a). This will be a partial deletion, because groundwater and marine organisms in surface water at OU A (specifically, Sweeper Cove and Kuluk Bay) and a small area of soil in OU B-1 will not be included in the request to delete, since deletion criteria for these media and areas have not been met.

Some deficiencies have periodically been found during annual institutional control inspections (see Section 6.5). Recommended corrective actions have been taken in all cases. One access restriction violation (trespass) was reported at an OU B-2 site, which led to the improvement of access barriers and additional communication with the community.

Pipeline Closures

The Navy cleaned and closed three pipelines in 2003 (U.S. Navy 2003c). This work was not part of a ROD remedy. Construction activities consisted of cleaning and closing the pipelines, removing all debris and fluid waste associated with the pipelines, and reclamation of the disturbed areas. The three pipelines included the following:

- Approximately 8,500 feet of 4-inch pipeline from the east bank of Sweeper Creek, across the creek, to a valve pit about 100 feet south of Runway 18-36.

- Approximately 2,250 feet of 8-inch mogas pipeline starting near the intersection of South Sweeper Creek and Main Road and heading southward, parallel to Seawall Road.

- Approximately13,700 feet of 10-inch fuel line labeled mogas from the Fuels Dock to 600 feet northeast of the intersection of Runways 18-36 and 23-5.

SWMU 17, Power Plant 3 Interim Action

In 2002, a portion of the site was regraded and fill material added to (1) prevent free product from “daylighting” at the ground surface at the site, (2) promote surface water runoff from the site, thereby minimizing groundwater recharge in the project area, and (3) prevent surface water from contacting free product, contaminated soil, or both in the project area and ultimately transporting contaminants into Sweeper Creek (U.S. Navy 2003d).

Table 5-1
Issues from the First Five-Year Review

Site	Issue	Action
SWMU 11, Palisades Landfill	One warning sign down, another sign is damaged.	In the first 5-year review, the proposed action was to erect and repair signs in October 2001. During the 2002 inspection, signs were still noted as needing repair. The Navy verbally confirmed that the signs were erected and/or repaired as recommended during the 2003 field season.
ASR-8 Facility (UST 42007-B)	Planned soil removal not completed due to need for site operations to continue.	In the first 5-year review, the Navy proposed additional soil removal to be completed in 2002. Limited soil removal is currently planned for 2008.
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area	Planned soil removal not completed due to need for site operations to continue.	In the first 5-year review, the Navy proposed additional soil removal to be completed in 2002. The site was recently regraded, and it is an active, primary fueling facility (U.S. Navy 2005c, Appendix E). The limited soil removal is currently planned for 2008.
Mount Moffett Power Plant 5 (USTs 10574 through 10577)	A soil removal was only partially completed, due to the presence of larger than anticipated quantities of affected soil.	In the first 5-year review, the Navy proposed additional soil removal to be completed in 2002. However, the site was reevaluated and recommended for NFRAP, because remedial actions (limited soil removal in July 1999) were completed and are protective of human health and the environment as discussed in the final cleanup report for 19 sites (U.S. Navy 2005b). Alaska DEC gave the site conditional closure status, or NFRAP, and recommended additional soil samples be collected to demonstrate DRO concentrations are below Alaska DEC Method Two Soil Cleanup Levels to achieve site closure (Alaska DEC 2005b).
Officer Hill and Amulet Housing (UST 31052-A)	Groundwater monitoring using the new well is required.	In the first 5-year review, the Navy proposed groundwater monitoring for a new well. The monitoring well (location 372) was installed in 2001. Groundwater monitoring at the site met monitoring endpoint criteria with 2001 and 2002 analytical results. The site was recommended for NFA in the 2002 annual monitoring report. Monitoring was not conducted beyond 2002 (U.S. Navy 2005c, Appendix E).

Table 5-1 (Continued)
Issues from the First Five-Year Review

Site	Issue	Action
Officer Hill and Amulet Housing (UST 31052-A) (Continued)	Groundwater monitoring using the new well is required.	The Navy recommended NFRAP, because remedial actions (limited soil removal in July 1999) were completed and are protective of human health and the environment as discussed in the final cleanup report for 19 sites (U.S. Navy 2005b). Alaska DEC gave the site conditional closure status, or NFRAP, and recommended additional soil samples be collected to demonstrate DRO concentrations are below Alaska DEC Method Two Soil Cleanup Levels to achieve site closure (Alaska DEC 2005b).
Finger Bay Quonset Hut (UST FBQH-1)	One groundwater monitoring well is planned to be installed.	In the first 5-year review, the Navy proposed installation of a new groundwater monitoring well. The monitoring well (FB-206) was installed in 2001. Groundwater monitoring at the site met monitoring endpoint criteria with 2001 and 2002 analytical results. The site was recommended NFA in the 2002 annual monitoring report. Monitoring was not conducted beyond 2002 (U.S. Navy 2005c, Appendix E). The Navy recommended NFRAP, because remedial actions (limited soil removal in September 1999) were completed and are protective of human health and the environment as discussed in the final cleanup report for 19 sites (U.S. Navy 2005b). Alaska DEC gave the site conditional closure status, or NFRAP, and recommended additional soil samples be collected to demonstrate DRO concentrations are below Alaska DEC Method Two Soil Cleanup Levels to achieve site closure (Alaska DEC 2005b).
SWMU 58 and SA 73, Heating Plant 6	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy selected for this site, which is one of the 10 free-product petroleum sites that do not pose a risk above target goals, is Monitored Natural Attenuation and Institutional Controls. Currently, there are three wells (12-601, 12-604, and 12-611) included in the monitoring of surface water protection (U.S. Navy 2005c, Appendix A).

Table 5-1 (Continued)
Issues from the First Five-Year Review

Site	Issue	Action
SWMU 15, Future Jobs/Defense Reutilization Marketing Office	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. Natural attenuation monitoring was conducted between 1999 and 2003. Concentrations of target analytes in groundwater met the monitoring endpoint criteria in 2003. The Navy recommends that natural attenuation monitoring for DRO, GRO, and BTEX be discontinued at this site (U.S. Navy 2005c, Appendix E).
SA 88, P-70 Energy Generator	Final remedy selection has yet to be determined.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy selected for this site, which is one of the 10 free-product petroleum sites that do not pose a risk above target goals, is Limited Groundwater Monitoring, and Institutional Controls. Currently, there is one well (12-701) included in the monitoring of surface water protection (U.S. Navy 2005c).
South of Runway 18-36 Area	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy is anticipated in 2006 via a decision document. Currently, there are six wells (02-231, 02-232, E-208, E-216, E-218, and MRP-12) included in the monitoring of surface water protection (U.S. Navy 2005c, Appendix A).
SWMU 62, New Housing Fuel Leak	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy is anticipated in 2006 via a decision document. Currently, there are two wells (03-155 and MW134-11) included in groundwater monitoring (U.S. Navy 2005, Appendix A).

Table 5-1 (Continued)
Issues from the First Five-Year Review

Site	Issue	Action
NMBC Building Area, T-1416 Expanded Area	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy selected for this site is Free-Product Recovery, Monitored Natural Attenuation and Institutional Controls. Specific groundwater monitoring requirements are yet to be determined.
NORPAC Hill Seep Area	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy selected for this site, which is one of the 10 free-product petroleum sites that do not pose a risk above target goals, is Limited Groundwater Monitoring, and Institutional Controls. Currently, there are two wells (04-146 and 04-147) included in the monitoring of surface water protection (U.S. Navy 2005c).
Tanker Shed, UST 42494	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. The final remedy selected for this site, which is one of the 10 free-product petroleum sites that do not pose a risk above target goals, is Free-Product Recovery, Monitored Natural Attenuation, and Institutional Controls. Currently, there are two wells (04-602 and TS-01) included in the monitoring of surface water protection (U.S. Navy 2005c).

Table 5-1 (Continued)
Issues from the First Five-Year Review

Site	Issue	Action
SWMU 61, Tank Farm B	Concentrations of petroleum hydrocarbons were detected above Alaska 18 AAC 75 Table C groundwater cleanup levels in sentinel wells associated with this site.	In the first 5-year review, the Navy proposed revising sentinel well locations or continuing monitoring at existing sentinel well locations. Natural attenuation monitoring was conducted between 1999 and 2004. New well 14-113 was installed in 2003 to monitor natural attenuation conditions adjacent to North Sweeper Creek and to provide for surface water protection monitoring. Concentrations of GRO and BTEX met monitoring endpoint criteria in TFB-MW-4A in 2003. Monitoring was discontinued at this location during 2004. The Navy recommends that natural attenuation monitoring for GRO and BTEX continue at locations 14-113, 14-210, and TFB-MW-4B and that visual inspections of the North Sweeper Creek shoreline for petroleum seeps and sheen commence in 2005 (U.S. Navy 2005c, Appendix E).

Notes:
AAC - Alaska Administrative Code
BTEX - benzene, toluene, ethylbenzene, and xylenes
DEC - Department of Environmental Conservation
DRO - diesel-range organics
GRO - gasoline-range organics
NFA - No Further Action
NFRAP - No Further Remedial Action Planned
NORPAC - North Pacific
SA - source area
SWMU - solid waste management unit
UST - underground storage tank

6.0 FIVE-YEAR REVIEW PROCESS

6.1 FIVE-YEAR REVIEW TEAM

The Navy is the lead agency for this 5-year review. Personnel from Naval Facilities Engineering Command Northwest (NAVFAC NW) represented the Navy in this 5-year review. Project managers and other staff from the EPA and Alaska DEC, the other 5-year review team members, have also participated in the review process. Both the EPA and Alaska DEC are cosignatories of the RODs for the former Adak Naval Complex. All team members had the opportunity to provide input to this report. EPA and Alaska DEC comments and responses to comments are provided in Appendix B.

6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

CERCLA Section 117(a), as amended, has specific requirements, including the distribution of certain reports to the public and that the public be notified of proposed cleanup plans and remedial actions. The community notification and involvement activities are described below.

6.2.1 History of Community Involvement

The Navy has maintained an ongoing commitment to community involvement since the time of the first investigations at Adak. The community has been informed of progress at the site through fact sheets, published public notices, open houses, public meetings, a Web site, and toll-free hotlines. The proposed plans were circulated for public comment prior to finalization of the RODs. Details of the community involvement history are provided in the following subsections.

Information Repositories

The Information Repository, which includes a copy of the Administrative Record, is located at the University of Alaska, Reserve Room, 3211 Providence Drive, Anchorage, Alaska, and is open to the public. The Administrative Record includes all documents used by the parties to the FFA to come to its decisions regarding Adak remediation. The official copy of the Administrative Record is located at NAVFAC NW, Silverdale, Washington. In addition, documents regarding the environmental investigation of Adak and the cleanup process are available to individuals on Adak at the Bob Reeve High School. The entire body of documents produced relative to CERCLA actions is available on Adak, together with copies of community and Restoration Advisory Board (RAB) briefing materials, newsletters, and fact sheets. Recently issued documents are also available at the Web site for Adak environmental cleanup, www.AdakUpdate.com.

Community Relations Plan

The Community Relations Plan (CRP) formalizes the process for involving the Adak Island community, members of the public, and the extended community interested in environmental restoration and property reuse. The first CRP, prepared in 1993, was rewritten in September 1994, revised in May 1995, and revised again in December 1996. The plan was reviewed in August 1999 and revised to include a comprehensive stakeholder relations plan, monthly newsletters, and the development of a Web site. An updated CRP was issued in October of 2001.

Restoration Advisory Board

The Adak RAB was formed in 1996 to advise the Navy on decisions concerning cleanup on Adak. Individuals interested in becoming members of the RAB filled out applications. All applicants were accepted as RAB members. The group originally consisted of approximately 45 interested private citizens and representatives of various organizations, such as TAC and the ARC. By early 1998, the RAB consisted of approximately 18 members. In 1999 and again in September 2000, additional RAB members representing the new emerging community on Adak were added as official members of the RAB.

The RAB generally meets biannually. Meetings are held in Anchorage or on Adak Island, and facilities are provided to allow interested parties to participate by telephone if desired. One of the RAB's activities is to review technical reports and provide comments and recommendations to the Navy. Prior to the incorporation of the second class City of Adak in April of 2001, on-island permanent residents and families were represented on the RAB by the Adak Community Council. As of May 2001, the mayor of City of Adak participated as a member of the RAB. The Aleut community was involved in the development of the Adak cleanup. The Chief Executive Officer for TAC served as the RAB co-chair from the RAB's inception until April 2000. Members of the Aleutian/Pribilof Island Association (A/PIA), which is the designated representative for the federally recognized Aleut tribal interests, and other Aleut community members are active participants in the RAB. In addition, A/PIA and the Navy have entered into a cooperative agreement to facilitate A/PIA's participation as a member of the OU B Project Team. A toll-free information line (1-800-360-1561) was established in 1995 to provide meeting dates and times, and since 1999, all RAB meeting information was regularly posted on the Web site *www.AdakUpdate.com*.

In the spring of 1999, the RAB received a grant from the Navy and was able to obtain a technical advisor (Dr. Ron Scrudato) under a Technical Assistance Public Participation (TAPP) grant to review documents and provide technical support. This grant was renewed in the summer of 2001.

Mailing List

The Navy maintains and regularly updates two mailing lists: a RAB-members list and a general mailing list. Approximately 40 names are on the RAB-members list. More than 225 names are on the general mailing list, which includes individuals, environmental organizations, businesses, and agencies. Both lists are published in the current CRP. The list is updated regularly, as additional individuals request information or involvement.

Fact Sheets and Newsletters

Since September 1999, 33 newsletters or fact sheets have been distributed. These newsletters (called *Adak Update*, jointly produced by the Navy, EPA, and Alaska DEC), or fact sheets (prepared by the Navy) have been published as new issues, notifications, and critical documents are prepared. The newsletter is distributed to the individuals and groups on the general mailing list, as outlined in the revised CRP. Additional copies of the newsletter and fact sheets are sent to the information repository on Adak and to the *www.AdakUpdate.com* Web site.

Open Houses

In addition to formal community briefings and RAB meetings, a series of open houses have been held on Adak and in Anchorage. These open houses allowed project managers and project team members from the Navy, EPA, and Alaska DEC to be available on a one-on-one basis to answer questions from the public and to address concerns. These open houses first started in July 1993 and have been held in May 1994; February 1998; September 1999; and January, April, and June 2000. A meeting with the community was held by the RAB in late September 1999. In addition, an open house was held in conjunction with the November 1999 RAB meeting in Anchorage.

Hot Lines and E-mail

To support the local reuse authority and the RAB, the Navy established a toll-free hot line in December 1995. RAB members and citizens interested in reuse or environmental restoration of Adak are encouraged to call and to leave a message regarding their questions or concerns. Messages are retrieved daily and responded to as soon as possible, generally within 3 days. The excavation notification e-mail site is *EFPB-AdakExcaNot@Navy.mil*. The hotline telephone number is 1-866-239-1219.

Stakeholder Relations

As part of the updated CRP, a comprehensive stakeholder relations program has been implemented. A “stakeholder” is defined as anyone with an economic, social, political, or personal interest in an issue. A wide range of stakeholders are involved and interested in the cleanup effort and transfer of Naval Air Facility Adak, including government agencies, the community of Adak, Native groups, residents of the greater Aleutian Islands, the Alaska State Legislature, and citizens throughout the state. The goal of the CRP is to create a forum that allows the voice of interested individuals to be considered in decisionmaking. The stakeholder communications agenda identifies the ideas, concerns, values, principles, motivations, and plans of all interest groups involved. The stakeholder relations program currently in place serves to identify and reconcile conflicting information and perceptions of stakeholders. In addition, the stakeholder relation program provides an opportunity for stakeholders to identify concerns related to proposed environmental investigation and cleanup approaches on Adak. These concerns are considered by the Navy and regulatory agencies as they develop and finalize decisions on required environmental cleanup.

Since August 1999, numerous one-on-one stakeholder meetings have been and continue to be conducted both in person and by telephone. In addition, the Navy's stakeholder relations specialist conducted on-island visits in November 1999, April 2000, July 2000, and May 2001 to solicit community input, suggestions, and concerns. Seven subsequent on-island visits have also been conducted by Navy technical and project management staff in the course of oversight of field investigation and construction projects.

In addition, the stakeholders relations program provides an opportunity for stakeholders to identify concerns related to proposed environmental investigation and cleanup approaches on Adak. These concerns are considered by the Navy and regulatory agencies as they develop and finalize decisions on required environmental cleanup.

Department of Defense RAB Roundtable

As an adjunct to the Alaska Forum on the Environment symposium held in Anchorage annually, the three military service branches have sponsored (on a rotating basis) a 1- to 2-day RAB Roundtable for Department of Defense site managers, support staff, RAB community co-chairs, and agency representatives. These meetings have been sponsored by the Navy every year since 2001, and have been facilitated by the Navy in February of 2002 and February of 2005. These meetings have included keynote addresses, plenary sessions, educational forums, workshops, and discussion groups to identify impediments and improvements to the RAB process at Alaska military CERCLA sites. The Navy's stakeholder relations technical experts have been crucial in developing and executing these acclaimed symposia.

Web Site

A project Web site *www.AdakUpdate.com* is currently on line. The site is easily accessible through common Internet search engines. Information is added and updated on a regular basis. The site contains all project newsletters, all presentation materials prepared for the RAB, fact sheets and news releases. Links to appropriate technical documents are provided. Information on RAB meetings, public meetings and open houses, and links to state and federal agency sites are also provided. The Web site also provides an interactive opportunity by enabling stakeholders and the public to e-mail their questions and comments. Figure 6-1 shows the *AdakUpdate.com* home page.

6.2.2 Community Friendly Sign Development

In the past, the Navy has posted ordnance signs, landfill signs, and fishing restriction signs on the island. In spring 2001, the Adak Island elementary school fourth grade class developed concepts for icons to be placed on the fishing advisory signs. The concepts presented to the Navy reflected the Aleut heritage. Images of Aleut Elders were selected by the students as a reminder to be safe and be aware while on the island. Examples of community friendly icons used are provided on Figure 6-2. The icons have been incorporated into various components of the MEC Awareness training program. In late 2003, the fishing advisory signs were removed at the request of the property owner with the concurrence of the Navy and regulatory agencies. The fishing advisory signs were replaced by an information pamphlet that was reviewed by Adak community members. This change in the OU A ROD remedy was formally documented in the 2003 OU A ROD amendment (U.S. Navy, USEPA, and Alaska DEC 2003).

Fact sheets containing information on the fish/shellfish consumption and related advisories were sent to on-island residents in October 2003, July 2004, January 2006, and August 2006. The Navy will continue to issue fact sheets to on-island residents on an annual basis. The next fact sheet will be published and distributed after the results of the 2007 marine monitoring and analysis are available.

6.2.3 Ordnance Awareness Training

The Navy implemented a resident-focused ordnance awareness training program on Adak Island in 1998. Under this program the Navy is responsible for ensuring that island residents and visitors are aware of the potential to encounter MEC items on Adak Island and know proper procedures for reporting such encounters. In addition, the program provides notification of access restrictions that exist for Parcel 4. To carry out these responsibilities, the Navy:

- Provides informational materials to residents of Adak (i.e. refrigerator magnets, coffee cups, Digital Video Disks, posters, highlighters, etc.). These materials convey information regarding how to report potential encounters with MEC.

- Provides hiking maps, DVDs, posters, and other informational materials to City of Adak (Charles Lyon) for distribution and dissemination to residents and visitors to Adak.

- Provides hiking maps to USF&W Adak Office to be provided to applicants of commercial special use permits. These maps provide information on access restrictions and reporting procedures for potential MEC encounters.

- Inspects access restriction notifications and barriers to ensure they function properly

- Communicates with City of Adak and on island employers to ensure awareness of access restrictions and the Navy's intent to enforce them.

- Reviews any incident related to potential MEC encounters on Adak Island to assess the need for revising existing provisions of the ordnance education and awareness program and institutional control .

While no specific requirement exists to maintain institutional controls within Parcel 4 areas at this time, the Navy has placed signage and fencing, as well as blocked access roads to Parcel 4 areas to reduce access and exposure to these areas since 1999. Since then, the Navy has continued to review and make improvements to the institutional control program to reduce explosive hazard exposure in this area. As part of this continuing review and improvement of ICs, the Navy has placed improved access barriers on roads to Parcel 4 and inspected signs and fencing already in place.

There are currently two versions of the ordnance awareness DVD, one for adults and one for children. A DVD was placed in the mailbox of each Adak Island resident in late July 2003. For Adak visitors, copies of the ordnance safety awareness DVDs are also available for checkout or viewing at the City of Adak offices, on the first floor of the high school. The ordnance awareness DVD was also provided to the Adak Island elementary school.

The Navy has several posters that have been effective in notifying people about ordnance hazards. One poster is general in nature, using the previously discussed Aleut grandparent (elder) figures in the foreground, with MEC in natural settings in the background, and the information concerning where more detailed materials can be obtained printed in the center. Laminated copies of these general information posters are posted at the airport, the port, the community store, the café, and by the Adak City office. An example of these posters is provided as Figure 6-3.

The UXO Awareness training materials currently available to the students and teaching staff include the child-focused DVD, coloring books featuring Boomer the Otter, and various items imprinted with the 911 number and steps to take if UXO is encountered (i.e., don't touch, ID location, call authorities). These materials also use the Aleut grandparent theme of "be safe, be aware." Through the 2005 school season, the school teacher (Julie Plummer) started each year with a viewing of the UXO Awareness video. The 2006 school year began with a new teacher and based on the most recent education survey interview with a school official, the session began without the viewing of the video. As a result of the interview, the school official indicated they would show the video and reinstate its showing at the beginning of each new school year.

For adult residents and visitors, a 12-page brochure and 4 double-sided, carabineer-clipped safety cards discuss such topics as the history of Adak, various types of munitions that were stored or handled on island, and the steps to take if MEC is encountered. There is also an updated hiking trail map, which shows the location of established hiking trails and has various facts about the natural flora and fauna of Adak.

For Adak residents, various imprinted items were distributed in the summer of 2003. These items all have MEC-related information printed on them; such as the Navy MEC hotline number, Boomer the otter, “be safe, be aware” language, or abbreviated steps to take if MEC is discovered (i.e., do not touch, remember location, call hotline). The items include refrigerator magnets, coffee mugs, tricolor markers, and small footballs.

Navy contractors receive MEC Awareness training prior to arriving on Adak, as part of their contract requirements. Visitors are currently notified of the availability of MEC Awareness materials via the posters at the airport and fishing dock. Posters are also on the door of the entrance to the high school and at the Bake and Tackle café. As part of the annual ICs site inspection, Adak residents and island visitors are interviewed to ascertain their awareness of, and comprehension of, the MEC Awareness training program.

6.2.4 Information Packages for Public Officials

An information package produced by the Navy defining primary areas of concern was presented to the Adak City Council in October 2002. Maps were supplied that included the boundary of the ICs sites, as identified in this plan. As part of the Institutional Controls Excavation Notification system, compact discs of the maps (as well as hard copies) are available in the Adak City office. In addition, the *AdakUpdate.com* Web site contains the maps, as well as other pertinent technical documents.

6.2.5 Community Involvement During the Five-Year Review

A fact sheet was mailed to community members on September 1, 2005, informing the public that the site is currently undergoing a 5-year review, when, where, and how they could receive information, and how to provide comments on the protectiveness of the remedy. Also, selected community members (primarily RAB members) were interviewed as part of the site interview process described in Section 6.6. Other than the documented interview responses, the Navy received no feedback or comments as a result of the fact sheet publication.

6.3 DOCUMENT REVIEW

Documents reviewed during this 5-year review were primarily those describing the construction and monitoring of the selected remedies, including ICs monitoring and site inspections, during the time period December 2001 to the present. The primary documents that were reviewed are listed below, and all of the documents reviewed are listed in Section 11.

- The signed RODs (U.S. Navy, USEPA, and Alaska DEC 1995, 2000, and 2001) and amendments
- The first 5-year review report (U.S. Navy 2001b)
- The Comprehensive Monitoring Plan (U.S. Navy 2005c)
- The most recent monitoring reports and data
- Various closure, cleanup, and completion reports
- Historical site assessment, inspection, and RI/FS reports

Review of these documents provided much of the information included in Sections 3 and 4 regarding the description of the sites, the RAOs and selected remedy components for each site, and the status of remedy implementation and monitoring at each site.

6.4 DATA REVIEW

This section describes trends in data collected through monitoring programs at the former Adak Naval Complex, with emphasis on data collected since the last 5-year review. The monitoring programs are described in Section 4, and the implications of the data on the functionality and protectiveness of the remedies are discussed in Sections 7 and 8. Trends for the data summarized herein are detailed in the annual groundwater monitoring report (U.S. Navy 2006a) and the annual landfill monitoring report (U.S. Navy 2006b). These documents are available for review on the Navy's Web site (*adakupdate.com*) and in the document repositories in Anchorage on Adak Island and in Silverdale, Washington (See Section 6.2.1). Appendix C provides the 1999 through 2005 data in an Excel spreadsheet. Statistical significance of a trend is defined in the OU A ROD (Navy, USEPA, and Alaska DEC 2000) as a trend with a degree of confidence that is at least 80 percent. The number of data points collected at most sites do not yet allow for this degree of confidence. However, apparent trends are summarized. Remedy status and changes to the monitoring program are briefly restated, as appropriate, in this section for context.

Most of the data collected at the former Adak Naval Complex between 2001 and 2005 have been collected in support of long-term monitoring at OU A sites, or in support of remedy selection or implementation (e.g., chemical sampling at OU B-1 sites). Data collected in support of remedy selection and implementation have been documented in decision documents or closure reports, respectively. These data are not discussed in detail in this 5-year review, but are incorporated into site-specific data trend discussions where appropriate.

In general, monitoring has been conducted at OU A sites annually in September or October. Monitoring at OU A has been prescribed by the CMP for OU A. The CMP has been revised twice since 2001, once in 2004 (U.S. Navy 2004d) and once in 2005 (U.S. Navy 2005c). Revisions have been reviewed and approved by Alaska DEC and EPA. The CMP has been revised for the following reasons:

- To reflect site status changes as remedial progress is realized, with corresponding changes to monitoring programs
- To augment monitoring requirements for sites at which monitoring was previously prescribed, but remedial decisions were recently documented
- To incorporate monitoring requirements at additional sites for which remedial decisions have been recently documented

The data review is summarized on a site-specific basis. Appendix C presents a summary of analytical results by site and location for samples collected from 2001 through 2005.

Analytical results from groundwater monitoring sites are compared to the endpoint criteria specified in the CMP (U.S. Navy 2005c). There are four limited groundwater monitoring sites where the endpoint criteria specified in the *Final Decision Document for Petroleum Sites with No Unacceptable Risk* (U.S. Navy and Alaska DEC 2005a) are 10 times the endpoint criteria for the remaining sites. These four sites are:

- NORPAC Hill Seep Area
- SA 82, P-80/P-81 Buildings, USTs 10587, 10579, and AST 10333
- SA 88, P-70 Energy Generator, UST 10578
- Yakutat Hangar, UST T-2039-A

6.4.1 Natural Attenuation

Natural attenuation is a remedial component for many of the OU A sites. Natural attenuation parameters (NAPs), which are indicators of natural attenuation activity, have been measured at applicable sites by the Navy since at least 1999. In addition, the U.S. Geological Survey characterized the effectiveness of natural attenuation processes for remediating petroleum-contaminated groundwater at OU A at the former Adak Air Complex (USGS 2005).

Both the Navy and U.S. Geological Survey data indicate that natural attenuation of petroleum hydrocarbons, via biological and or chemical means, is ongoing at Adak. The U.S. Geological Survey study (USGS 2005) and annual reports prepared for the 2001 through 2005 monitoring events document the evidence used and provide the rationale for this conclusion.

6.4.2 Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4

Data Review

The Navy has conducted annual groundwater monitoring at one location (ANT-601) at the Antenna Field (USTs ANT-1, ANT-2, ANT-3, and ANT-4) from 2001 through 2005. Monitored natural attenuation is the remedy selected for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples are collected from this well to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Groundwater samples have been collected from well ANT-601 for DRO and RRO analyses. Because RRO endpoint criteria were met in 2004, Alaska DEC and EPA concurred that RRO monitoring could be discontinued in 2005.

Figure 6-4 shows the location of monitoring well ANT-601 relative to potential source areas and the downgradient surface water body, Palisades Lake. Monitoring well ANT-601 is located within the dissolved petroleum plume, approximately 75 feet downgradient from the former petroleum-release area at this site.

DRO was reported in groundwater samples collected from 2001 to 2005 at concentrations ranging from 1,700 to 3,200 µg/L. These concentrations are greater than the Alaska DEC groundwater cleanup level of 1,500 µg/L. The highest DRO concentration was measured in the 2001 sample from this well. The 2005 sample contained DRO at a concentration of 2,410 µg/L. RRO was not detected in the 2001 through 2005 samples at concentrations greater than the Alaska DEC RRO groundwater cleanup level of 1,100 µg/L.

DRO concentrations reported in groundwater samples from monitoring location ANT-601 appear to be increasing over time, if the data from 1990 are included. However, DRO concentrations appear to be decreasing from 2001 to 2005. Additional DRO data are required to produce a statistically significant estimate of the DRO concentration trend.

Future Monitoring Recommendations

DRO concentrations in groundwater remain above the cleanup level of 1,500 µg/L. Therefore, annual groundwater monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.3 Former Power Plant, Building T-1451

Data Review

The Navy has conducted annual groundwater monitoring at location 01-118 at the Former Power Plant, Building T-1451 site from 2001 through 2005. Annual monitoring has been conducted at location E-701 since 2002 and at locations 01-150 and 01-151 since 2003. Monitored natural attenuation is the remedy selected for this site (U.S. Navy, USEPA, and Alaska DEC, 2000). Groundwater samples have been collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Background monitoring for DRO, GRO, BTEX, and NAPs was initiated at well E-701 during 2003. Groundwater samples have been collected from each of these four wells for DRO, RRO, and NAPs analyses. The 2003 groundwater sample collected from well E-701 was also analyzed for GRO and BTEX. Based on results through 2004, Alaska DEC and EPA concurred with a reduction in DRO and RRO monitoring frequency for well E-701, with continued annual NAP monitoring to document background conditions. Because endpoint criteria were met in 2004, Alaska DEC and EPA concurred that RRO monitoring could be discontinued in 2005 at locations 01-150 and 01-151.

Figure 6-5 shows the location of the monitoring wells relative to potential source areas at the Former Power Plant site and the downgradient surface water body, East Canal of the airport ditch system. Monitoring wells 01-118, 01-150, and 01-151 are located within the dissolved petroleum plume downgradient from the former petroleum-release area at this site and upgradient from the East Canal. Monitoring well E-701 is located approximately 400 feet south from the former petroleum release area. This well is located beyond the dissolved-petroleum plume and has been identified as a background monitoring location for the downtown area on Adak Island.

DRO has been measured in well 01-118 at concentrations ranging from 7,080 to 11,200 µg/L, and RRO has ranged from 1,130 to 2,900 µg/L. The highest DRO concentration at well 01-118 was measured in the 2005 sample. The highest and lowest RRO concentrations at 01-118 were measured in the 2005 and 2003 samples, respectively. DRO and RRO have not been measured in groundwater samples from well 01-150 at concentrations greater than practical quantitation limits (PQLs) or cleanup levels. DRO has been measured in the downgradient well 01-151 at concentrations ranging from 1,590 to 2,840 µg/L, with RRO concentrations reported below the

PQLs. The highest DRO concentration at 01-151 was measured in the 2005 sample. DRO, GRO, and BTEX have not been measured at concentrations greater than PQLs in groundwater samples from the background well E-701.

The DRO concentrations observed in groundwater samples from wells 01-118 and 01-150 and the RRO observed in samples from well 01-118 are greater than the Alaska DEC groundwater cleanup level of 1,500 µg/L for DRO and 1,100 µg/L for RRO. RRO has not been measured at concentrations greater than the cleanup level in groundwater samples from the downgradient well 01-151.

DRO concentrations at well 01-118 appear to be decreasing, while increasing at wells 01-150 and 01-151. RRO concentrations at well 01-118 appear to be decreasing. However, these trends cannot be demonstrated with a statistical significance. Further monitoring and sample analyses are required to produce a statistically significant estimate of DRO and RRO concentration trends at these locations.

Future Monitoring Recommendations

DRO concentrations appear to be decreasing near the former source area. Dissolved DRO is approaching the East Canal in groundwater at concentrations greater than the cleanup level (well 01-151). Groundwater samples from well 01-150, which is positioned approximately 280 feet upgradient of well 01-151, have not contained DRO or RRO at concentrations greater than cleanup levels and PQLs, respectively. Annual groundwater monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.4 GCI Compound, UST GCI-1

Data Review

The Navy has conducted annual groundwater monitoring at two locations (04-100 and 04-701) at the GCI Compound, UST GCI-1 site from 2001 through 2005. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC have selected monitored natural attenuation with ICs as the final remedy for this site (U.S. Navy and Alaska DEC 2005b). As a result, the Navy initiated annual monitoring at wells 04-202 and 04-210 in 2005. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to evaluate natural attenuation parameters. Groundwater samples have been collected from each well for GRO, BTEX, and NAPs analyses. Groundwater samples collected from well 04-100 have also been analyzed for DRO.

Figure 6-6 shows the location of these monitoring wells relative to potential source areas at the GCI Compound site. Wells 04-202 and 04-210 are located along the centerline of the dissolved plume, with 04-202 near the former source area and 04-210 located approximately 180 feet downgradient. Well 04-701 is located near the leading edge of the plume approximately 380 feet downgradient of 04-202, and well 04-100 is located south of the plume centerline approximately 150 feet southeast of well 04-202.

DRO and GRO have been measured in groundwater samples from well 04-100 at concentrations ranging from 376 to 440 µg/L and 1,600 to 5,300 µg/L, respectively. The highest GRO concentration was measured in the 2004 groundwater sample from well 04-100. The GRO concentrations have been greater than the cleanup level of 1,300 µg/L. BTEX constituents have not been measured at concentrations greater than cleanup levels or PQLs in groundwater samples from this well. GRO has been measured at concentrations ranging from 53 to 547 µg/L in groundwater samples from well 04-701, which are below the GRO cleanup level. BTEX constituents have not been measured in groundwater samples from well 04-701 at concentrations greater than cleanup levels and or PQLs.

The groundwater sample collected from well 04-210 in 2005 contained GRO at a concentration of 4,580 µg/L, which is greater than the cleanup level of 1,300 µg/L. Benzene was measured in the 2005 sample from this well at a concentration of 5.66 µg/L, which is slightly greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes were not measured in the groundwater sample from this well at concentrations greater than their respective cleanup levels. Well 04-202 was sampled last during 2002. GRO was measured at 5,100 µg/L and benzene was measured at 5 µg/L in this sample, which are greater than their respective cleanup levels of 1,300 and 5 µg/L. Toluene, ethylbenzene, and total xylenes were not measured at concentrations greater than their cleanup levels in this sample. Well 04-202 was not sampled as planned in 2005, because free-product was measured at a thickness of 0.02 foot in this well.

GRO concentrations at locations 04-100 and 04-701 appear to be increasing. DRO concentrations at location 04-100 appear to be decreasing. Further monitoring is required to demonstrate statistically significant estimates of these apparent trends.

Between September 1996 and September 2005, monitoring wells within the vicinity of the GCI Compound have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. In October 2001 and September 2005, free product was detected in 1 of the 10 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.02 foot, in well 04-202 on September 20, 2005.

Free-product recovery at the GCI Compound has not occurred since November 1997, because free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b).

Future Monitoring Recommendations

GRO concentrations remain above the cleanup level along the centerline of the plume and product was observed in one near source well (04-202). GRO concentrations appear to be increasing at the margins of the dissolved plume (wells 04-100 and 04-701), however, GRO concentrations are not greater than the cleanup level at the surface water protection monitoring point (04-701). Additional data are required to establish statistically significant trends at the margins and within the dissolved plume. The measurement of free product in well 04-202 does not appear indicative of a widespread issue requiring action at this time. Annual groundwater monitoring (and free-product removal, if necessary) should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.5 Housing Area (Arctic Acres)

Data Review

The Navy has conducted annual groundwater monitoring at three locations (03-416, 03-420, and AA-01) at the Housing Area (Arctic Acres) from 2001 through 2004. The next sampling at location 03-416 is planned for 2006. Well 03-420 was sampled in 2005. Two additional wells (03-421 and 03-890) were sampled in 2005. Monitored natural attenuation is the ROD-specified remedy for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Groundwater samples from these wells have been analyzed for DRO, RRO, and NAPs. Based on results through 2004, Alaska DEC and EPA concurred with a recommendation for a reduction of sampling frequency at wells 03-416 and AA-01 from annually to once every other year and removal of RRO as an analyte beginning in 2005. Figure 6-7 shows the location of these monitoring wells.

Wells 03-416 and AA-01 were not sampled in 2005. DRO concentrations in groundwater samples from well 03-416 have ranged from 790 to 3,450 µg/L with the highest concentration measured in the 2001 sample. The 2004 sample contained DRO at a concentration of 1,160 µg/L. The 2001 sample is the only sample from this well that contained DRO at a concentration greater than the cleanup level of 1,500 µg/L. RRO has not been measured at a concentration greater than the PQL in the samples from well 03-416. DRO concentrations in groundwater samples from well AA-01 have ranged from 320 to 1,190 µg/L, with the highest concentration measured in the 2001 sample. DRO in groundwater samples from well 03-420 have ranged from 4,900 to 12,300 µg/L, with the highest concentration measured in the 2001 sample. DRO was measured in the 2005 sample from 03-420 at 5,650 µg/L. The DRO concentrations measured in samples from 03-420 are greater than the cleanup level of 1,500 µg/L. RRO in groundwater samples collected at 03-420 range from 341 to 1,200 µg/L, with the highest concentration measured in the 2001 sample.

DRO was measured in groundwater samples from well 03-421 at concentrations of 81,300 µg/L in 2001 and 3,500 µg/L in 2002. Approximately 0.2 foot of free-product was measured on the groundwater surface in well 03-421 during 2005. DRO was measured in groundwater samples from well 03-890 at concentrations of 90,600 µg/L in 2001 and 16,000 µg/L in 2002. Approximately 0.2 foot of free-product was also measured on the groundwater surface in well 03-890 during 2005.

DRO concentrations reported in groundwater samples collected from location 03-420 between 2002 and 2005 appear to be increasing slowly over time, with DRO concentrations decreasing at locations 03-416 and AA-01. RRO concentrations have been below PQLs at locations 03-416 and AA-01 and appear to be decreasing at location 03-420. These trends are apparent and cannot be demonstrated with statistical significance. Additional DRO data are required to produce statistically significant estimates of the DRO concentration trends.

Wells that were sampled once during this review period were 03-422, 04-149, 04-150, 04-404, AA-02, AA-03, AA-04, AA-05, AA-06, NS-3, and NS-4. These wells were sampled during October 2001, prior to initiation of the CMP program. Of these 11 wells sampled, DRO was detected in one well (04-149) at a concentration of 5,220 µg/L, which is greater than the cleanup level of 1,500 µg/L.

Future Monitoring Recommendations

DRO concentrations in groundwater appear to be decreasing over time in samples from wells 03-416 and AA-01. However, DRO concentrations appear to be increasing slowly in groundwater samples from well 03-420, and free-product was observed in two wells during 2005. Therefore, annual groundwater monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.6 NMCB Building Area, T-1416 Expanded Area

Data Review

The Navy is not currently conducting annual monitoring at the NMCB Building, Area T-1416 Expanded Area. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). As a result, free-product monitoring and recovery were conducted during this review period until July 2005. The interim free-product recovery remedy was completed in July 2005 and the closure report was approved by Alaska DEC in January 2006. The Navy and Alaska DEC have selected a final remedy for this site (U.S. Navy and Alaska DEC 2006). The final remedy includes ICs, free-product recovery, and monitored natural attenuation. A monitoring program will be developed and implemented based on the selected final remedy.

A number of field efforts were conducted during the review period in support of final remedy selection. During June 2001, nine groundwater monitoring wells were installed (02-812, 02-814, 02-815, 02-817, NMCB-01, NMCB-03, NMCB-04, NMCB-05, and NMCB-06). Soil sampling was conducted at 17 borehole locations beginning in August 2001 and ending in October 2001. One well (02-818) was installed in March 2002. Marine sediment sampling was conducted at eight locations (02-802, 02-803, 02-805, 02-807, 02-808, 02-820, 02-821, and 02-822). Forty-Seven groundwater samples were collected from 32 wells between June 2001 and March 2002. Monitoring well and sediment sampling locations are shown on Figure 6-8.

Soil Sampling Results. Subsurface soil samples were collected from 2 monitoring well locations and all 17 borehole locations and analyzed for DRO, GRO, BTEX, VOCs, and SVOCs.

DRO was measured at concentrations greater than the cleanup level of 230 mg/kg in subsurface soil samples from six locations. DRO was measured in soil from these locations at concentrations ranging from 248 to 22,600 mg/kg. These samples were collected at depths ranging from approximately 8 to 18 feet bgs. The highest concentration was measured in a sample at a depth of approximately 13 feet bgs. The depth to groundwater at this site generally ranges from 4 to 15 feet bgs.

GRO was measured at concentrations greater than the cleanup level of 260 mg/kg in soil samples collected from three locations. GRO was measured in soil from these locations at concentrations ranging from 330 to 3,670 mg/kg. The highest concentration was measured at a depth of approximately 6 feet bgs.

Benzene was detected at concentrations greater than the cleanup level of 0.02 mg/kg in soil samples from three locations. Benzene was measured at concentrations ranging from 0.0419 to 1.15 mg/kg, with the highest concentration measured at the same location that has the highest measured GRO concentration. This is also the only location where ethylbenzene was measured at a concentration greater than the cleanup level of 5 mg/kg.

Toluene and total xylenes were not measured at concentrations greater than their respective cleanup levels of 4.8 and 69 mg/kg in the soil samples analyzed during this review period.

Methylene chloride was measured in one soil sample at a concentration of 2.09 mg/kg, which is greater than the cleanup level of 0.01 mg/kg. This result is for a soil sample collected from the same location as that of the highest GRO measurement, but at a depth of approximately 8 feet bgs.

None of the other analytes were detected in soil samples collected during the review period at concentrations greater than their respective PQLs and or cleanup levels.

Marine Sediment Sampling Results. Eight marine sediments collected in August 2003 were analyzed for DRO and SVOCs. DRO was detected in one sediment sample (location 02-803) at an estimated concentration of 39 mg/kg, which is well below the risk-based screening concentration (RBSC) of 90.6 mg/kg used for the focused feasibility study (U.S. Navy 2005h). SVOCs were not detected in the eight marine sediment samples at concentrations greater than PQLs and or RSBCs.

Groundwater Sampling Results. Groundwater samples were analyzed for DRO, GRO, BTEX, VOCs, and SVOCs. Not all samples were analyzed for all of these analytes. DRO was measured at concentrations greater than the cleanup level of 1,500 µg/L in 21 samples. The highest concentration of 44,500 µg/L was measured in the sample collected from well 02-475 in June 2001. Well 02-475 was only sampled once during this review period. GRO was measured at concentrations greater than the cleanup level of 1,300 µg/L in 16 samples. The highest concentration of 15,400 µg/L was measured in the June 2001 sample from well 02-489. Well 02-489 was only sampled once during this review period. Benzene was measured at concentrations greater than the cleanup level of 5 µg/L in 15 samples. The highest benzene concentration of 139 µg/L was measured in the March 2002 sample from well 02-489. Toluene, ethylbenzene, and total xylenes were not measured at concentrations greater than their respective cleanup levels. These data are being considered for the ongoing final remedy evaluation.

VOCs and SVOCs were not detected at concentrations above PQLs and or cleanup levels.

Free-Product Monitoring. Between September 1997 and September 2005, monitoring wells within the vicinity of the NMCB Building T-1416 Expanded Area site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between May 2001 and September 2005, free product has been detected in 11 of the 34 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 2.33 feet, in well 02-300 on May 11, 2002.

Free-product recovery at this site was conducted between September 1997 and July 2005, using passive recovery devices installed in site wells. Since 2001, free-product recovery was conducted between May 2001 and November 2001, between May 2002 and October 2002, and between August 2004 and July 2005. During these periods, approximately 194 gallons of free product were recovered. Free-product recovery efforts were discontinued in July 2005. As of July 2005, free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft closure report (U.S. Navy 2005i). Alaska DEC approved the closure report in January 2006. As part of the remedial action for the site, additional free-product recovery activities are planned for the site in new wells that are to be installed as part of the remedial action for the site.

Future Monitoring Recommendations

Free-product is still present at the site. Dissolved petroleum hydrocarbons are present in groundwater at concentrations greater than cleanup levels. Soil impacts identified during the review period are, for the most part, below the product or groundwater surfaces. DRO was detected in one of the eight marine sediment samples collected from the site during the review period at a concentration below the RBSC. The sediment data suggest that free product and/or dissolved petroleum hydrocarbons observed at the site do not currently pose a risk to the adjacent marine environment. A monitoring program will be established based on the final remedy which was selected in the final decision document (U.S. Navy and Alaska DEC 2006). Alaska DEC has requested that well 02-452 be sampled for 2, 4 dinitrotoluene and other munitions constituents. The need for continued munitions constituent monitoring will be based on results of the initial sampling.

The final decision document for the NMCB Building T-1416 Expanded Area specified that dissolved petroleum hydrocarbon concentrations will be compared to 10 times the Alaska groundwater cleanup levels (18 AAC 75.345). Future results from this site will be evaluated against 10 times the cleanup levels, following execution of the final decision document anticipated in 2006.

6.4.7 NORPAC Hill Seep Area

Data Review

The Navy initiated annual groundwater monitoring at six locations (04-145, 04-146, 04-147, 04-403, 04-405, and NS-2) at the NORPAC Hill Seep Area in 2005. Under a decision document executed in 2005, the Navy and Alaska DEC selected limited groundwater monitoring as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As specified in the decision document (U.S. Navy and Alaska DEC 2005a), groundwater samples are collected from these wells to evaluate groundwater quality relative to 10 times the Alaska groundwater cleanup levels

(18 AAC 75.345) as part of the limited groundwater monitoring remedy. Groundwater samples from these wells were analyzed for DRO.

Figure 6-9 shows the location of the monitoring points. Wells NS-2, 04-403, 04-145, and 04-405 are located in or near a housing area. Well 04-146 and 04-147 are located downgradient of the housing area and are monitored for surface water protection purposes.

DRO concentrations measured in 2005 samples collected from this site ranged from 316 µg/L in the upgradient well NS-2 to 4,240 µg/L in the surface water protection well 01-147. Product was observed in the surface water protection well 04-146. DRO was measured at concentrations less than the cleanup level of 13,000 µg/L in four of the sampled wells.

Groundwater monitoring wells within the vicinity of the NORPAC Hill Seep Area have been periodically gauged for petroleum product. Gauging commenced in September 1996 and proceeded until November 2001. Free-product thickness was also measured in September 2005 as part of the annual monitoring program. Only data collected since 2001 are summarized here. Between June 2001 and September 2005, free product has been detected in 1 of 11 wells. Well 04-146 was gauged 153 times between June 2001 and November 2001 and once in September 2005. Product was measured in the well 61 times during this 5-year review period, and the maximum thickness in the well was 0.16 foot. This 0.16-foot thick layer of product was measured in well 04-146 during the most recent gauging of the well (September 22, 2005).

A passive recovery bailer was installed in Well 04-146 in March 1998 and operated through June 2000. Product recovery was discontinued at this location from July 2000 through May 2001. A passive-recovery bailer was re-installed in well 04-146 on June 1, 2001 and checked daily until November 2001. Approximately 0.85 gallon of free product was recovered from this well during this period. Free-product recovery efforts at the NORPAC Hill Seep Area were discontinued on November 15, 2001, because free-product recovery met the practicable endpoint established for the shutdown of product recovery as specified in the OU A ROD, as detailed in the draft closure report (U.S. Navy 2005i). The closure report was approved by Alaska DEC in January 2006.

Future Monitoring Recommendations

DRO is present in groundwater at concentrations less than 10 times the Alaska cleanup level, which is the comparative criteria for the site. DRO has migrated to the downgradient surface water protection points at concentrations greater than cleanup levels. Free product was observed in surface water protection well 04-146 in 2005. Annual monitoring should be continued as prescribed by the CMP, Revision 2 (U.S. Navy 2005c). Inspections for visual signs of seeps and sheens should be added to the annual monitoring protocols for this site, because of the presence of free product in surface water protection well 04-146.

6.4.8 ROICC Contractor's Area, UST ROICC-7

Data Review

The Navy has conducted annual groundwater monitoring at three locations (08-175, 08-200, and 08-202) at the ROICC Contractor's Area (UST ROICC-7) from 2001 through 2005. Limited groundwater monitoring was the remedy selected for this site (U.S. Navy, USEPA, and Alaska DEC 2000). However, monitoring results obtained between 1999 and 2003 identified benzene concentrations in groundwater above the Alaska groundwater cleanup levels. Because benzene concentrations in groundwater exceed cleanup levels, the site failed to achieve endpoint criteria established for the limited groundwater monitoring remedy in the OU A ROD. Therefore, the Navy initiated natural attenuation evaluation monitoring at this site. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to evaluate natural attenuation parameters. Groundwater samples are collected from each of these three wells and analyzed for site-specific target analytes (GRO and BTEX, and NAPs). Because benzene concentrations have been below the endpoint criteria in downgradient well 08-175, Alaska DEC and EPA concurred with the 2004 recommendation to reduce BTEX monitoring at this location to once every other year, with the next sampling planned in 2006.

Benzene concentrations in groundwater samples from wells 08-200 and 08-202 (Figure 6-10) have been above the cleanup level of 5 µg/L. Benzene concentrations in groundwater samples from 08-200 have decreased from 361 to 288 µg/L from 2001 to 2004. The 2005 benzene result for well 08-200 was reported at 14.6 µg/L. Benzene concentrations in groundwater samples from well 08-202 have ranged from 16 to 24 µg/L between 2001 and 2004, with the maximum and minimum detections measured in the 2003 and 2004 samples, respectively. The 2005 benzene result for 08-202 was reported at 233 µg/L. Based on the reported results, it appears that benzene concentrations have decreased significantly in groundwater samples from well 08-200 and increased significantly in groundwater samples from well 08-202 from 2004 to 2005. However, benzene concentrations have historically been substantially higher in well 08-200 than 08-202, but this relationship is reversed for the 2005 monitoring results. Based on the historical benzene concentration relationships, it is possible that the 2005 results for wells 08-200 and 08-202 were switched. Results from the 2006 monitoring event could confirm this possibility.

Benzene concentrations have been below the cleanup level in groundwater samples from downgradient well 04-175.

GRO, toluene, ethylbenzene, and total xylene concentrations have been below their respective cleanup levels in groundwater samples collected from these three wells since 2001.

Benzene concentrations appear to be decreasing in groundwater samples from well 08-200 and 08-202, with the exception of the noted 2005 discrepancy at location 08-202. Benzene concentrations in groundwater samples from well 04-175 are fluctuating at concentrations below the cleanup level. These trends are apparent and cannot be demonstrated with statistical significance. Additional benzene data are required to produce statistically significant estimates of the benzene concentration trends.

Future Monitoring Recommendations

Benzene remains in groundwater at concentrations greater than the cleanup level in the near source area. However, benzene has not migrated to the downgradient monitoring point at concentrations greater than the cleanup level. Annual monitoring should be continued as prescribed by the CMP, Revision 2 (U.S. Navy 2005c).

6.4.9 Runway 5-23 Avgas Valve Pit

Data Review

The Navy has conducted annual periodic groundwater monitoring at two locations (14-100 and 14-110) at the Runway 5-23 Avgas Valve Pit site from 2001 through 2005. Monitored natural attenuation is the remedy selected for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Groundwater samples have been analyzed for GRO, BTEX, and NAPs.

Figure 6-11 shows the location of these monitoring wells. Wells 14-100 and 14-110 are located approximately 30 and 80 feet downgradient of the former source area.

GRO concentrations in groundwater samples from well 14-100 have ranged from 1,000 to 4,200 µg/L, with the highest concentration measured in the 2000 sample. The 2004 sample from 14-100 contained GRO at 3,095 µg/L, and the 2005 sample contained 1,770 µg/L. Groundwater samples collected from well 04-100 in 2000, 2001, 2004, and 2005 contained GRO at concentrations greater than the cleanup level of 1,300 µg/L. Benzene concentrations in groundwater samples from this well have ranged from 0.76 to 12.5 µg/L, with the highest concentration measured in the 2001 groundwater sample. Benzene has decreased to concentrations below cleanup levels since 2003. Toluene, ethylbenzene, and total xylenes concentrations have been below their respective cleanup levels in groundwater samples from well 04-100.

GRO concentrations in groundwater samples from well 04-110 have ranged from 920 to 1,240 µg/L, with the highest concentration measured in the 2004 sample. GRO was measured at 631 µg/L in the 2005 sample from this well. BTEX concentrations have been below their respective cleanup levels or PQLs in groundwater samples from this downgradient well.

GRO and BTEX concentrations in groundwater samples from well 04-100 have generally decreased since 1999. GRO concentrations in groundwater samples from well 04-110 have been relatively flat. These trends are apparent and cannot be demonstrated with statistical significance. Additional GRO and BTEX data are required to produce statistically significant estimates of these concentration trends.

Future Monitoring Recommendations

GRO concentrations in groundwater from the near source well are greater than the cleanup level and have fluctuated, but show an apparent decreasing trend. Benzene concentrations in groundwater from the near source decreased to concentrations below the cleanup level in 2003. GRO and BTEX concentrations in groundwater at the downgradient well have been below their respective cleanup levels with benzene concentrations also below the PQLs. Based on these observations, it appears that GRO and BTEX are naturally degrading to concentrations below cleanup levels prior to reaching the downgradient monitoring point located approximately 80 feet from the former source area. Annual monitoring should be continued as prescribed by the CMP, Revision 2 (U.S. Navy 2005c) to assess stability of the dissolved plume and assess the statistical significance of the decreasing GRO concentration trend.

6.4.10 SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs

Data Review

The Navy has conducted annual groundwater monitoring at two locations (12-801 and 12-802) from 2001 through 2005 at the SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs. The ROD-specified interim remedy for this site was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC selected monitored natural attenuation with ICs as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As a result, the Navy initiated annual monitoring at four additional locations (12-145, 12-152, MW-116, and MW-117) in 2005. These locations were also sampled in 2002. Surface water protection monitoring is specified in the CMP, Revision 2 (U.S. Navy 2005c) at wells 12-801 and 12-802 to monitor for migration of petroleum hydrocarbons in groundwater towards Clam Lagoon. Groundwater is monitored at locations 12-145, 12-152, MW-116, and MW-117 for the monitored natural attenuation component of the final remedy. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345). Groundwater samples were analyzed for DRO, GRO, and

BTEX. Well 12-802 also serves as the background well for this area, and the 2004 sample collected from it was analyzed for NAPs.

Figure 6-12 shows the location of these monitoring wells. Well 12-145 is located within a former UST excavation and inferred source area. Well 12-152 is located approximately 220 feet downgradient of the former UST excavation, and wells MW-116 and MW-117 are located approximately 290 and 240 feet from the former UST excavation, respectively. Well MW-116 is positioned south of the plume centerline, and MW-117 is positioned north of the plume centerline. Well 12-801 is located in a surface drainage swale approximately 800 feet from the former UST excavation along a line drawn between wells 12-145 and MW-117. Well 12-802 is located approximately 780 feet from the former UST excavation along an approximate line drawn between wells 12-152 and MW-116.

DRO concentrations have increased from 850 to 4,580 µg/L and GRO concentrations have decreased from 4,500 to 1,880 µg/L in the 2002 and 2005 groundwater samples from source area well 12-145, respectively. The 2005 DRO concentration was greater than the cleanup level of 1,500 µg/L, and the 2002 and 2005 GRO concentrations were greater than the cleanup level of 1,300 µg/L. Benzene concentrations have decreased from 160 to 2.4 µg/L in the 2002 and 2005 samples from this well, respectively, with the 2002 concentration being greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylene concentrations were below cleanup levels or PQLs in the 2002 and 2005 samples from this well.

DRO concentrations have decreased from 1,200 to 1,130 µg/L, and GRO concentrations decreased from 3,500 to 1,200 µg/L in the 2002 and 2005, respectively, groundwater samples from monitored natural attenuation well MW-117. The 2002 concentration was greater than the cleanup level of 1,300 µg/L. Benzene concentrations have decreased from 29 to 5.45 µg/L in the 2002 and 2005 samples from this well, both of which are greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylene concentrations have been below their respective cleanup levels in the 2002 and 2005 groundwater samples from this well.

Since 2001, DRO, GRO, and BTEX concentrations have been below PQLs or cleanup levels in groundwater samples collected from monitored natural attenuation wells 12-152 and MW-166 together with surface water protection wells 12-801 and 12-802.

The apparent trends described for this site are based on results of two sampling events and are not considered to be statistically significant. Additional data are required to estimate statistically significant trends.

Between November 1996 and September 2005, monitoring wells within the vicinity of the SA 78, Old Transportation Building site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between September

2001 and September 2005, free product was detected in one of six wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.02 foot in well 12-145 on August 5, 2002.

Free product recovery at the SA 78, Old Transportation Building site has not occurred since June 2000, because free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site.

Future Monitoring Recommendations

The existing data suggest that DRO concentrations may be increasing, whereas GRO and BTEX concentrations are decreasing, in the source area. DRO, GRO and BTEX concentrations appear to be decreasing in the well immediately downgradient of the source area. The data also suggest that dissolved hydrocarbons have not migrated significantly beyond downgradient well MW-117.

Results from the surface water protection wells show that dissolved petroleum hydrocarbons have not reached the surface water protection monitoring points and suggest that the downgradient surface water body, Clam Lagoon, is not currently at risk.

In general, monitored natural attenuation appears to be effective for GRO and BTEX. DRO concentrations did increase in the source are; however, they are expected to decrease over time. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c) to monitor natural degradation of petroleum hydrocarbons and to monitor for migration of dissolved constituents toward Clam Lagoon.

6.4.11 SA 79, Main Road Pipeline, South End

Data Review

The Navy has conducted annual groundwater monitoring at two locations (wells 02-230 and MRP-MW8) at SA 79, Main Road Pipeline, South End site since 2001. Monitored natural attenuation with surface water protection monitoring is the selected remedy for the site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring at the south end of the site. Groundwater samples have been analyzed for DRO and NAPs.

In 2004, the Navy proposed modification to the monitoring program for this site, based on the interpretation of monitoring results obtained between 1999 and 2003. These modifications included discontinuation of monitoring for GRO and BTEX compounds in groundwater at locations 02-230 and MRP-MW8 and initiation of visual inspection of the Sweeper Cove shoreline for petroleum seeps or sheen. In 2005, the Navy proposed termination of lead monitoring at MRP-MW15 (SA 79, Main Road Pipeline, South End) because endpoint criteria had been met. Alaska DEC and EPA concurred with these proposed modifications.

Figure 6-13 shows the location of these monitoring wells. Wells 02-230 and MRP-MW8 are located approximately 70 and 100 feet from the shoreline of Sweeper Cove respectively.

DRO concentrations in groundwater samples collected from well 02-230 during this review period have ranged from 3,900 to 5,760 µg/L, with the highest concentration measured in the 2004 sample. DRO was measured in the 2005 sample from this well at 4,060 µg/L. DRO concentrations in groundwater samples from well MRP-MW8 have ranged from 2,790 to 3,890 µg/L during this review period. This highest DRO concentration was measured in the 2004 sample from this well. DRO was measured in the 2005 sample from this well at 3,700 µg/L. The DRO concentrations measured at both site wells during the review period were greater than the DRO cleanup level of 1,500 µg/L. Well 02-230 is a surface water protection monitoring point. As a result of the measured DRO concentrations in groundwater samples from 02-230, visual inspection of the shoreline for petroleum seeps and sheens is conducted annually. For marine environments, such as Sweeper Cove, the inspection is conducted at low tide, if possible. Sediments are disturbed in an effort to induce a sheen, if present. No evidence of petroleum seeps or sheens along the shoreline or in surface water of Sweeper Cove has been documented during the review period.

DRO concentrations in groundwater samples from both wells 02-230 and MRP-MW8 appear to be increasing. This trend is apparent and cannot be demonstrated with statistical significance. Additional DRO data are required to produce statistically a significant estimate of the DRO concentration trend at this location.

Future Monitoring Recommendations

Dissolved DRO has migrated to the surface water protection point at a concentration greater than the cleanup level. However, petroleum seeps and or sheens have not been observed along the adjacent shoreline of Sweeper Cove. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.12 SA 80, Steam Plant 4, USTs 27089 and 27090

Data Review

The Navy has conducted annual groundwater monitoring at two locations (04-103 and SP4-3) at SA 80, Steam Plant 4, USTs 27089 and 27090. Well SP4-3 has been sampled annually since 2002, while well 04-103 has been sampled annually since 2003. A groundwater sample was collected from well 04-173 in 2004. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC selected monitored natural attenuation with ICs as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As a result, the Navy initiated annual monitoring at three additional locations (04-158, 04-159, and 04-801) in 2005. Groundwater samples have been collected from these wells for DRO and NAPs analyses.

Figure 6-14 shows the location of these monitoring wells. Wells 04-158 and 04-173 are located in the general former source area. Wells 04-159 and 04-801 are located within the dissolved plume at increasing downgradient distances, respectively. SP4-3 is located south of the centerline, and 04-103 is located substantially south of the plume centerline and further downgradient than SP4-3.

DRO concentrations in groundwater samples from well 04-103 have been below the cleanup level of 1,500 µg/L. DRO was measured at a concentration of 2,560 µg/L in the 2004 groundwater sample from well 04-173. DRO was measured in the groundwater samples from well SP4-3 at concentrations ranging from 1,670 to 5,130 µg/L, with the highest concentration measured in the 2004 sample and the lowest concentration measured in the 2005 sample. The measured DRO concentrations in groundwater samples from wells 04-173 and SP4-3 have been above the DRO cleanup level of 1,500 µg/L. DRO concentrations were measured at 7,310 µg/L in the 2005 sample from well 04-158 and 1,410 µg/L in the 2005 sample from 04-159. The 2005 sample from downgradient well 04-801 did not contain DRO at a concentration greater than the PQL.

DRO concentrations in groundwater samples from SP4-3 appear to be decreasing. This apparent trend cannot be demonstrated with statistical significance. Additional DRO data are required to produce statistically a significant estimate of the DRO concentration trend at this location. There are not enough time-dependent data points to estimate apparent trends in groundwater samples from wells 04-103, 04-158, 04-159 04-173, and 04-801 at this time.

Between October 1996 and September 2005, monitoring wells within the vicinity of the SA 80, Steam Plant 4 site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between October 2001 and September 2005, free product was detected in five of the eight wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 1.23 feet, in well 04-173 on September 10, 2005.

Free-product recovery at the SA 80, Steam Plant 4 site ceased in June 2000, because free product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site (U.S. Navy and Alaska DEC 2005a). However, the Navy will perform annual free-product monitoring as part of the scheduled annual groundwater monitoring activities. All site wells will be monitored for free product, and free product will be removed that is detected in wells above minimum thicknesses specified in the decision document (0.5 foot in a 2-inch well and 0.1 foot in a 4- or 6-inch well). Free product found in wells during the 2005 monitoring effort (2.5 gallons) was removed in accordance with the protocols of the CMP, Revision 2 (U.S. Navy 2005c) and the decision document (U.S. Navy and Alaska DEC 2005a). The free-product recovery protocol was not in place prior to the 2005 monitoring effort, and therefore free product found during monitoring in 2001 through 2004 was not removed.

Future Monitoring Recommendations

DRO is present in groundwater at concentrations greater than the cleanup level in the former source area and immediately downgradient. DRO has not migrated to the downgradient monitoring points at concentrations greater than PQLs. Annual monitoring and product removal, if warranted, should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.13 SA 82, P-80/P-81 Buildings, UST 10587 and AST 10333

Data Review

The Navy has conducted annual groundwater monitoring at one location (12-401) at SA 82, P-80/P-81 Buildings since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC have selected limited groundwater monitoring as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As a result, the Navy initiated annual monitoring at three locations (12-170, 12-172, and 12-180) in 2005 for the limited groundwater monitoring component of the final remedy. These wells were also sampled in 2002. Well 12-401 is being monitored for surface water protection purposes. The downgradient surface water body is Clam Lagoon. Groundwater samples are collected from these wells to evaluate groundwater quality relative to 10 times Alaska groundwater cleanup levels (18 AAC 75.345), as specified in the decision document (U.S. Navy and Alaska DEC 2005a), to protect the downgradient water body. Groundwater samples from these wells have been analyzed for DRO.

Figure 6-15 shows the location of these monitoring wells. Wells 12-170 and 12-180 are each positioned within individual former UST excavations that are separated by approximately 110 feet. Wells 12-172 and 12-401 are located approximately 90 and 220 feet downgradient of well 12-170, respectively.

DRO has been measured at concentrations of 300 and 1,500 µg/L in the 2002 and 2005, respectively groundwater samples from well 12-170. These concentrations are less than 10 times the cleanup level. DRO has not been measured at concentrations greater than PQLs and or cleanup levels in groundwater samples collected from well 12-172, 12-180, or 12-401.

Based on the two data points from well 12-170, DRO concentrations appear to be increasing. However, additional data are required to estimate a statistically significant trend.

Between October 1996 and September 2005, monitoring wells within the vicinity of the SA 82, P-80/P-81 Buildings have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between September 2001 and September 2005, free product has been detected in two of the six wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.17 foot, in well 12-170 on October 15, 2003.

Free product recovery at the SA 82, P-80/P-81 Buildings has not occurred since June 2000, because free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site.

Future Monitoring Recommendations

Dissolved DRO is present in groundwater in the area of a former UST at a concentration less than 10 times the cleanup level. DRO has not been measured at concentrations greater than the cleanup level in areas outside of the immediate area of the former UST and has not migrated to the surface water protection point. These results suggest that Clam Lagoon is not currently at risk from this site. Free product was observed at the site in 2003, but was not observed in 2004 or 2005 and DRO concentrations remain at or below the cleanup level. This indicates that the remedy selected in the decision document (limited groundwater monitoring) remains appropriate.

Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.14 SA 88, P-70 Energy Generator, UST 10578

Data Review

The Navy has conducted annual groundwater monitoring at one location (12-701) at the SA 88, P-70 Energy Generator, UST 10578 since 2001 for surface water protection purposes. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC selected limited groundwater monitoring as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As a result, the Navy initiated annual monitoring at five locations (12-162, 12-163, 12-197, 12-198, and 12-253) in 2005. Groundwater samples were collected from these wells to evaluate groundwater quality relative to 10 times the Alaska groundwater cleanup levels (18 AAC 75.345), as specified in the decision document (U.S. Navy and Alaska DEC 2005a). Groundwater samples collected from these wells have been analyzed for DRO.

Groundwater samples were collected from wells 12-162, 12-163, 12-198, and 12-252 in September 2004 and analyzed for DRO, GRO, and BTEX compounds. These wells were sampled to support final remedy evaluation.

Figure 6-16 shows the location of these wells relative to site features. Well 12-701 is located outside of the dissolved petroleum plume, approximately 170 feet downgradient of the former UST at this site and approximately 300 feet upgradient of a drainage ditch that drains to Clam Lagoon. Well 12-162 is located within the former UST excavation limits at the site. Well 12-163 is located approximately 20 feet downgradient of the former UST excavation. Well 12-198 is located approximately 15 feet upgradient of the former UST excavation. Well 12-252 is located approximately 40 feet crossgradient and downgradient of the former UST excavation.

DRO was measured at concentration of 524,000 µg/L, which is greater than 10 times the cleanup level of 1,500 µg/L in the 2004 groundwater sample from well 12-163. Well 12-163 is located just downgradient of the former UST location. Free product was measured at a thickness of 0.26 foot in well 12-163 in 2004. Product was also observed in four wells during the 2005 event at thicknesses of 0.3 foot (12-162), 0.12 foot (12-163), 0.06 foot (12-197), and 1.21 feet (12-198).

DRO has remained below PQLs in groundwater samples collected from downgradient well 12-701, which is monitored for surface water protection purposes. DRO was measured at concentrations of 3,810 and 7,200 µg/L in the one-time groundwater samples collected from wells 12-162, and 12-198 in 2004. The highest DRO concentration was measured in the groundwater sample from well 12-198, which is upgradient of the former UST. These concentrations are less than 10 times the DRO cleanup level of 1,500 µg/L. The one-time 2004 groundwater sample from well 12-252 contained DRO at a concentration of 749 µg/L, which is less than the DRO cleanup level.

Between October 1996 and September 2005, monitoring wells within the vicinity of the SA 88, P-70 Energy Generator, UST 10578 site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between September 2001 and September 2005, free product has been detected in five of the eight wells installed at the site. The maximum measured thickness of free product reported at the site since 2001 was 1.86 feet, in well 12-198 on September 12, 2004.

Free-product recovery at the SA 88, P-70 Energy Generator, UST 10578 site ceased in June 2000, because free-product recovery met the practicable endpoint established for the shut down of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site. However, the Navy will perform annual free-product monitoring as part of the scheduled annual groundwater monitoring activities. All site wells will be monitored for free product, and free product will be removed that is detected in wells above minimum thicknesses specified in the decision document. Free product will be removed annually if the measured thickness is greater than 0.5 foot in a 2-inch well and greater than 0.1 foot in a 4- or 6-inch well. Free product found in wells during the 2005 monitoring effort (1 gallon) was removed in accordance with the protocols of the CMP, Revision 2 (U.S. Navy 2005c) and the decision document (U.S. Navy and Alaska DEC 2005a). The free-product recovery protocol was not in place prior to the 2005 monitoring effort, and, therefore, free product found during monitoring in 2001 through 2004 was not removed.

Future Monitoring Recommendations

The DRO concentration in a near source area well was greater than 10 times the groundwater cleanup levels in 2004. Product was observed in near source wells in 2005. The largest product thickness was measured in well 12-198, which is approximately 15 feet upgradient of the former UST location at the site.

Dissolved DRO has not migrated to the surface water protection point, which suggests that the downgradient surface water body (Clam Lagoon) is not currently at risk from the known site conditions. Annual monitoring should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

Given the observed free-product at the site, it is unlikely that the limited groundwater monitoring will be functionally capable of meeting the RAOs (U.S. Navy and Alaska DEC 2005a).

6.4.15 South of Runway 18-36 Area

Data Review

The Navy has conducted annual groundwater monitoring at six locations (E-208, E-216, E-218, 02-231, 02-232, and MRP-12) at the South of Runway 18-36 Area site since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA and, Alaska DEC 2000). The Navy and Alaska DEC will select a final remedy for this site (U.S. Navy 2004f). The proposed plan for the South of Runway 18-36 site, institutional controls, free-product recovery, monitored natural attenuation, was submitted for public review in December 2005. A final decision on the final remedy for this site is planned for 2006. Surface water protection monitoring is specified for locations at this site in the CMP, Revision 2 (U.S. Navy 2005c) to monitor the potential migration of petroleum hydrocarbons in groundwater towards South Sweeper Creek and Sweeper Cove. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to monitor for surface-water protection. Groundwater samples from wells 02-231, 02-232, E-208, E-216, E-218, and MRP-12 have been analyzed for the DRO. Groundwater samples collected from well 02-231 have also been analyzed for GRO and BTEX compounds.

Figure 6-17 shows the location of the monitoring wells relative to the downgradient surface water bodies, South Sweeper Creek and Sweeper Cove. The three wells that are located nearest to the creek are wells E-218, 02-231, and 02-232. These wells are approximately 40, 20, and 80 feet from the creek, respectively. Based on historical monitoring results, the Navy also conducts visual inspections of South Sweeper Creek in the area of wells 02-231, 02-232, E-216, and E-218 for petroleum seeps and sheens. For flowing water bodies, such as South Sweeper Creek, the visual inspection is conducted both upgradient and downgradient of the targeted monitoring well. Sediments are disturbed in an effort to induce sheen, if present.

DRO has not been measured at concentrations above PQLs and/or cleanup levels in groundwater samples collected from wells E-208 and MRP-12. The 2003 sample from well E-218 contained DRO at a concentration greater than the cleanup level, while the 2001, 2002, 2004, and 2005 samples from this well did not contain DRO at concentrations greater than the cleanup level. DRO has been measured at concentrations ranging from 2,600 to 23,800 µg/L in groundwater samples from wells 02-231, 02-232, and E-216. This range is greater than the cleanup level of 1,500 µg/L. The highest DRO concentration was measured in the 2001 sample from well 02-231. Free-product was observed on the groundwater surface at E-216 in 2004.

GRO has been measured at concentrations ranging from 910 to 2,200 µg/L in groundwater samples from well 02-231, with the highest concentration measured in the 2004 sample. GRO was measured at 1,450 µg/L in the 2005 sample from this well. GRO has been measured at concentrations greater than the cleanup level of 1,500 µg/L in the 2001, 2003, and 2004 groundwater samples from well 02-231. Benzene has been measured at concentrations ranging from 33 to 110 µg/L in groundwater samples from this well. The highest benzene concentration was measured in the 2003 groundwater sample, and the 2005 groundwater sample contained 42 µg/L. Benzene has been measured at concentrations greater than the cleanup level of 5 µg/L in groundwater samples collected from well 02-231 since 1999. The federal surface water standard for benzene is 710 µg/L based on human ingestion of organisms. The benzene concentration range of 33 to 110 µg/L in groundwater at well 02-231 is significantly lower than the surface water standard. Toluene, ethylbenzene, and total xylenes have not been measured in groundwater samples collected from well 02-231 at concentrations greater than their respective cleanup levels since 1999.

DRO concentrations in groundwater appear to be increasing in samples from wells E-218 and 02-232. GRO and benzene concentrations appear to be increasing in groundwater samples from well 02-231. However, these trends are apparent and cannot be demonstrated with statistical significance. Additional data are required to produce statistically significant estimates of these trends.

Wells that were sampled once during this review period were 18/36-01 through 18/36-05. These wells were sampled during October 2001, prior to initiation of the CMP program. Of these five wells, DRO was measured at concentrations greater than the cleanup level of 1,500 µg/L in the samples from wells 18/36-01 and 18/36-02. These data are being considered for the final remedy evaluation.

Between June 1997 and September 2005, monitoring wells within the vicinity of the South of Runway 18-36 Area site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between May 2001 and September 2005, free product was gauged multiple times. Free product has been detected in 15 of the 20 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 2.015 feet in well E-216 on May 11, 2002.

Free-product recovery at this site was conducted between June 1997 and July 2005, using passive recovery devices. Since 2001, free-product recovery was conducted between May and November 2001, between May and October 2002, and between August 2004 and July 2005. During these periods, approximately 91 gallons of free product were recovered. Free-product recovery efforts were discontinued in July 2005. As of July 2005, free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the closure report (U.S. Navy 2005i) approved by Alaska DEC in January

2006. Additional free-product recovery activities are planned for the site because seven new wells will be installed as part of the remedial action for the site.

Future Monitoring Recommendations

Petroleum hydrocarbons have migrated in groundwater to surface water protection points 02-231 and 02-232 at concentrations greater than cleanup levels. However, no seeps or sheens have been identified on the shoreline, and sheens were not observed on the surface water in the area of these two wells.

The draft decision document specifies that dissolved hydrocarbon concentrations will be compared to 10 times the Alaska cleanup levels (AAC 18 75-345). Future results will be compared to 10 times the cleanup level following execution of the final decision document.

6.4.16 SWMU 14, Old Pesticide Disposal Area

Data Review

The Navy has conducted annual groundwater monitoring at two locations at SWMU 14, Old Pesticide Disposal Area. Groundwater samples have been collected annually from location MW14-5 since 1999. Annual groundwater monitoring was initiated in 2003 at location 01-153. The combination of monitored natural attenuation and compliance monitoring is the selected remedy for this site (U.S. Navy, USEPA, and Alaska DEC 2000). The natural attenuation remedy is related to petroleum hydrocarbons observed in groundwater at the site. Compliance monitoring is related to chlorinated solvents, total lead, dissolved lead, methylene chloride, and bis-2(ethylhexyl)phthalate observed in groundwater at the site.

Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Groundwater samples have been collected from wells 01-153 and MW14-5 for DRO, GRO, BTEX, dissolved and total lead, total thallium, VOCs, bis(2-ethylhexyl)phthalate, and NAPs. Based on previous results, Alaska DEC and EPA have concurred with the recommendation that total thallium monitoring be discontinued at both of the locations beginning in 2005 and that DRO monitoring frequency be reduced to every other year at 01-153 with the next sampling planned for 2006. It was also agreed that bis(2-ethylhexyl)phthalate monitoring would be terminated at MW14-5.

Figure 6-18 shows the location of the monitoring wells relative to the site features. MW14-5 is located nearest to the inferred source area at the site and well 01-153 is located approximately 230 feet downgradient.

DRO concentrations in groundwater samples from MW14-5 have ranged from 1,720 to 3,900 µg/L, with the highest concentration measured in the 2001 sample. The lowest DRO concentration was measured in the 2004 groundwater sample from this well. DRO was measured at 2,770 µg/L in the 2005 sample from this well. GRO concentrations in groundwater from MW14-5 have ranged from 12,000 to 17,950 µg/L, with the highest concentration measured in the 2004 sample. GRO was measured at 12,600 µg/L in the 2005 sample from this well. The DRO and GRO concentrations observed in groundwater samples from MW14-5 have been above their respective cleanup levels of 1,500 and 1,300 µg/L during this review period. DRO concentrations from this well have generally increased since 1999, and GRO concentrations have fluctuated during this same time period with a slight decreasing apparent trend.

Benzene concentrations have decreased from 20.1 µg/L in 2001 to less than 5 µg/L in 2005 in groundwater samples from well MW14-5. However, the PQL for the 2003 sample was 40 µg/L, which is greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes have been measured at concentrations below their respective PQLs since 2001.

PCE was reported at concentrations below PQLs or the cleanup level of 5 µg/L in groundwater samples collected from well MW14-5 since 2001. However, the PQL for the 2003 sample was greater than the cleanup level. Trichloroethene (TCE) and 1,1-dichloroethene (1,1-DCE) have been reported at concentrations below PQLs since 2001; however, the 2003, 2004, and 2005 PQLs were greater than their respective cleanup levels of 5 and 7 µg/L. Trans-1,2-dichloroethene (trans-1,2-DCE) and cis-1,2-dichloroethene (cis-1,2-DCE) have been reported at concentrations below PQLs, and the PQLs have been below their respective cleanup levels of 100 and 70 µg/L. Vinyl chloride has been reported below PQLs since 2001. However, the 2001, 2003, 2004, and 2005 PQLs for vinyl chloride were greater than the cleanup level of 2 µg/L. Methylene chloride concentrations have been reported below the PQLs since 2001. However, the PQLs for the 2001, 2003, 2004, and 2005 samples were greater than the cleanup level of 5 µg/L.

Trends have not been assessed, because the chlorinated solvent concentrations have generally been reported at concentrations below PQLs in groundwater samples collected from well MW14-5 since 2001, and the only variability is reflected in the varying PQLs.

Since bis(2-ethylhexyl)phthalate concentrations were below endpoint criteria during the 2003 and 2004 monitoring events, monitoring for this compound at MW14-5 was terminated.

Total lead concentrations in groundwater samples from well MW14-5 have ranged from 21.5 to 83.6 µg/L, with the highest concentration measured in the 2003 sample and the lowest concentration measured in the 2004 sample. Total lead was measured at 22.3 µg/L in the 2005 sample from this well. Dissolved lead concentrations from well MW14-5 have ranged from 25.3

o 84.6 µg/L, with the highest and lowest concentrations measured in 2003 and 2004, respectively. Dissolved lead was measured at 20.8 µg/L in the 2005 sample from this well. Total and dissolved lead concentrations in samples from well MW14-5 have been greater than the cleanup level of 15 µg/L since 2001.

Total and dissolved lead concentrations have generally decreased in groundwater samples from well MW14-5. The exceptions to this generalization are the total and dissolved 2003 results, both of which appear to be unusually high, relative to both previous and subsequent results.

DRO, GRO, and BTEX concentrations in 2003, 2004, and 2005 groundwater samples from well 01-153 were below their respective cleanup levels.

PCE concentrations have decreased from been reported at 27 µg/L in 2003 to 6.75 µg/L in 2005 at well 01-153. PCE concentrations have been greater than the cleanup level of 5 µg/L since monitoring was initiated at the location in 2003. TCE, 1,1-DCE, and vinyl chloride were reported in the 2003, 2004, and 2005 groundwater samples at concentrations below PQLs. However, the 2003 PQLs were greater than their respective cleanup levels. Trans-1,2-DCE and cis-1,2-DCE were reported in the 2003, 2004, and 2005 groundwater samples at concentrations below PQLs, and the PQLs were less than their respective cleanup levels. Methylene chloride was reported at concentrations below PQLs in the 2003, 2004, and 2005 samples.

Trends have not been assessed, since the VOC concentrations have generally been reported at concentrations below PQLs in groundwater samples collected from well 01-153.

Bis-2(ethylhexyl)phthalate was reported in the 2004 and 2005 groundwater samples from well 01-153 at concentrations below the PQL and/or cleanup level of 6 µg/L. Bis-2(ethylhexyl)phthalate was inadvertently omitted from the analyte list in 2003.

Total lead was reported at 12.3 and 51.3 µg/L in the 2003 and 2004 groundwater samples from 01-153 and at 7.82 µg/L in the 2005 sample. Dissolved lead was reported at 11, 45.1, and 7.18 µg/L in the 2003, 2004, and 2005 samples from 01-153, respectively. The 2004 total and dissolved lead concentrations were greater than the cleanup level of 15 µg/L. Total and dissolved lead concentrations in well 01-153 samples have decreased from 2003 to 2005. However, these concentrations were substantially elevated in the 2004 sample. These apparent trends are not statistically significant, since they are based on only two sample results each. Additional data are required to estimate statistically significant trends.

Future Monitoring Recommendations

DRO, GRO, total lead, and dissolved lead concentrations near the inferred source area remain above their respective cleanup levels. DRO concentrations here appear to be increasing, while total and dissolved lead concentrations appear to be decreasing. GRO concentrations here appear to be fluctuating. Benzene concentrations near the source area have decreased to concentrations below cleanup levels. PCE, total lead, and dissolved lead remain above cleanup levels at the downgradient monitoring point. Annual monitoring should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c) until endpoint criteria are met.

6.4.17 SWMU 15, Future Jobs/DRMO

Data Review

The Navy has conducted annual groundwater monitoring at two locations (MW15-3 and MW15-424) at the SWMU 15, Future Jobs/DRMO site since 2001. The combination of monitored natural attenuation and compliance monitoring is the selected remedy for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Monitored natural attenuation is related to petroleum hydrocarbons, and compliance monitoring is related to chlorinated solvents and methylene chloride observed in groundwater at the site. Groundwater samples have been collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. The Alaska DEC and EPA concurred with the 2003 recommendation to discontinue all monitoring at MW15-424 and discontinue monitored natural attenuation (petroleum hydrocarbons) and methylene chloride monitoring at well MW15-3. As a result, compliance monitoring for VOCs at MW15-3 is the only monitoring that has been conducted at this site since 2004.

Figure 6-19 shows the location of the monitoring wells relative to the site features. Well MW15-3 is located near the inferred source area, and well MW15-424 is located approximately 420 feet downgradient of MW15-3.

For the monitored natural attenuation portion of the remedy, groundwater samples were collected from both wells for DRO, GRO, BTEX, and NAPs analyses. Two consecutive samples were collected from well MW15-3 in 2003 and 2004 and well MW15-424 in 2002 and 2003 that did not contain DRO, GRO, or BTEX concentrations greater than their respective cleanup levels. Based on these measurements, the endpoint criteria had been met for petroleum hydrocarbons at well MW15-3 in 2004 and MW15-424 in 2003. As a result, monitoring for petroleum hydrocarbons at this site has been discontinued.

For the compliance portion of the remedy, groundwater samples were also collected from both wells for chlorinated solvents and methylene chloride analyses. Chlorinated solvents and methylene chloride were not measured at concentrations greater than cleanup levels in the 2002 and 2003 groundwater samples collected from well MW15-424. Based on these measurements, the endpoint criteria for these analytes were met, and all monitoring at well MW15-424 has been discontinued.

PCE concentrations in groundwater samples from well MW15-3 have decreased from 12.3 µg/L in 2001 to 7.15 µg/L in 2005. The 2004 PCE result (4.03 µg/L) for MW15-3 was the only result since 2001 that was below the cleanup level of 5 µg/L. TCE concentrations increased from 6.24 µg/L in 2001 to 13.6 µg/L in 2004 and decreased to 9.84 µg/L in 2005. TCE concentrations in groundwater samples from MW15-3 have been above the cleanup level of 5 µg/L. Groundwater samples from MW15-3 have not contained 1,1-DCE, trans-1,2-DCE, or vinyl chloride at concentrations above PQLs and/or their respective cleanup levels since 2001. Cis-1,2-DCE concentrations have decreased from 9.9 µg/L in the 2002 sample to 2.32 µg/L in 2005. Methylene chloride concentrations in groundwater samples from MW15-3 were below PQLs in to 2003 and 2004 samples. Methylene chloride monitoring was discontinued beginning in 2005.

In general, PCE concentrations appear to be decreasing and TCE concentrations appear to be increasing in groundwater samples from well MW15-3. Cis-1,2-DCE concentrations appear to be fluctuating in samples from this well. However, these apparent trends are not statistically significant and additional data are required to estimate statistically significant trends.

Future Monitoring Recommendations

Monitoring at well MW15-424 has been terminated with Alaska DEC and EPA concurrence. Natural attenuation monitoring for petroleum hydrocarbons and methylene chloride monitoring have been terminated at both monitored locations, with Alaska DEC and EPA concurrence. PCE concentrations have decreased to but were measured at concentrations greater than cleanup level in 2005 near the source area. TCE remains above the cleanup level near the source area. Annual monitoring should continue as prescribed by the CMP, Revision 2 (U.S. Navy 2005c).

6.4.18 SWMU 17, Power Plant 3

Data Review

The Navy has conducted annual groundwater monitoring at seven locations (05-375, 05-735, 05-810, 05-811, 05-815, R-1, and R-6) at the SWMU 17, Power Plant 3 site since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery for petroleum and compliance monitoring for nonpetroleum chemicals (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC will select a final petroleum remedy for this site under SAERA (U.S. Navy 2004f). A decision on the final petroleum remedy for this site is anticipated in 2006. The CMP, Revision 2 (U.S. Navy 2005c) specifies surface water protection monitoring at locations 05-375, 05-810, 05-811, and 05-815 to monitor for migration of petroleum hydrocarbons in groundwater towards downgradient surface water bodies Yakutat Creek and South Sweeper Creek. Locations 05-735, R-1, and R-6 are specified as compliance monitoring points. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to monitor for surface water protection.

The Navy proposed changes to the existing monitoring program for this site, based on the interpretation of monitoring results obtained between 1999 and 2003. Alaska DEC and EPA concurred with the recommendation to discontinue VOC monitoring at locations R-1 and R-6.

Groundwater samples have been collected from wells 05-375, 05-810, 05-811, 05-815 for DRO, GRO, BTEX, and NAPs analyses for surface water protection purposes. Groundwater samples have been collected from well 05-735 for VOC and bis(2-ethylhexyl)phthalate analyses as part of the compliance monitoring. Groundwater samples have been collected from wells R-1 and R-6 for bis(2-ethylhexyl)phthalate analyses as part of compliance monitoring and DRO as part of a final remedy that is yet to be determined.

Figure 6-20 shows the locations of the monitoring wells relative to known source areas at the site. Wells 05-375, R-1, and R-6 are installed within the dissolved petroleum plume northeast from the Power Plant building. Wells 05-810, 05-811, and 05-815 are located downgradient from the dissolved petroleum plume in close proximity to downgradient surface water bodies. These wells are located approximately 125, 200, and 60 feet, respectively, upgradient from the downgradient surface water bodies. Well 05-735 is located approximately 50 feet downgradient from Building 10203, which formerly contained a dry cleaning facility.

Groundwater samples collected from surface water protection monitoring locations (05-375, 05-810, 05-811, and 05-815) since 2001 have not contained DRO, GRO, or BTEX constituents at concentrations greater than PQLs or cleanup levels.

PCE concentrations in groundwater samples at compliance monitoring well 05-735 increased from 3 µg/L in 2002 to 10.4 µg/L in 2004 and decreased to 7.25 µg/L in 2005. TCE concentrations in groundwater samples from this well have increased from 3 µg/L in 2002 to 5.45 µg/L in 2005. The 2001, 2004, and 2005 groundwater samples contained PCE at concentrations greater than the cleanup level of 5 µg/L, and the 2004 and 2005 groundwater samples contained TCE at concentrations greater than the cleanup level of 5 µg/L. 1,1-DCE was not measured at concentrations greater than PQLs or cleanup levels in samples collected from well 05-735 since 2001. However, the 2002 1,1-DCE PQL was greater than the cleanup level of 7 µg/L. Groundwater samples from this well have contained cis-1,2-DCE at concentrations greater than the cleanup level of 70 µg/L since 2001. Cis-1,2-DCE concentrations have fluctuated between 189 µg/L in 2001 and 730 µg/L in 2003. Cis-1,2-DCE was measured at 542 µg/L in the 2005 groundwater sample from well 05-735. Trans-1,2-DCE has not been measured at concentrations greater than the cleanup level of 100 µg/L since 2001. Vinyl chloride concentrations have been measured at concentrations greater than the cleanup level of 2 µg/L since 2001, and they have increased from 4.18 µg/L in 2001 to 7.2 µg/L in 2005.

Methylene chloride was measured at a concentration of 15 µg/L in the 2002 groundwater sample from 05-735, which is greater than the cleanup level of 5 µg/L. Methylene chloride was not measured at concentrations greater than PQLs in the 2001, 2003, 2004, and 2005 groundwater samples from this well. However, the PQLs for these results were greater than the cleanup level. Bis(2-ethylhexyl)phthalate has not been measured at concentrations greater than PQLs since 2001, however, the 2001 PQL was greater than the cleanup level of 6 µg/L.

PCE, TCE, trans-1,2-DCE, and vinyl chloride concentrations in groundwater samples from well 05-735 appear to be increasing, while the cis-1,2-DCE concentrations are fluctuating. These apparent trends are not statistically significant, and additional data are required to estimate statistically significant trends.

DRO concentrations have decreased from 3,730 µg/L in 2001 to 1,040 µg/L in 2005 in groundwater samples from well R-1. The 2005 DRO result was below the cleanup level of 1,500 µg/L. RRO has not been measured at concentrations greater than the cleanup level of 1,100 µg/L in groundwater samples from this well, and RRO concentrations have decreased from 750 µg/L in 2001 to 240 µg/L in 2004. Bis(2-ethylhexyl)phthalate has not been measured in groundwater samples from R-1 at concentrations greater than the cleanup level of 6 µg/L.

DRO concentrations have been measured in groundwater samples from well R-6 at concentrations greater than the cleanup level of 1,500 µg/L. However, DRO concentrations have decreased from 12,000 µg/L in 2001 to 4,740 µg/L in 2005. RRO has not been measured at concentrations greater than the cleanup level of 1,100 µg/L in groundwater samples from this well. Bis(2-ethylhexyl)phthalate has not been measured in groundwater samples from R-6 at concentrations greater than the cleanup level of 6 µg/L.

DRO concentrations in groundwater samples from wells R-1 and R-6 appear to be decreasing. However, these apparent trends are not statistically significant and additional data are required to estimate statistically significant trends.

Wells that were sampled once during this review period were HC-2, HC-3, MW-17-7, MW-4, MW-5, MW-7, PP-01, PP-02, PP-03, PP-04, PP-05, and PP-06. These wells were sampled during July or September 2001, prior to initiation of the CMP program. These samples were analyzed for DRO, GRO, BTEX, VOCs, and SVOCs. DRO was measured in the 2001 samples from wells HC-2, HC-3, MW-4, MW-5, and PP-05 at concentrations greater than the cleanup level of 1,500 µg/L. Benzene was detected in the groundwater sample from well PP-05 at a concentration greater than the cleanup level of 5 µg/L. These data are being considered for the final remedy evaluation.

Between March 1993 and September 2005, monitoring wells within the vicinity of the SWMU 17, Power Plant 3 site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between June 2001 and September 2005, free product was gauged multiple times. Free product has been detected in 7 of the 23 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.62 foot in well HC-1 on September 7, 2001.

Fifteen sediment samples were collected from the former waste oil and retention ponds prior to the 1999 remedial activities. The sediment removals that took place associated with these remedial actions rendered these samples no longer applicable. In addition, an unacceptable ecological risk was calculated using sediment analytical results that were collected prior to the 1999 remediation at SWMU 17. Therefore, ten additional sediment samples were collected in 2005 to determine DRO and PAH concentrations in Yakutat Creek to re-evaluate ecological risks with current data.

DRO was detected in the 10 samples collected in 2005 from or adjacent to Yakutat Creek. Concentrations ranged from 258 mg/kg in the sample from location 12 to a minimum of 7.75 mg/kg at location 90, the farthest upstream location. Location 12 contained the maximum concentration in both 1995 and 2005, however, the 2005 concentration was more than two orders of magnitude, or 99.6 percent, lower than the 1995 concentration.

PAH compounds were either not detected or detected at very low concentrations in 12 samples collected prior to remedial actions and in 10 samples collected in 2005 from or adjacent to Yakutat Creek. No PAHs were detected in a 2005 sample from location 12, where a sample was collected and contained nine detectable PAHs in 1995.

Free-product recovery at this site was conducted between October1996 and July 2002 through a combination of passive skimmers installed in site wells and a dual-trench product recovery system. Since 2001, the free-product recovery system operated from May 2001 through November 2001, and from May 2002 through July 2002. During these periods, approximately 165 gallons of free product were recovered. Free-product recovery efforts were discontinued in July 2002. As of July 2002, free-product recovery met the technical practicable endpoint established in the OU A ROD for shutdown of product recovery systems that are dependent on water table depression to facilitate product recovery.

Future Monitoring Recommendations

Petroleum hydrocarbons have not migrated to the surface water protection wells. Groundwater samples from well 05-735 have contained PCE, TCE, and cis-1,2-DCE at concentrations greater than cleanup levels. Since the endpoint criteria at locations R-1 and R-6 has been met, bis(2-ethyhexyl)phthalate monitoring should be discontinued at these locations. Annual monitoring should be continued as specified in the CMP, Revision 2 (U.S. Navy 2005c) with the noted exception.

6.4.19 SWMU 55, Public Works Transportation Department Waste Storage Area

Data Review

The Navy has conducted annual groundwater monitoring at two locations (55-145 and 55-146) at SWMU 55, Public Works Transportation Department Waste Storage Area site since 2001. Compliance monitoring is the selected remedy for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345). Groundwater samples have been collected from wells 55-145 and 55-146 for VOCs and bis(2-ethylhexyl)phthalate analyses.

Based on monitoring results for 2002 through 2004, Alaska DEC and EPA concurred with a recommendation to discontinue monitoring of dissolved antimony and bis(2-ethylhexyl)phthalate at well 55-145 in 2004 and 2005, respectively. In addition, Alaska DEC and EPA concurred with a recommendation to discontinue monitoring of dissolved antimony after the 2003 monitoring event at locations 55-145 and 55-146 and a reduction of VOC monitoring to every other year at location 55-146 after the 2004 monitoring event. The next planned monitoring for VOCs at location 55-146 is 2006.

Figure 6-21 shows the location of these wells relative to site features. Well 55-145 is located near the inferred source area and well 55-146 is located approximately 300 feet downgradient.

PCE concentrations have decreased in groundwater samples collected from well 55-145 from 180 µg/L in 2001 to 90.3 µg/L in 2005. However, this concentration range is greater than the cleanup level of 5 µg/L. TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride have not been detected at concentrations greater than PQLs since 2001. Methylene chloride has not been detected at concentrations greater than PQLs in groundwater samples from well 55-145. However, the 2003 PQL was greater than the cleanup level of 5 µg/L.

Well 55-146 serves as the downgradient monitoring point for the site. PCE and cis-1,2-DCE have not been measured in groundwater samples from well 55-146 at concentrations greater than PQLs or cleanup levels since 2001. TCE, 1-1,DCE, trans-1,2-DCE, vinyl chloride, and methylene chloride and bis(2-ethylhexyl)phthalate have not been measured in groundwater samples from this well at concentrations greater than PQLs since 2001.

PCE concentrations in groundwater from well 55-145 appear to be decreasing. However, this apparent trend is not statistically significant and additional data are required to estimate a statistically significant trend.

Future Monitoring Recommendations

PCE in groundwater remains above cleanup levels near the source area. However, PCE concentrations appear to be decreasing. Chlorinated solvents have not migrated in groundwater to the downgradient monitoring point. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.20 SWMU 58/SA 73, Heating Plant 6

Data Review

The Navy has conducted annual groundwater monitoring at three locations (12-601, 12-604, and 12-611) at SWMU 58/SA 73, Heating Plant 6 since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC have selected monitored natural attenuation with ICs as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). Surface water protection monitoring is specified in the CMP, Revision 2 (U.S. Navy 2005c) at locations 12-601, 12-604, and 12-611 to monitor for migration of petroleum hydrocarbons in groundwater towards Clam Lagoon. The Navy initiated monitoring at 6 additional locations (12-101, 12-110, 12-114, 12-120, 12-121, and 12-203) in 2005 as part of the final remedy (monitored natural attenuation). Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345). Groundwater samples have been collected from these wells for DRO, GRO, and BTEX analyses. A groundwater sample was collected from well 12-203 in 2004 and analyzed for DRO, GRO, and BTEX compounds to support final remedy evaluation.

Figure 6-22 shows the location of the monitoring wells relative to the source area. Wells 12-203 and 12-611 are within the dissolved plume, while wells 12-601 and 12-604 are approximately 200 to 300 feet from the source area and 350 to 550 feet from the downgradient water body, Clam Lagoon. Wells 12-101, 12-110, 12-114, 12-120, 12-121, and 12-203 are generally located within or near the former source area.

DRO, GRO, and BTEX concentrations have not been measured at concentrations greater than PQLs or cleanup levels in groundwater samples collected from surface water protection wells 12-601 or 12-604 since 2001. Groundwater samples collected from surface water protection well 12-611 have contained DRO at concentrations between 4,000 and 4,950 µg/L, with the highest concentration measured in the 2004 sample. DRO was measured at 2,750 µg/L in groundwater collected from this well during the 2005 sampling event. This concentration range is greater than the DRO cleanup level of 1,500 µg/L. GRO concentrations in groundwater samples from well 12-611 have been below the cleanup level, while benzene concentrations have fluctuated around 25 µg/L. This benzene concentration range is greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes concentrations have been below cleanup levels in groundwater samples collected from well 12-611.

DRO was measured at 51,900 µg/L in the groundwater sample collected from well 12-203 in 2004, which is greater than the cleanup level. GRO and BTEX concentrations in the 2004 sample from this well were below PQLs or cleanup levels. Free-product was observed on the groundwater surface in well 12-203 at a thickness of 0.79 foot during 2005.

DRO was measured at 14,300 µg/L in the 2005 sample from well 12-121, 2,080 µg/L in the 2005 sample from well 12-114, and 1,540 µg/L in the 2005 sample from well 12-120. The concentrations are greater than the DRO cleanup level of 1,500 µg/L. GRO and BTEX constituents were not measured at concentrations greater than their respective PQLs and/or cleanup levels in the 2005 groundwater samples from these wells. DRO, GRO, and BTEX constituents were also not measured at concentrations greater than their respective PQLs and/or cleanup levels in the 2005 groundwater sample from well 12-101.

DRO appears to be increasing in the groundwater samples collected from well 12-611. However, this apparent trend is not statistically significant. There are insufficient data to assess trends in the wells first sampled in 2005. Additional data are required to estimate a statistically significant trend at this site.

Between October 1996 and September 2005, monitoring wells within the vicinity of SWMU 58/SA 73 Heating Plant 6 have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between September 2001 and September 2005, free product has been detected in 4 of the 17 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.79 foot, in well 12-203 on September 12, 2005. This well is a 0.5-inch-diameter well scheduled for replacement with a 2-inch-diameter well in 2006.

Free-product recovery at SWMU 58/SA 73 Heating Plant 6 has not occurred since July 2000, because free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft free-product recovery closure report (U.S. Navy 2000b). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site. However, the Navy will perform annual free-product monitoring as part of the scheduled annual groundwater monitoring activities. All site wells in the annual monitoring program will be monitored for free product, and free-product will be removed that is detected in wells above minimum thicknesses specified in the decision document (0.5 foot in a 2-inch well and 0.1 foot in a 4- or 6-inch well). The free-product thickness found in 2005 did not meet the explicit removal criteria of the CMP, Revision 2 (U.S. Navy 2005c).

Future Monitoring Recommendations

Free-product was observed in four groundwater wells near the former source area at the site and DRO is present in a number of wells at concentrations greater than the cleanup level. Benzene is present in groundwater at a concentration greater than the cleanup level in one well. Results also indicate that the dissolved plume has not migrated to the downgradient monitoring points at concentrations greater than PQLs and that the downgradient surface water body is not currently at risk. Therefore, natural attenuation monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.21 SWMU 60, Tank Farm A

Data Review

The Navy has conducted annual groundwater monitoring at 3 locations (LC5A, MW E006 and MW E501) at the SWMU 60, Tank Farm A site since 2001. Monitored natural attenuation is the remedy selected for this site (U.S. Navy, USEPA, and Alaska DEC 2000). Groundwater samples have been collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring.

Historically, these wells have been monitored for DRO, GRO, BTEX, and NAPs. Alaska DEC and EPA concurred with changes to the monitoring program recommended in the 2003 annual groundwater monitoring report (U.S. Navy 2004e). The changes were (1) GRO and BTEX monitoring was discontinued at location LC5A, (2) DRO, GRO, ethylbenzene, toluene, and total xylenes monitoring was discontinued at location MW E006, and (3) all monitoring was discontinued at location MW E501, because the stated chemicals met the endpoint criteria for groundwater monitoring at these locations during 2003. Beginning in 2005, LC5A is monitored for DRO with inspection of the adjacent shoreline for seeps or sheens, and MW E006 is monitored for BTEX.

Figure 6-23 shows the locations of the monitoring wells relative to existing structures and surface water bodies. Well MW E006 is installed adjacent to an unnamed creek that drains the central portion of Tank Farm A. Well LC5A is located downgradient from the Tank Farm, approximately 80 feet upgradient from South Sweeper Creek.

DRO concentrations in groundwater samples from well LC5A have increased from 1,100 µg/L in 2002 to 2,170 µg/L in 2004 and decreased to 1,500 µg/L in 2005. The 2003 and 2004 samples contained DRO at concentrations greater than the cleanup level of 1,500 µg/L. GRO concentrations in groundwater samples from LC5A have decreased from 1,500 µg/L in 2000 to 740 µg/L in 2003. The 2000 groundwater sample is the only sample collected from this well during the review period that contained GRO at concentrations greater than the cleanup level of 1,300 µg/L. BTEX constituents have not been measured at concentrations greater than their respective cleanup levels in groundwater samples from LC5A since 1999.

Visual inspections of the South Sweeper Creek shoreline for petroleum seeps and sheen commenced in 2005. For flowing water bodies, such as South Sweeper Creek, the visual inspection is conducted both upgradient and downgradient of the targeted monitoring well. Sediments are disturbed in an effort to induce sheen, if present. The 2005 visual inspection of the shoreline near LC5A did not identify any petroleum seeps or sheens on the sediment or surface water.

DRO and GRO have not been measured at concentrations greater than their respective cleanup levels in groundwater samples collected from well MW E006 since 2001. Benzene concentrations in groundwater samples from this well have increased from 13.1 µg/L in 2001 to 19 µg/L in 2003. Benzene concentrations then decreased to 10.1 µg/L in 2004 and decreased again to 7.82 µg/L in 2005. These concentrations are greater than the benzene cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes have not been measured at concentrations greater than PQLs and/or cleanup levels in groundwater samples collected from MW E006 since at least 2001.

DRO, GRO, and BTEX constituents have not been measured at concentrations greater than their respective cleanup levels in groundwater samples from well MW E501 since at least 2001.

DRO concentrations at well LC5A appear to be fluctuating, while GRO concentrations appear to be decreasing. These apparent trends are not statistically significant, and additional data are required to estimate a statistically significant trend.

Future Monitoring Recommendations

Endpoint criteria were met for all analytes at well MW E501 in 2003, and monitoring was terminated at this location with Alaska and EPA concurrence. DRO decreased to a concentration equal to the cleanup level in the 2005 sample from LC5A, while GRO has decreased to concentrations below the cleanup level at this location. Benzene concentrations remain above the cleanup level at MW E006. Annual monitoring should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.22 SWMU 61, Tank Farm B

Data Review

The Navy has conducted annual groundwater monitoring at up to four locations (14-113, 12-210, TFB-MW-4A, and TFB-MW-4B) at the SWMU 61, Tank Farm B site since 2001. The remedy specified for this site in the OU A ROD is monitored natural attenuation (U.S. Navy, USEPA, and Alaska DEC 2000). Surface water protection monitoring is specified in the CMP, Revision 2 (U.S. Navy 2005c) at locations 14-113 and 14-210 to monitor for migration of petroleum hydrocarbons in groundwater toward North Sweeper Creek. Natural attenuation monitoring has been conducted at locations TFB-MW4A and TFB-MW4B for the monitored natural attenuation component of the remedy. Groundwater samples have been collected from these wells for GRO and BTEX analyses to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring.

Alaska DEC and EPA concurred with the 2003 annual groundwater monitoring report recommendation that monitoring be discontinued at well TFB-MW4A, and therefore, no sample was collected from this well in 2004 or 2005. Based on 2003 monitoring results, visual inspection of North Sweeper Creek is also conducted annually in the areas of 14-113 and 14-210. For flowing water bodies, such as North Sweeper Creek, the visual inspection is conducted both upgradient and downgradient of the targeted monitoring well. Sediments are disturbed in an effort to induce sheen, if present.

Figure 6-24 shows the location of monitoring wells 14-113, 14-210, and TFB-MW4B relative to potential source areas at the site and the downgradient surface water body, North Sweeper Creek. Monitoring wells 14-113 and 14-210 are located within the dissolved petroleum plume, approximately 150 and 250 feet, respectively, downgradient from the former petroleum-release area at this site and approximately 50 and 175 feet, respectively, from North Sweeper Creek.

GRO and BTEX constituents have not been measured at concentrations greater than cleanup levels in groundwater samples from well TFB-MW-4A since 1996. As a result, monitoring was terminated at this location. Wells TFB-MW-4A and TFB-MW-4B are located immediately adjacent to each other, with TFB-MW-4A monitoring a deeper portion of the aquifer than TFB-MW-4B.

GRO and BTEX concentrations have been measured at concentrations greater than their respective cleanup levels in groundwater samples collected from well TFB-MW-4B since 2001. GRO has been measured in groundwater samples from TFB-MW-4B at concentrations ranging from 30,000 to 50,600 µg/L, while benzene concentrations have ranged from 49.5 to 73 µg/L in groundwater samples collected from this well. Toluene concentrations in groundwater samples from well TFB-MW-4B have ranged from 3,000 to 6,110 µg/L, while ethylbenzene concentrations have ranged from 990 to 2,200 µg/L in groundwater samples collected from this well. Total xylenes concentrations have ranged from 7,600 to 13,456 µg/L. The highest concentrations of GRO and BTEX constituents have been measured either in the 2003 or 2004 samples from this well. GRO and BTEX concentrations in groundwater samples from TFB-MW-4B have generally fluctuated since 2001.

GRO has increased from 2,000 µg/L in 2003 to 6,880 µg/L in 2004 at surface water protection location 14-113, while benzene has decreased slightly from 34 to 30.8 µg/L in these samples during this period. GRO and benzene have decreased to 3,900 and 22.7 µg/L, respectively, in the 2005 sample from this well. The GRO and benzene concentrations in the 2003, 2004, and 2005 groundwater samples from well 14-113 were greater than their respective cleanup levels of 1,300 and 5 µg/L. Toluene, ethylbenzene, and total xylenes were not measured at concentrations greater than their respective cleanup levels in these samples.

GRO has fluctuated from 2,300 to 5,900 µg/L in groundwater samples collected from surface water protection well 14-210, with the highest concentration measured in the 2001 sample. GRO was measured at 3,560 µg/L in the 2005 sample from this well. BTEX constituent concentrations have not been measured at concentrations greater than PQLs or cleanup levels in groundwater samples from this well.

GRO concentrations have fluctuated in groundwater samples from surface water protection well 14-210, ranging from 2,300 µg/L in 2002 to 5,900 µg/L in 2001. GRO was measured at 5,220 µg/L in the 2004 groundwater sample from this well. BTEX concentrations have been below their respective cleanup levels in groundwater samples collected from this well since 2001.

Since GRO concentrations in the 2003, 2004, and 2005 groundwater samples from surface water protection wells 14-113 and 14-210 were greater than Alaska DEC cleanup levels, visual inspections of the North Sweeper Creek shoreline have been conducted annually in the area of these wells. The purpose of the inspections is to identify petroleum seeps in the shoreline or sheens on the surface water of North Sweeper Creek. No seeps or sheens have been identified on the shoreline, and sheens have not been observed on the surface water.

Dissolved petroleum hydrocarbon concentrations have generally fluctuated in groundwater samples from wells 14-113, 14-210, and TFB-MW-4B since 2001, with no clearly identifiable trends.

Future Monitoring Recommendations

Dissolved petroleum hydrocarbons remain at concentrations above cleanup levels in groundwater samples from well TFB-MW-4B. Based on results of the 2003 and 2004 groundwater samples, dissolved petroleum hydrocarbons have migrated in groundwater to the surface water protection points at this site. However, there were no petroleum seeps or sheens observed on the shoreline or water surface of North Sweeper Creek during the 2003, 2004, and 2005 monitoring events. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.23 SWMU 62, New Housing Fuel Leak

There are three areas associated with SWMU 62: Eagle Bay Housing Area, Sandy Cove Housing Area, and Turnkey Housing Area. Sampling was conducted at Eagle Bay and Sandy Cove Housing Areas during this review period. The results for these two areas are summarized below.

The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The proposed plan for SWMU 62 was submitted for public review in December 2005. The final remedy for these sites has yet to be determined (U.S. Navy 2004f). A decision on the final remedy for this site is planned for 2006.

Eagle Bay Housing Area Data Review

The Navy conducted groundwater monitoring at 16 locations (03-012, 03-103, 03-104, 03-107, 03-109, 03-562, 03-898, AMW-704, CTO124-MW15, HMW-303-1, HMW-303-2, HMW-303-4, HMW-303-10, MW-303-13, MW-303-16, and MW-303-17) at the Eagle Bay Housing Area site in 2001 and 2002. The CMP, Revision 2 (U.S. Navy 2005c) does not specify annual monitoring in this area. Sampling was conducted during this time period to monitor site conditions and support final remedy selection. Groundwater samples were collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345). Groundwater samples have been collected from these for DRO, GRO, RRO, and BTEX analyses.

Figure 6-25 shows the locations of the monitoring wells relative to existing structures at the site. Apparent groundwater flow is to the west towards the East Canal. Wells 03-102, AMW-704, and 03-898 are located at the downgradient edge of the site near the East Canal. The remainder of the sampled wells have are located within the site to monitor the extent of groundwater impacts.

All 16 wells were sampled in September or October 2001. Wells 03-012, 03-109, 03-898, and AMW-704, located along the downgradient edge of the site, were also sampled in October 2002.

The 2001 sampling results show that DRO was detected in 9 of the 15 analyzed groundwater samples at concentrations ranging from 135 to 19,900 µg/L. The highest concentration was measured in the sample from well HMW-303-4, which is located in the south-central portion of the site. DRO was measured at concentrations greater than the cleanup level of 1,500 µg/L in the 2001 samples from 7 of the 15 sampled wells (03-104, 03-107, AMW-704, CTO124-MW15, HMW-303-2, HMW-303-4, and HMW-303-10). DRO was not detected in the 2001 sample from downgradient well 03-012 at a concentration greater than the PQL. DRO was measured in the 2001 samples from downgradient wells 03-898 and AMW-704 at concentrations of 135 and 4,170 µg/L, respectively. The 2001 sample from AMW-704 contained DRO at a concentration greater than the cleanup level of 1,500 µg/L.

GRO was detected in groundwater from 6 of the 15 wells sampled in 2001 at concentrations ranging from 60.3 to 10,600 µg/L. The highest concentration was measured in the sample from well 03-107, located along the northern border of the site. The sample from well 03-107 was the only 2001 sample that contained GRO at a concentration greater than the cleanup level of 1,300 µg/L. GRO was not detected at concentrations greater than the PQL in the 2001 samples from downgradient wells 03-012 and 03-898. GRO was measured at a concentration of 150 µg/L in the 2001 sample from downgradient well AMW-704, which is less that the cleanup level.

The groundwater sample from well 03-107 was the only 2001 sample to contain benzene and ethylbenzene at concentrations greater than their respective cleanup levels of 5 and 700 µg/L. Benzene was measured at 82.1 µg/L and toluene was measured at 712 µg/L in the sample from this well.

The 2001 groundwater samples from the four downgradient wells (03-102, 03-109, 03-898, and AMW-704) were the only samples in which RRO was measured. RRO was not detected at concentrations greater than the PQL.

None of the four wells sampled in 2002 contained DRO, GRO, RRO, or BTEX concentrations greater than the cleanup levels. RRO was not measured in the samples from these four wells at concentrations greater than the PQL and or cleanup level.

Future Monitoring Recommendations

DRO, GRO, benzene, and ethylbenzene are present in groundwater at concentrations greater than cleanup levels. The GRO, benzene, and ethylbenzene exceedances are limited to one well (03-107). DRO has migrated in groundwater to the downgradient monitoring point AMW-704. A monitoring program will be established following determination of a final remedy, which is anticipated to be selected in 2006.

Sandy Cove Housing Area Data Review

The Navy has conducted annual groundwater monitoring at two locations (03-155 and 03-619) at the Sandy Cove Housing Area site since 2001. In 2005, well MW-134-11 was added to the monitoring program as a replacement to well 03-619, because MW-134-11 was considered a more representative monitoring location. Groundwater samples are collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to monitor for NAPs. Groundwater samples have been collected from these for DRO, GRO, BTEX, and NAPs analyses.

Figure 6-26 shows the locations of the monitoring wells relative to existing structures at the site. Both wells were installed downgradient from a known petroleum-release source area within the Sandy Cove Housing area to evaluate the downgradient extent of petroleum-related chemicals dissolved in groundwater. These wells are located approximately 1,200 feet (03-155), 1,500 feet (03-619), and 1,600 feet (MW-134-11) upgradient from Sweeper Cove, the closest downgradient surface water body, which is located to the south of the site.

DRO concentrations have increased in groundwater samples collected from well 03-155 from 750 µg/L in 2003 to 2,070 µg/L in 2005. The 2004 and 2005 DRO results for this well were greater than the cleanup level of 1,500 µg/L. GRO and BTEX concentrations were below their respective cleanup levels in the 2003, 2004, and 2005 samples collected from this well.

Well MW-134-11 has been sampled in 2001 and 2005 during this review period. DRO has decreased from 7,450 µg/L (2001) to 3,500 µg/L (2005) at this location. GRO and BTEX constituent concentrations were below their respective cleanup levels in the 2001 and 2005 samples collected from this well.

DRO concentrations in groundwater samples from well 03-619 have decreased from 1,940 µg/L in 2001 to 710 µg/L in 2004. DRO concentrations dropped below cleanup level of 1,500 µg/L in the 2004 groundwater sample from this well. GRO and BTEX concentrations were below their respective cleanup levels in the 2003 and 2004 samples collected from this well.

DRO concentrations appear to be increasing in groundwater samples from well 03-155 and decreasing in samples from well MW-134-11. These trends are apparent and are not statistically significant. Additional sampling is required to estimate statistically significant trends in the DRO data at these locations.

Wells 03-778, 03-886, DW-134-2, HMW-102-1, HMW-134-2, HMW-139-2, HMW-146-3, MRP-MW1, MRP-MW2, MRP-MW3, MW-102-4, MW-134-10, MW-146-3, and MW-146-4 were sampled during September 2001, prior to initiation of the CMP program. The samples were analyzed for DRO, GRO, and VOCs. DRO was measured in 12 samples at concentrations greater than the cleanup level of 1,500 µg/L. GRO was measured in three samples at concentrations greater than the cleanup level of 1,300 µg/L. Benzene was measured in four samples at concentrations greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes were measured in one sample at concentrations greater than their respective cleanup levels of, 1,000, 700, and 10,000 µg/L. The remaining VOCs were not measured at concentrations greater than PQLs in these samples. The 2001 groundwater samples that contained dissolved hydrocarbon constituents at concentrations greater than cleanup levels were collected from wells within the defined areal extent of impacted groundwater. These data are being considered for the final remedy evaluation.

Between November 1992 and September 2005, monitoring wells within the vicinity of the SWMU 62, New Housing Fuel Leak site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between May 2001 and September 2005, free product was gauged multiple times. Free product has been detected in 40 of the 82 wells gauged for free product at the site. The maximum measured thickness of free product reported at the site since 2001 was 1.33 feet, in well HMW-139-2 on September 27, 2003.

Free-product recovery at the SWMU 62, New Housing Fuel Leak site has not occurred since May 2000. The Navy prepared the Draft Free-Product Recovery Closure Report for SWMU 62, New Housing Fuel Leak site that presented a comparison of the system recovery to endpoint criteria (URSG 1999b). Based on the comparison of the volume of recovered product with the volume of total fluids pumped during 1999, the product recovery system at the SWMU 62, New Housing Fuel Leak site was shown to meet the criterion established to achieve its practicable endpoint. Subsequently, the product-recovery system was shut down on May 1, 2000. Final closure for active free-product recovery has not yet been approved by Alaska DEC.

Future Monitoring Recommendations

DRO concentrations remain above the cleanup level at this site. GRO and BTEX concentrations were measured at concentrations greater than cleanup levels in groundwater samples collected at this site in 2001. Annual monitoring should continue at this site as prescribed in the CMP, Revision 2 (U.S. Navy 2005c) until a final remedy has been determined and a remedy-specific monitoring program is implemented. Passive free-product recovery has been recommended in the proposed plan for this site.

6.4.24 Tanker Shed, UST 42494

Data Review

The Navy has conducted annual groundwater monitoring at two locations (04-601 and TS-01) at the Tanker Shed, UST 42494 site since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC have selected monitored natural attenuation with ICs and free-product recovery as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). As a result, the Navy initiated monitoring at three additional locations (04-175, 04-290, and 04-306) in 2005 and will install an additional surface water protection well at the site (04-602) in 2006. Groundwater samples were also collected from wells 04-175 and 04-290 in 2001. Groundwater samples have been collected from well TS-02 for surface water protection to monitor migration of petroleum hydrocarbons in groundwater towards the East Canal. Groundwater samples have been collected from these wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that natural attenuation is occurring. Groundwater samples have been collected from these wells for GRO, BTEX, DRO, and NAPs analyses.

Figure 6-27 shows the locations of the monitored wells relative to the inferred source area. Wells 04-601 and TS-01 are approximately 400 and 600 feet downgradient of the source area at this site. Wells 04-175, 04-306, and 04-290 are located along the approximate centerline of the dissolved plume at increasing distances from the source area, respectively. Well 04-602 will be installed as a surface water protection monitoring point.

DRO concentrations in groundwater from well 04-175 have decreased from 16,900 µg/L in 2001 to 7,080 µg/L in 2005. Both of these concentrations are greater than the cleanup level of 1,500 µg/L. GRO and BTEX constituents were not measured at concentrations greater than their respective PQLs and/or cleanup levels in the 2001 and 2005 samples from this well.

DRO concentrations in groundwater from well 04-290 have increased from 2,890 µg/L in 2001 to 9,220 µg/L in 2005. Both of these concentrations are greater than the cleanup level of 1,500 µg/L. GRO concentrations in groundwater from this well have decreased from 3,190 µg/L in 2001 to 541 µg/L in 2005. The 2001 GRO concentration was greater than the cleanup level. BTEX constituents were not measured at concentrations greater than their respective PQLs and/or cleanup levels in the 2001 and 2005 samples from this well.

DRO and GRO concentrations were measured at 2,500 and 1,460 µg/L, respectively, in the 2005 sample from well 04-306. These concentrations are greater than the DRO and GRO cleanup levels. BTEX constituents were not measured at concentrations greater than their respective PQLs or cleanup levels in the 2005 sample from this well.

DRO concentrations in groundwater samples from well 04-601 have fluctuated from a low of 1,000 µg/L in 2003 to a maximum of 2,600 µg/L in 2005. The 2003 sample was the only sample collected from 2001 to 2005 that did not contain DRO at a concentration greater than the cleanup level of 1,500 µg/L. GRO concentrations have been below the cleanup level of 1,300 µg/L. The benzene concentrations in groundwater samples from 04-601 have decreased from 13.3 µg/L in 2001 to 0.54 µg/L in 2005. Groundwater samples collected in 2001 and 2002 from this well contained benzene at concentrations greater than the cleanup level of 5 µg/L. Toluene, ethylbenzene, and total xylenes have not been measured at concentrations greater than their respective cleanup levels in groundwater samples collected from 04-601 since at least 2001.

Groundwater samples from surface water protection well TS-01 have not contained DRO, GRO, or BTEX constituents at concentrations greater than their respective cleanup levels in groundwater samples collected since 2001.

These apparent trends discussed above are not statistically significant. Additional sampling is required to estimate statistically significant trends in the concentration data at this site.

Wells 04-302, 04-303, 04-304, 04-310, 04-131, 04-314, TS-03, and TS-04 were sampled during October 2001, prior to initiation of the CMP program. Wells 04-302, 04-303, and 03-304 were sampled again in March 2002. These samples were analyzed for DRO, GRO, BTEX, and VOCs. DRO was measured at concentrations greater than the cleanup level of 1,500 µg/L in samples from wells 04-302, 04-303, and 04-304. GRO was measured in the groundwater sample from well 04-302 at a concentration greater than the cleanup level of 1,300 µg/L. Benzene was measured in the groundwater samples from wells 04-302, 04-303, and 04-304 at concentrations greater than the cleanup level of 5 µg/L.

Between October 1996 and September 2005, monitoring wells within the vicinity of the Tanker Shed site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Free-product monitoring at the Tanker Shed was conducted between May and November 2001. Monitoring was inadvertently discontinued in 2002, did not restart until August 2004, and continued through September 2005. Since 2001, free product has been detected in 15 of the 23 wells installed at the site. The maximum measured thickness of free product reported at the site since 2001 was 0.49 foot in well 04-309 on September 10, 2005. Free-product gauging is currently conducted annually at all 24 wells at this site.

Free-product recovery at this site was conducted between January 1997 and July 2005 through a combination of passive automated skimmers and canisters installed in site wells. Since 2001, free-product recovery was conducted between May and November 2001 and again between August 2004 and July 2005. During these periods, approximately 23.4 gallons of free product were recovered. Free-product recovery efforts were discontinued in July 2005, as detailed in the closure report (U.S. Navy 2005i). Alaska DEC approved the interim action free-product recovery closure report in January 2006.

Future Monitoring Recommendations

DRO and benzene is present in groundwater at concentrations above their respective cleanup levels in the source area. DRO concentrations appear to be fluctuating over time, while benzene concentrations appear to be decreasing. GRO, toluene, ethylbenzene, and total xylene concentrations in groundwater are below the cleanup level. Dissolved petroleum hydrocarbons have not migrated to the downgradient surface water protection monitoring point. Annual monitoring and free-product recovery should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.25 Yakutat Hangar, UST T-2039-A

Data Review

The Navy has conducted annual groundwater monitoring at two locations (05-389 and 05-801) at the Yakutat Hangar, UST T-2039-A site since 2001. The interim remedy specified for this site in the OU A ROD was free-product recovery (U.S. Navy, USEPA, and Alaska DEC 2000). The Navy and Alaska DEC have selected limited groundwater monitoring as the final remedy for this site (U.S. Navy and Alaska DEC 2005a). The Navy initiated groundwater monitoring at four locations (05-221, 05-244, 05-250, and MW-2) in 2005 for the limited groundwater monitoring remedy. Groundwater samples are collected from these wells to evaluate groundwater quality relative to 10 times the Alaska groundwater cleanup levels (18 AAC 75.345) and to verify that petroleum hydrocarbons have not migrated to these surface water protection points. Groundwater samples are analyzed for DRO.

Figure 6-28 shows the location of the monitoring wells relative to potential source areas at the site and the downgradient surface water body, South Sweeper Creek. Monitoring wells 05-389 and 05-801 are located approximately 400 and 300 feet, respectively, downgradient of the source areas at the site and approximately 60 from the downgradient surface water body, South Sweeper Creek. Wells 05-244 and 05-250 are located near the source area and wells MW-2 and 05-221 are located within the dissolved plume at increasing downgradient distances, respectively.

Groundwater samples were collected from wells 05-221, 05-244, and 05-250 during 2002 and 2005. DRO was not measured at concentrations greater than 10 times the Alaska cleanup level of 15,000 µg/L in these samples. A groundwater sample was collected from well MW-2 in 2005, which contained DRO at 4,650 µg/L.

DRO has not been measured at concentrations greater than 10 times the Alaska cleanup level of 15,000 µg/L in groundwater samples collected from surface water protection monitoring points 05-389 and 05-801 since 2001.

Between October 1996 and September 2005, monitoring wells within the vicinity of the Yakutat Hangar, UST T-2039-A site have been gauged periodically for the presence of free product. However, only data collected since 2001 are summarized here. Between October 2001 and September 2005, free product was gauged only five times in one well (05-801). In September 2005, an additional 10 wells were gauged for the presence of free product. Measurable thicknesses of free product have not been observed in any well on the site since February 2000.

Free-product recovery at the Yakutat Hangar, UST T-2039-A site has not occurred since November 2000, because free-product recovery met the practicable endpoint established for the shutdown of product recovery specified in the OU A ROD, as detailed in the draft closure report (U.S. Navy 2005i). While Alaska DEC did not specifically concur with the cessation of the product recovery efforts at this site, Alaska DEC has been involved and concurred with subsequent decisions made regarding this site, as discussed in Section 3.1.2. Alaska DEC did approve the decision document for the site, which stated that free-product recovery endpoints have been met for the site.

Future Monitoring Recommendations

DRO is not present in groundwater at concentrations greater than 10 times the Alaska cleanup level. Dissolved petroleum hydrocarbons have not migrated in groundwater to the downgradient surface water protection points at concentrations greater than PQLs or cleanup levels. Annual monitoring should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.26 SWMU 11, Palisades Landfill

Data Review

The Navy has collected sediment samples from three locations (101, 102, and 103) and surface water samples from two locations (101 and 102) annually at Palisades Landfill since 1998. The samples are collected and analyzed for PCBs, selected VOCs, and selected total inorganics (TIN). The surface water samples are also analyzed for selected dissolved inorganics (DIN). The sediment samples are also analyzed for total organic carbon (TOC) and grain size. The sediment samples are analyzed for TOC for normalization prior to comparison to endpoint criteria. The purpose of monitoring at SWMU 11, Palisades Landfill is to ensure that the environmental cleanup remedy remains protective of human health and the environment, ensure that conditions remain compliant with the applicable laws and regulations, and document concentration trends. Based on monitoring results through 2004, Alaska DEC and EPA concurred with the recommendations to reduce sediment monitoring for PCBs to once every other year, with the next scheduled sampling in 2006 and termination of PCB monitoring in surface water samples (U.S. Navy 2005d).

Figure 6-29 shows the sampling locations relative to site features. Sampling location 101 represents the upgradient location along the Palisades Creek flow path northwest of the landfill before it enters the ponded area. Sampling location 102 is located where the surface water exits the landfill at the base of the metal debris. Sampling location 103 is located in the sandy bank of Palisades Creek just before it enters Kuluk Bay and represents a downgradient sampling point intended to evaluate the migration of contaminants beyond location 102. Sediment samples from locations 101 and 102 are considered freshwater sediment samples, and the sediment sample from location 103 is considered a marine sediment sample.

Specific analytes for these samples have been total PCBs, Aroclors, bis(2-ethylhexyl)phthalate, selected PAHs, antimony, arsenic, chromium, and nickel.

The ecological endpoint criteria for the following selected chemicals are based on μg/kg of TOC: benzo(a)anthracene (freshwater), benzo(b)fluoranthene (freshwater), benzo(k)fluoranthene (freshwater), bis(2-ethylhexyl)phthalate (freshwater and marine), fluoranthene (marine), fluorene (freshwater), and pyrene (marine). These endpoint criteria, specified in the CMP, Revision 2 (U.S. Navy 2005c) were derived from the ecological RBSC provided in the PSE-2 guidance document (U.S. Navy 1996a). The ecological RBSCs presented in the PSE-2 document were calculated for these chemicals, assuming that sediment samples would contain 1 percent TOC, and, therefore, the units of the ecological RBSC presented in the PSE-2 are microgram of analyte per kilogram of sediment.

Sediment Monitoring Results. Acenaphthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, fluoranthene, and indeno(1,2,3-c,d)pyrene have not been detected at concentrations above the endpoint criteria in sediment samples collected during the 2001, 2002, 2003, 2004, and 2005 sampling events. However, the reporting limits for acenaphthene, bis(2-ethylhexyl)phthalate, and fluoranthene in one or more sediment samples collected during 2001 and 2004 were above the endpoint criteria. In addition, the reporting limit for benzo(k)fluoranthene in the sample collected from location 102 in September of 2004 was above the endpoint criterion, and the reporting limit for indeno(1,2,3-c,d)pyrene for all three sediment samples collected in October of 2001 was above the endpoint criterion.

Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, phenanthrene, and pyrene were detected at concentrations above the endpoint criteria during the November 2000 sampling event at location 102. However, the reporting limits were above the endpoint criteria for all of these compounds in two or more sediment samples collected during 2001 and 2004.

Benzo(a)anthrancene, benzo(a)pyrene, benzo(b)flouranthene, and chrysene were also detected at concentrations above the endpoint criteria during 2005 at location 102. Fluorene was detected at location 101 during the October 2002 sampling event at concentrations greater than the endpoint criteria. In addition, the reporting limits were above the endpoint criterion for this compound in two of the three sediment samples collected in 2001 and 2004. Benzo(a)pyrene was detected during 2005 at locations 101 and 103 at concentrations greater than the endpoint criterion.

Benzo(a)pyrene and chrysene are the only two SVOCs that were included on the target compound list that were detected more than once at concentrations greater than the endpoint criteria. Benzo(a)pyrene was detected at locations 101, 102, and 103 during 2004 and 2005, at location 103 during 2003, at location 101 during 2002, and at locations 102 and 103 during 2000. Benzo(a)pyrene was not detected in 2001. However, the reporting limit for this compound was above the endpoint criterion for all three sediment samples collected in 2001. Chrysene was detected at location 101 in October 2003 and at location 102 in November 2000. Chrysene was not detected in 2001 or 2004. However, the reporting limit was above the endpoint criterion for two of the three sediment samples collected in 2001 and 2004. There appears to be no clear concentration trend for PAHs during the 2000 to 2004 time period. Evaluation of concentration trends is difficult to interpret, because of the variable reporting limits during the 2000 to 2004 time frame.

Sediments were not sampled for PCBs in 2005, as per the CMP, Revision 2 (U.S. Navy 2005c). The only PCBs that have been detected in sediments during the 2000 to 2004 time period are Aroclor 1254 and Aroclor 1260. Aroclor 1254 was detected above the endpoint criterion at location 102 at the Palisades Landfill during the October 2001 sampling event. Aroclor 1260 was detected above the endpoint criterion at all three locations at the Palisades Landfill during the November 2000 sampling event and at location 102 during the October 2001 and September 2004 sampling events. In addition, reporting limits exceeded the endpoint criteria for all Aroclors with endpoint criteria during the post-2000 sampling events. Since the reporting limits exceeded the endpoint criteria, an evaluation of concentration trends was not performed.

Antimony was not detected above the endpoint criterion during the 2002 through 2005 annual sampling events. However, it was detected above the endpoint criterion in the sample collected from location 102 during 2001. Arsenic has been detected above the endpoint criterion in all samples collected during the 2001 through 2005 sampling events. Chromium was detected in the sediment sample from location 102 during the 2003 and 2005 sampling events at concentrations greater than the endpoint criterion. Chromium was detected at a concentration greater than the endpoint criterion in the 2005 sample from location 103. Nickel was detected in the sediment sample from location 102 at concentrations greater than the endpoint criterion during 2000, 2001, 2003, and 2004, and it was detected at a concentration greater than the endpoint criterion in the sample collected from location 103 during 2002 and 2005.

In general, the concentrations of arsenic, chromium, and nickel appear to have decreased slightly at locations 101 and 102 when comparing the 2005 analytical results to the 2003 and 2004 results, whereas these inorganic concentrations have increased slightly at location 103.

Surface Water Monitoring Results. PCBs were not detected in the surface water samples collected at the Palisades Landfill during the 2000 through 2004 time period. Based on these results, surface water monitoring for PCBs was terminated beginning 2005. The recommendation to drop PCB analyses of surface water at the Palisades Landfill was originally presented in the 2004 annual landfill monitoring report (Navy 2005d), which the Alaska DEC approved. The recommended change was then incorporated into the Final CMP, Revision 2 (Navy 2005c).

None of the DIN or TIN included on the target analyte list for the Palisades Landfill were detected above the endpoint criteria during the 2001 through 2005 time period. The reporting limit for arsenic during the 2000 and 2001 sampling events was greater than the endpoint criterion.

Future Monitoring Recommendations

Some SVOCs and inorganics are present in sediment samples at concentrations above endpoint criteria immediately downgradient of the landfilled area at the site. However, surface water samples do not contain target analytes at concentrations above endpoint criteria. Annual monitoring should continue as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.27 SWMU 13, Metals Landfill

Data Review

The Navy has conducted annual groundwater monitoring at eight locations (MW13-1, MW13-2, MW13-3, MW13-4, MW13-5, MW-603, MW-604, and MW-605) at SWMU 13, Metals Landfill since 1997. The samples have been analyzed for VOCs, SVOCs, TIN, DIN, water quality parameters (WQPs), and total dissolved solids (TDS). The purpose of monitoring at SWMU 13, Metals Landfill is to ensure that the environmental cleanup remedies remain protective of human health and the environment, conditions remain compliant with the applicable laws and regulations, and to document concentration trends. Based on monitoring results through 2004, Alaska DEC and EPA concurred with the recommendations to discontinue total and dissolved arsenic and barium and reduce VOC and SVOC monitoring to once every other year, with the next sampling for these analytes planned for 2006 (U.S. Navy 2005d).

Figure 6-30 shows the sampling locations relative to site features. All of the wells are located parallel to the shoreline of Kuluk Bay and are located downgradient of the center of the landfill.

Specific target analytes have been bis(2-ethylhexyl)phthalate, chlorobenzene, 1,4-dichlorobenzene,1,3-dichlorobenzene, ethenes, arsenic, and barium.

Bis(2-ethylhexyl)phthalate, the only SVOC included on the target analyte list for the Metals Landfill, was not detected in any of the groundwater samples collected during the 2004 sampling event. This compound was detected above the endpoint criterion at two locations during the 2000 sampling event. Therefore, it appears that the concentration of this compound is decreasing.

Of the eight VOCs included on the target analyte list for the Metals Landfill, six were detected during the 2000 through 2004 time period. 1,1-dichloroethene and trans-1,2-dichloroethene were not detected during any of the sampling events. 1,3-dichlorobenzene, 1,4-dichlorobenzene, chlorobenzene, cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene were detected during the 2004 sampling event. All of these compounds were also detected during at least one other sampling event between 2000 and 2004. All concentrations of detected target analytes were less than endpoint criteria.

No dissolved inorganics or total inorganics included on the target analyte list for the Metals Landfill have been detected above the endpoint criteria during the 2001 through 2004 time period. Dissolved arsenic was measured in groundwater samples from wells MW13-1 (4.83 µg/L) and MW13-2 (6.3 µg/L) at concentrations greater than the background concentration of 2 µg/L, but below the endpoint criterion of 50 µg/L.

Future Monitoring Recommendations

Target analytes have not been detected at concentrations greater than endpoint criteria in groundwater samples collected from eight monitoring wells at the site since 2001. Based on these results, RAOs are being met. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.28 SWMUs 18/19, White Alice Landfill

Data Review

The Navy has conducted annual groundwater monitoring at two locations (21-3 and 21-4) and surface water monitoring at three seep locations (WASW01, WASW02, and WASW03) at SWMUs 18/19, White Alice Landfill since 1997. The samples have been analyzed for VOCs, TIN, DIN, WQPs, and TDS. The purpose of monitoring at SWMUs 18/19, White Alice Landfill is to ensure that the environmental cleanup remedies remain protective of human health and the environment, that conditions remain compliant with the applicable laws and regulations, and to document concentration trends. Based on monitoring results through 2004, Alaska and EPA concurred with the recommendations to reduce surface water and groundwater sampling frequency to once every other year, with the next scheduled sampling planned for 2006 and termination of monitoring for the WQP methylene blue active substance.

Figure 6-31 shows the sampling locations relative to site features. Well 21-3 is located downgradient of the landfilled area to the southwest, and well 21-4 is located to the northeast of the landfill. Seep sampling location WASW01 is located west of the landfilled area along a small, south-southwest flowing creek that drains the landfill cap. Seep sampling location WASW02 is located approximately 600 feet south of WASW01.

Specific target analytes have been arsenic, barium, nickel, and chromium.

Seep Monitoring Results. No VOCs are included on the target analyte list for the White Alice Landfill. Two VOCs not included on the target analyte list were detected in one surface water sample collected during the 2004 sampling event. Neither of the VOCs detected in the surface water exceeded Alaska groundwater cleanup levels (18 AAC 75.345).

No DIN or TIN included on the target analyte list for the White Alice Landfill were detected above the endpoint criteria during the 2000 through 2004 time period. However, the reporting limits for arsenic during the 2000 and 2001 sampling events were greater than the endpoint criterion. All inorganics not on the target analyte list were either not detected or detected at concentrations less than the Alaska groundwater cleanup levels (18 AAC 75.345) during the 2004 sampling event.

Groundwater Monitoring Results. No VOCs are included on the target analyte list for the White Alice Landfill. Two VOCs not included on the target analyte list were detected in one groundwater sample collected during the 2004 sampling event. Neither of the VOCs detected in groundwater exceeded Alaska groundwater cleanup levels (18 AAC 75.345).

No DIN or TIN included on the target analyte list were detected in groundwater above the endpoint criteria during the 2000 through 2004 time period. All inorganics not on the target analyte list were detected at concentrations less than Alaska groundwater cleanup levels (18 AAC 75.345) during the 2004 sampling event.

Future Monitoring Recommendations

Target analytes and non-target analytes were not detected at concentrations greater than endpoint criteria or Alaska groundwater cleanup levels (18 AAC 75.345). These results indicate that the RAOs are currently being met. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.4.29 SWMU 25, Roberts Landfill

Data Review

The Navy has conducted annual groundwater monitoring at four locations (A-2, A-3, A-5, and B-1) and five surface water sampling locations (RLSW01, RLSW02, RLSW03, RLSW04, and RLSW05) at SWMU 25, Roberts Landfill since 1997. The samples have been analyzed for VOCs, TIN, DIN, WQPs, and TDS. The purpose of monitoring at SWMU 25, Roberts Landfill is to ensure that the environmental cleanup remedies remain protective of human health and the environment, that the conditions remain compliant with the applicable laws and regulations, and to document concentration trends. Based on monitoring results through 2004, Alaska and EPA concurred with the recommendation to discontinue monitoring for the WQP methylene blue active substance.

Figure 6-32 shows the monitoring points relative to site features. Well A-2 is located along the northwestern perimeter of the landfill, while wells A-3 and A-5 are located downgradient of the eastern boundary. Well B-1 is located near the southern boundary. Surface water sampling location RLSW03 is located downgradient of the eastern boundary between wells A-3 and A-5 in a small creek that runs parallel to the eastern boundary and empties into Sweeper Cove. Surface water sampling locations RLSW04 and RLSW05 are located within a creek that is east of the RLSW03 creek, which flows to the north-northeast and also empties into Sweeper Cove.

Specific target analytes have been ethenes, BTEX, priority pollutant total metals antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.

Surface Water Monitoring Results. No VOCs included on the target analyte list for the White Alice Landfill was detected in the samples collected during 2004 or 2005. With the exception of cis-1,2-dichloroethene, none of the target analytes were detected during the 2001, 2002, and 2003 sampling events. Cis-1,2-dichloroethene was detected at a concentration close to the reporting limit in 2000 at concentrations below the endpoint criterion.

One inorganic (copper) on the target analyte list for the Roberts Landfill was detected at concentrations greater than the endpoint criterion at two locations during 2005. In addition, total copper was detected at concentrations above the endpoint criterion at two locations during the 2001, 2002, 2003, and 2004 sampling events. Total copper concentrations have decreased from 480 to 122 µg/L since 2001 in surface water samples from RLSW03 and have fluctuated from about 13 to 32 µg/L in samples from RLSW05. All of the other inorganics included on the target analyte list for the Roberts Landfill were either not detected, or detected at concentrations less than the endpoint criteria. However, the reporting limits for total arsenic exceeded the endpoint criterion in 2000 and 2001; total cadmium exceeded the endpoint criterion in 2001; total and dissolved mercury exceeded the endpoint criterion in 2000, 2001, 2002, 2003, and 2004; and total silver exceeded the endpoint criterion in 2000, 2001, 2002, 2003, 2004, and 2005.

Groundwater Monitoring Results. None of the VOCs included on the target analyte list for the Roberts Landfill was detected in the four groundwater samples collected at the site during 2004 and 2005. With the exception of ethylbenzene, toluene, m,p-xylene, and o-xylene, none of the target analytes was detected during the 2000, 2001, 2002, and 2003 sampling events. Ethylbenzene, o-xylene, and toluene were detected at concentrations less than the endpoint criteria at one location during the 2000 sampling event. m,p-Xylene was detected at concentrations less than the endpoint criterion at two locations during the 2000 sampling event. All detected concentrations were close to the reporting limits.

No dissolved inorganics or total inorganics included on the target analyte list for the Roberts Landfill were detected above the endpoint criteria during 2004 and 2005. Three of the total inorganics included on the target analyte list—chromium, lead, and nickel—were detected above the endpoint criteria in the groundwater sample collected from one location during the 2003 sampling event. These inorganics were not detected above the endpoint criteria during the 2000, 2001, 2002, 2004, and 2005 sampling events. Total aluminum, a non-target analyte, has increased in groundwater samples from 1,730 µg/L in 2000 to 153,000 µg/L in 2003 and decreased to 2,140 µg/L in 2005. It should be noted that the dissolved aluminum concentration in the sample collected in 2003 was 928 µg/L, which is considerably lower than the total aluminum concentration in the 2003 sample. Because of this, the 153,000 µg/L value is potentially the result of a high suspended solids content in that sample. In addition, the dissolved aluminum concentration in the sample collected in 2003 is lower than the dissolved aluminum concentration in the sample collected in 2005 (1,280 µg/L), even though the total aluminum concentration is several orders of magnitude higher in the 2003 sample. A cleanup standard has not been established for aluminum in groundwater at the state or federal levels.

Future Monitoring Recommendations

Total copper has been measured at concentrations greater than the endpoint criterion in surface water samples from RLSW03, RLSW04, and RLSW05. However, copper concentrations at these locations are fluctuating and decreasing. Target total inorganics were not detected at concentrations greater than endpoint criteria in groundwater samples collected in 2004. The non-target analyte, total aluminum, has an apparent increasing trend at A-3 over time. However, cleanup standards have not been established for aluminum in groundwater. These results indicate that the RAOs are currently being met. Annual monitoring should be continued as prescribed in the CMP, Revision 2 (U.S. Navy 2005c).

6.5 RESULTS OF SITE INSPECTION

Inspections have been conducted annually at OU A, OU B-1, and OU B-2 sites beginning in 2002. As a result, formal inspections were not made as part of this 5-year review. The discussion in the subsections below is based on a review of inspection reports generated for years 2002 through 2005 (U.S. Navy 2003a, 2004c, 2005e, and 2005f).

The ICMP (U.S. Navy 2005c) specifies requirements for inspections and management of ICs and engineering controls (ECs) on Adak. Sites where ICs and/or ECs have been specified were inspected as part of the annual monitoring events conducted during September or October. The annual inspections are intended to ensure that ICs and ECs remain effective in protecting human health and the environment. Sites at which ICs or ECs did not appear to be functioning as intended or have been damaged are discussed below together with corrective measures that have been implemented. Sites at which ICs and ECs are functioning as intended are not discussed. The IC and EC requirements for all sites are tabulated in Section 4 (Table 4-3).

Given the remote nature of Adak Island, the limited field season, and weather conditions that challenge air access, the Navy plans actions to address deficiencies in ICs and ECs that are identified during annual inspections beginning in December of each year after the report has been completed, and then implements the remedies during the next field season.

6.5.1 Results of 2002 Institutional Controls Inspections

Recommendations based on observations made during the 2002 inspections are discussed in this section together with actions the Navy took during the 2003 field season to ensure that the ICs and ECs remain protective. The ICs and/or ECs at sites not discussed in this section were deemed to be functioning as intended and protective of human health and the environment.

Education Program

During the 2002 institutional controls inspections, the Navy conducted informal interviews with on-island personnel regarding the educational program and potential improvements. Interviews were conducted with residents, ARC personnel, City of Adak personnel, and USFWS personnel. These interviews were intended to ensure that educational programs were functioning in accordance with the ICMP and applicable RODs.

Interviews conducted with on-island personnel and informal surveys indicated that there needs to be improvement to the ordnance safety awareness program. There are community members very familiar with the program; however, newer community members are not aware of its existence. In addition, interviews with several island visitors indicated no knowledge that the requirement to view the UXO video was still active. Residents did not know where to get more information on UXO-related topics, and they were also unaware that viewing the video was still mandatory. Community members were aware of the *Adakupdate.com* Web site, but noted access problems to the site because of capacity issues with the local provider. Community members recommended that the UXO videos and other education materials be mailed to all Adak residents.

Kuluk Bay and Sweeper Cove

Engineering controls implemented for Kuluk Bay and Sweeper Cove include subsistence fish advisory signs and an educational program. The subsistence fish advisory signs for Sweeper Cove and Kuluk Bay were placed along the shorelines in October 2001. The sign inspection performed in October 2002 showed the signs were in place and in good condition; however, signage was not observed at the Small Boat Harbor. It was recommended that signage be placed at the Small Boat Harbor. It was also noted that the fish advisory signs have a local telephone number to the Caretaker Site Office, however, the Caretaker Site Office was turned over to the ARC lease in December 2002. It was recommended that the telephone number on the signage be updated as appropriate (U.S. Navy 2003a).

In September 2003, the OU A ROD was amended, with regulatory concurrence and stakeholder review, to remove petroleum sites from the original OU A ROD and to replace fish advisory signs with written fact sheets. These resident-targeted fact sheets were developed with regulatory and stakeholder involvement. The final fact sheet was distributed to Adak residents and Adak RAB members, as well as posted on the AdakUpdate.com Web site in October 2003. As a result, the fishing advisory signage was removed together with the need for revisions or replacements recommended in the 2002 inspection report (U.S. Navy 2004c).

SWMU 11, Palisades Landfill

The ICs at SWMU 11, Palisades Landfill include land use, equitable servitude, and excavation restrictions (see Table 4-3). During the inspection in October 2002, there were no indications of a change in land use in this area. No residential construction had occurred at the site. There were no indications of excavation activities. Therefore, ICs appear to be functioning as intended to protect human receptors from exposure to soil or groundwater. ECs that were implemented at SWMU 11 include a soil cover. At the time of inspection, the cover appeared to be intact and undisturbed. Some of the signs associated with SWMU 11 were broken and required repair. It was recommended that the signs at SWMU 11 be repaired (U.S. Navy 2003a). The recommendations were implemented during the 2003 field season.

SWMU 25, Roberts Landfill

The ICs at SWMU 25, Roberts Landfill include land use, equitable servitude, groundwater use, and excavation restrictions (see Table 4-3). During the inspection in October 2002, there were no indications of a change in land use in this area. The site did not appear to be in use. No residential construction had occurred at the site. There were no indications that groundwater is being used at the site. There were no indications of excavation activities. Therefore, ICs appeared to be functioning as intended to protect human receptors from exposure to soil or groundwater. ECs that were implemented at SWMU 25 include a landfill cap (soil cover) and signs. At the time of inspection, the caps appeared to be intact and undisturbed. There was one sign that required replacement, and a portion of the fence was down. It was recommended that the sign and fencing be repaired or replaced and the new vegetation on the recently closed cell be inspected next summer to ensure the growth continues (U.S. Navy 2003a). The recommendations were implemented during the 2003 field season.

SWMU 62, New Housing Fuel Leak

The ICs at SWMU 62 include land use, equitable servitude, groundwater use, and excavation restrictions (Table 4-3). During the inspection in October 2002, there were no indications of a change in land use in this area. There are two areas where excavation had taken place, the first was at the Fish and Wildlife area to install a fence. However, the excavation was not below 2 feet. The second excavation area was at a water line break on Main Road. An excavation permit was submitted by the City of Adak once the repairs were completed. The Navy was notified and the excavation was conducted under an emergency repair. The Navy has requested that the City provide an excavation permit prior to breaking ground, even for emergency work as soon as possible. There were no indications that groundwater was being used at the site, and there were no other indications of excavation activities without an excavation permit. Therefore, ICs appeared to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2003a).

OU B-1 and OU B-2 Ordnance Areas

The ordnance IC consists of maintaining the existing Adak Island Ordnance Awareness program. The ordnance awareness training program is a requirement of the OU B-1 ROD and is considered an interim action for the OU B-2 sites. Island residents and visitors are required to participate in an established ordnance awareness training program. This program applies to the entire northern section of Adak and, therefore, is not a site-specific IC. This program is intended to familiarize on-island residents and visitors with the history of ordnance use, storage, handling, and disposal on Adak Island; basic characteristics of ordnance items on Adak; and the procedures that should be followed if a suspected ordnance item is encountered.

During the October 2002 site inspection, it was noted that ordnance hazard signs were in place at the trail heads and OU B-2 sites. There were several locations along the OU B-2 sites that required sign replacement and or fence repair. Several of the signs tied to the fencing had come down. It was recommended that fences and gates along all MEC-restricted areas be repaired where human intrusion was likely to occur. It was also recommended that fencing and signs near the recreation area be repaired or replaced.

Interviews with several island visitors indicated no knowledge that viewing the MEC video was still a requirement. In addition, some island residents did not know where to go to get more information on MEC-related topics and also were unaware that viewing the MEC awareness video was still mandatory. The U.S. USFWS office has the video, viewing apparatus, and other educational material regarding the MEC program, but does not hold the responsibility to enforce the requirement. To achieve effective implementation of the mandatory MEC awareness training, it was recommended that the Navy expand the medium and forum by which the information was presented. It was recommended that the videos (one focused on adults and one for children) be updated to reflect the current status of MEC removal and remediation on Adak. It was also recommended that household items, such as refrigerator magnets, note pads, and ice scrapers, etc. be printed with the MEC Awareness logos (developed by Adak school children) and response phone number on them. Recommended ways to disseminate MEC information as the community grows were as follows (U.S. Navy 2003a):

- Information packages for public officials
- Classroom education
- Toll free telephone number
- Informational surveys

The recommendations for OU B-2 Ordnance Areas were evaluated beginning in December 2002 and it was concluded that more in-depth interviews would be conducted during the 2003 inspections to determine the best mechanism for increasing public awareness and education.

6.5.2 Results of 2003 Institutional Controls Inspections

Recommendations based on observations made during the 2003 inspections are discussed in this section together with actions the Navy took during the 2004 field season to ensure that the ICs and ECs remain protective. The ICs and/or ECs at sites not discussed in this section were deemed to be functioning as intended and protective of human health and the environment.

Education Program

During the 2003 institutional controls inspections, the Navy conducted informal interviews with on-island personnel regarding the UXO educational program and potential improvements. Interviews were conducted with residents, ARC personnel, City of Adak personnel, and visitors to Adak. These interviews were intended to ensure that the UXO educational programs were functioning in accordance with the ICMP and applicable RODs.

Interviews were completed in October 2003 with local residents, individuals on assignment and temporarily working on Adak, and visitors. The interviews revealed that there are community members familiar with the program, including the video and educational materials such as magnets and posters. However, newer community members and visitors are not fully aware of its existence. The newer residents did know, however, that there was a possibility of encountering ordnance on the island and to be cautious when hiking. Interviewees associated with the Adak fishing industry indicated that informational videos were not shown to fishermen during the October 2002 through October 2003 period and that the last time the Port of Adak showed an informational video to fishermen was in January 2002. When asked about the *Adakupdate.com* Web site, community members were aware of the Web site in general. However, there are access problems because of capacity issues with the local provider. The use of a community channel as a possible outreach option was discussed with interviewees. Community members noted that many people do not have cable television because of its cost. Therefore, this is not effective option for communicating to the community. Community members thought that the best way to access community members was to provide information by mail.

SWMUs 18/19, White Alice Landfill

The ICs at SWMUs 18/19 are the restriction of land use to outdoor recreational activities, which are included in an equitable servitude, and a provision that prohibits excavation (Table 4-3). During the inspection in October 2003, there were no indications of a change in land use in this area. No residential construction had occurred at the site. There were no indications of excavation activities. Therefore, ICs appeared to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2004c).

ECs that were implemented at SWMUs 18/19 include a soil cover. At the time of the 2003 inspection, the cover appeared to be intact and undisturbed. Portions of the south-southwestern slope of the landfill perimeter were showing a minor amount of erosion, and isolated areas in this vicinity were not vegetated. The erosion and lack of vegetation in this area did not indicate that the landfill cap or the foundation of the landfill was currently being compromised. However, it was recommended that this area be revegetated (U.S. Navy 2004c).

Funding, contractual, and timing issues precluded completion of the recommended revegetation during the 2004 field season.

SWMU 25, Roberts Landfill

The ICs at SWMU 25 are the restriction of land use to outdoor recreational activities, the restriction of groundwater use, which are included in an equitable servitude, and an excavation prohibition (Table 4-3). During the inspection in October 2003, there were no indications of a change in land use in this area. The site did not appear to be in use. No residential construction had occurred at the site. There were no indications that groundwater is being used at the site and there were no indications of excavation activities. Therefore, ICs appeared to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2004c).

ECs that were implemented at SWMU 25 include a landfill cap (soil cover) and signs. At the time of the 2003 inspection, the caps appeared to be intact and undisturbed. New vegetation was planted in 2002 on the cell that was closed in 2002, and very little new vegetation was observed over the cell during the October 2003 inspection. The central-western and southern portions of the landfill were not vegetated. It was recommended that these areas be revegetated.

Funding, contractual, and timing issues precluded completion of the recommended revegetation during the 2004 field season.

OU B-1 and OU B-2 Ordnance Areas

The Navy has imposed access restrictions at the OU B-2, Parcel 4 area. Based on the October 2003 inspection, the ordnance hazard signs were in place at the OU B-2 sites. As well as maintaining the MEC awareness program for OU B-2 sites, the Navy has implemented some additional ECs at Parcel 4 to limit access to Navy-retained lands. ECs include partial perimeter fencing with attached warning signs and blocked roadways with locked gates. At the time of the October 2003 inspection, the ECs remained in place.

The ordnance IC consists of maintaining the existing Adak Island Ordnance Awareness program. The ordnance awareness training program is a requirement of the OU B-1 ROD (U.S. Navy, USEPA, and Alaska DEC 2001). Island residents and visitors are required to participate in an established ordnance awareness training program. This program applies to the entire northern section of Adak and, therefore, is not a site-specific IC. This program is intended to familiarize on-island residents and visitors with the history of ordnance use, storage, handling and disposal on Adak Island; basic characteristics of ordnance items on Adak; and the procedures that should be followed if a suspected ordnance item is encountered.

The 2003 IC inspection with regard to the Adak Island Ordnance Awareness program consisted of the completion of interviews with local residents, individuals on assignment and temporarily working on Adak (e.g., for a period of 6 months), and visitors. Interviews conducted in October 2003 revealed that there are community members very familiar with the program, including the video and educational materials, such as magnets and posters. However, newer community members and visitors were not fully aware of the program’s existence. Interviewees associated with the Adak fishing industry indicated that informational videos were not shown to fishermen during the October 2002 to October 2003 period and that the last time the Port of Adak showed an informational video to fishermen was in January 2002.

Interviewees were queried about the *AdakUpdate.com* Web site, which could provide access to ordnance information. When asked about the Web site, community members (not including visitors or some temporary residents) were aware of the Web site in general. However, there are access problems to the Web site, because of capacity issues with the local internet provider. There are only 10 random access lines and 10 dedicated lines to serve the community of Adak.

The use of a community channel as a possible outreach option was discussed with interviewees. When asked about the use of a community channel, it was noted by community members that many people do not have cable television because of its cost. Without cable, the community channel is not an effective option.

Overall, the community members still thought the best way to access community members was to provide the information by mail.

The ordnance awareness program was revised in 2002 to 2003. Ordnance education materials (coloring books, refrigerator magnets, and posters) were distributed to children in early Summer 2003. Individual DVD copies of the adult- and children-oriented videos were placed in on-island mailboxes in July 2003. Topic-specific ordnance fact sheets were also distributed at this time.

The MEC Awareness materials were changed, with stakeholder involvement, to reflect the needs of the current nonmilitary community. An effort was made to incorporate icons and characters more reflective of the Aleut culture and to provide MEC-related information at a level that nonmilitary people could understand.

Items with logos and emergency telephone numbers, such as coffee mugs, refrigerator magnets, tricolor markers, and small balls, were planned for distribution in 2004, in an effort to provide a continuing safety reminder in residents' households. Additionally, in summer 2004, a community briefing by the Fort Richardson Explosives Ordnance Detachment was conducted. The purpose of this briefing was to inform City of Adak officials and residents of the procedure to follow to obtain responses from the Fort Richardson Explosives Ordnance Detachment when ordnance is discovered.

Interviews conducted with on-island personnel in October 2003 indicated that the ordnance safety awareness program may need to be re-emphasized, with regard to improving communication with visitors and newer and temporary residents. It was recommended that the Navy discuss options with the airline carriers to show an informational video prior to takeoff, or in flight, and also to contact the skippers of the individual vessels that off-load to the processing plant about showing an informational video to their crews aboard or prior to departure from other ports as a means of providing the awareness training to visitors.

Based on the interviews conducted, most residents were aware of the existing video, the various educational materials, such as posters and magnets, and the restrictions. However, the newer residents were unaware that it was required viewing. The newer residents did know, however, that there was a possibility of encountering ordnance on the island and knew to be cautious when hiking.

6.5.3 Results of 2004 Institutional Controls Inspections

Recommendations based on observations made during the 2004 inspections are discussed in this section together with actions the Navy took during the 2005 field season to ensure that the ICs and ECs remain protective. The ICs and/or ECs at sites not discussed in this section were deemed to be functioning as intended and protective of human health and the environment.

Education Program

During the 2004 institutional controls inspections, the Navy conducted informal interviews with on-island personnel regarding the UXO educational program and potential improvements. Interviews were conducted with residents, ARC personnel, City of Adak personnel, and visitors to Adak. These interviews were intended to ensure that the UXO educational programs were functioning in accordance with the ICMP and applicable RODs.

Interviews were completed in September 2004 with residents and visitors. Interviews indicated that community members are very familiar with the program, which includes the distribution of educational materials (UXO videos, posters, and magnets), and the restrictions. However, some residents were not aware of the existence of a toll-free telephone number and e-mail address to obtain additional information on ordnance issues. When asked about the *Adakupdate.com* Web site, community members were aware of the Web site in general. However, there are access problems to the site because of the relatively high cost charged by the local provider. Many people cannot afford the monthly fee for internet service. The use of a community channel as a possible outreach option was discussed with interviewees. Community members noted that many people do not have cable television because of its cost. Therefore, this is not effective option for communicating to the community. Community members thought that the best way to access community members was to provide information by mail or at community meetings.

SWMUs 18/19 White Alice Landfill

Engineering controls that were implemented at SWMUs 18/19 include a soil cover. At the time of inspection, the cover appeared to be intact and undisturbed. Portions of the south-southwestern slope of the landfill perimeter were showing a minor amount of erosion, and isolated areas in this vicinity were not vegetated. The erosion and lack of vegetation in this area were not considered a compromise to the landfill cap or foundation. There are two locations (one along the west side of the landfill and one near the east side entrance) where an approximately 10-foot-long section of the top strand of the barbed wire in the perimeter fencing was broken. There was also one sign down near the east side entrance. It was recommended that the eroded area be revegetated, the perimeter fencing be repaired, and the signage repaired or replaced (U.S. Navy 2005e).

The Navy procured a contractor to have the eroded areas regraded and revegetated. A closure report was prepared following completion of construction activities that described the restoration methods employed and the area that was revegetated (U.S. Navy 2005g). The 2005 internal draft inspection report (U.S. Navy 2005f) indicated that the perimeter fencing was in good condition, as was the cable gate at the entrance. Signage was also in good condition and was visible around the entire perimeter of the landfill.

SWMU 25, Roberts Landfill

The ICs at SWMU 25 are the restriction of land use to outdoor recreational activities the restriction of groundwater use, which are included in an equitable servitude, and an excavation prohibition (Table 4-3). During the inspection in September 2004, there were no indications of a change in land use in this area. The site did not appear to be in use and no residential construction had occurred at the site. There were no indications that groundwater is being used at the site, and there were no indications of excavation activities. Therefore, ICs appeared to be functioning as intended to protect human receptors from exposure to soil or groundwater.

Engineering controls that were implemented at SWMU 25 include a landfill cap (soil cover) and signs. At the time of inspection, the cap appeared to be intact and undisturbed. New vegetation was planted in 2002 on the cell that was closed in 2002, and very little new vegetation was observed over the cell during the September 2004 inspection. The Navy procured a contractor to have these areas regraded and revegetated. A closure report was prepared following completion of construction activities that described methods employed and the area that was revegetated (U.S. Navy 2005g).

Along the western perimeter of the landfill, two sections of fencing (each about 30 yards long), were damaged. The damage consisted of either broken strands of barbed wire fencing, or broken posts. These sections of fencing were repaired last year, and the damage observed in 2004 was inferred to be a result of snow buildup along the fence. Deficiencies in the perimeter fencing and signage were not noted during the 2005 inspections (U.S. Navy 2005f).

OU B-1 and OU B-2 Ordnance Areas

The Navy has imposed access restrictions at the OU B-2, Parcel 4 area. Based on the September 2004 inspection, the ordnance hazard signs are in place at the OU B-2 sites. As well as maintaining the MEC Awareness program for OU B-2 sites, the Navy has implemented some additional ECs at Parcel 4 to limit access to Navy-retained lands. ECs partial perimeter fencing with attached warning signs and blocked roadways with locked gates. Based on the September 2004 inspection, the ECs were in place, with the exception of damaged barbed-wire fencing at the location to the northeast of Andrew Lake. Barbed-wire fencing was damaged at three different locations that are in relatively close proximity to one another, and each location consists of approximately a 10 foot length of fencing in need of repair (U.S. Navy 2005e). The engineering controls were observed to be intact and in good condition during the September 2005 inspection (U.S. Navy 2005f).

6.5.4 Results of 2005 Institutional Controls Inspections

Findings and recommendations based on observations made during the 2005 inspections are discussed in this section. The Navy will consider these recommendations and take appropriate actions during the 2006 field season. The ICs and/or ECs at sites not discussed in this section were deemed to be functioning as intended and protective of human health and the environment.

Education Program

The Navy has an established education program that provides residents with information on ICs, groundwater restrictions, excavation restrictions, fishing restrictions, and UXO awareness. During the 2005 institutional controls inspections, the Navy interviewed 14 people to determine if the education plan is effective and whether revisions to the program would make it more relevant to the community's needs. Results of the interviews are presented in Table 6-1. The interviewees consisted of 13 residents and one visitor. Eight of the interviewees had lived on the island for over one year, and five had lived on the island for less than a year. The one visitor had spent 29 days on the island.

Interviews indicated that, in general, the community is familiar with the education program. All interviewees were aware of land use restrictions on Adak, and over 70 percent of people interviewed were aware of the excavation notification. Half of those interviewed were aware of the ordnance safety video and had seen it. However, most interviewees were not aware of the existence of a toll-free telephone number and an e-mail address to contact for additional information on institutional controls, and only 36 percent of those interviewed were aware of the fishing advisory on Adak.

SWMU 2 (Causeway Landfill), SWMU 4 (South Davis Road Landfill), and SWMU 29 (Finger Bay Landfill)

The ICs at SWMU 2, SWMU 4, and SWMU 29 are the restriction of land use to outdoor recreational activities, which are included in an equitable servitude, and a provision that prohibits excavation (Table 4-3). During the inspection in September 2005, there were no indications of a change in land use in this area. No residential construction had occurred at the site, and there were no indications of excavation activities. Therefore, ICs appear to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2005f).

ECs that were implemented at SWMU 2, SWMU 4, and SWMU 29 include signs and a soil cover. At the time of inspection, the cover appeared to be intact and undisturbed (U.S. Navy 2005f).

It was recommended that signs stating the presence of a buried landfill should be placed near the roadways closest to the perimeter of the landfill boundaries (U.S. Navy 2005f). The Navy is contracting to implement this recommendation during 2006.

SWMU 13, Metals Landfill

The ICs at SWMU 13 are the restriction of land use to outdoor recreational activities, the restriction of groundwater use, which are included in an equitable servitude, and an excavation prohibition (Table 4-3). During the inspection in September 2005, there were no indications of a change in land use in this area. The site did not appear to be in use, and no residential construction had occurred at the site. There were no indications that groundwater is being used at the site and no indications of excavation activities. Therefore, ICs appear to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2005f).

ECs that were implemented at SWMU 13 include a landfill cap (soil cover) and signs. At the time of inspection, the cap appeared to be intact. The drainage swale liner on the north side of the landfill is missing and damaged in some locations. Approximately 275 feet of liner will need to be replaced. Some minor erosion was observed in this area (U.S. Navy 2005f).

Signs were present at the perimeter of the landfill. However, there was no sign located at the main gate on the west side of landfill. The main gate consists of a lockable cable that prohibits vehicle access. The ECs appear to be functioning as intended to protect human and ecological receptors from exposure to soil or groundwater (U.S. Navy 2005f).

It was recommended that the portion of the drainage swale liner that has been damaged on the north end of the landfill be repaired to prevent further erosion in this area. In addition, it was recommended that a sign similar to those found on the perimeter of the landfill be placed at the entrance facing the new housing community (U.S. Navy 2005f). The Navy is contracting to implement these recommendations during 2006.

SWMU 25, Roberts Landfill

The ICs at SWMU 25 are the restriction of land use to outdoor recreational activities, the restriction of groundwater use, which are included in an equitable servitude, and an excavation prohibition (Table 4-3). During the inspection in September 2005, there were no indications of a change in land use in this area. The site did not appear to be in use, and no residential construction had occurred at the site. There were no indications that groundwater is being used at the site, and there were no indications of excavation activities. Therefore, ICs appear to be functioning as intended to protect human receptors from exposure to soil or groundwater (U.S. Navy 2005f).

ECs that were implemented at SWMU 25 include a landfill cap (soil cover), signs, and a fence. At the time of inspection, vegetation was found to be sparse in two locations on the cap. One location coincided with that described by the inspector in 2004. The other area where vegetation is sparse is located just south of a small pond on the west side of the landfill. Runoff from the pond is flowing directly south on the cap and is bypassing two existing drainages. Erosion is occurring in the area between the two drainages and some landfill debris has been exposed (U.S. Navy 2005f).

Along the western perimeter of the landfill, soil under one section of fencing has eroded. The erosion is due to the presence of a natural drainage in the area. The fence in this location is in good condition. However, the location will need to be monitored to verify that the fencing remains intact. The fence around the remainder of the landfill is also intact and in good condition (U.S. Navy 2005f).

It was recommended that the two sparsely vegetated areas noted during the site inspection be revegetated when possible. It was also recommended that the portion of the cap that has eroded be repaired and that the runoff be diverted to existing drainages to prevent further erosion in this area (U.S. Navy 2005f). The Navy is contracting to implement these recommendations during 2006.

6.6 RESULTS OF INTERVIEWS

Interviews were conducted with persons familiar with the CERCLA and SAERA actions at Adak. Interviewees were selected from the Navy (NAVFAC NW), current property owners, regulatory and advisory agencies, and community members. Interview instructions and questions were sent to potential interviewees via hard-copy mail or e-mail. Responses to questions were returned either in writing, or through telephone interviews. Not all those invited to comment chose to do so. Interview responses are documented in Appendix D. Highlights of the interview responses are summarized in the following sections.

6.6.1 Navy Personnel

The Navy respondents reported the following two changes in site conditions since the last 5-year review:

- The number of permanent residents on Adak has declined by half, reducing the intensity of land use.
- Repairs to the Roberts and White Alice Landfills were required and implemented.

The Navy respondents were aware of no community concerns regarding remedy implementation or overall protectiveness. Regular operation, maintenance, and monitoring (OMM) were reported as ongoing by the Navy respondents, and no unexpected difficulties associated with OMM were reported. The only changes to OMM over the last 5 years were reported to consist of sampling added in accordance with the May 2005 decision document for petroleum sites with no unacceptable risk.

The Navy respondents reported that some deficiencies have periodically been found during annual IC inspections and that recommended corrective actions have been taken in all cases. One access restriction violation (trespass) was reported at an OU B-2 site, which led to the improvement of access barriers and additional communication with the community.

The Navy reported extensive actions taken to implement the ICs required by the RODs. Those measures are discussed in this 5-year review in Section 6.5.

6.6.2 Land Owners

The land owners providing interview responses included representatives from the Alaska Department of Transportation and Public Facilities (ADOT&PF) and TAC. Both landowner respondents reported feeling well informed about the environmental cleanup activities on Adak. Neither landowner reported any changes in site conditions that could impact the protectiveness of the remedies, although ADOT&PF noted that future airport improvement projects could affect site conditions. Neither landowner reported any vandalism, trespassing, or other incidents that could impact the protectiveness of the remedy, and neither land owner was aware of any community concerns regarding remedy implementation.

TAC expressed a general concern regarding human health, emphasizing that remedial work should continue at sites where free-product recovery is possible.

ADOT&PF expressed dissatisfaction with the level of contamination being allowed to remain in soils and with the ICs that could make future airport improvement projects more difficult. ADOT&PF noted that written processes and procedures need to be put in place regarding future land disturbance for airport improvement projects.

6.6.3 Agency Personnel

The agencies providing responses included Alaska DEC, EPA, and the USFWS Alaska Maritime National Wildlife Refuge (Refuge). Both EPA and Alaska DEC reported feeling well informed overall regarding environmental actions on Adak. Alaska DEC, however, noted that they had not been informed as to the disposition of ordnance-related items discovered during a recent dredging project. The Refuge also reported that they were generally well informed, but were dissatisfied by not receiving a recent draft OU B-1 ROD amendment directly from the Navy.

With regard to changes in applicable or relevant and appropriate requirements (ARARs) and new scientific findings potentially calling into question remedy protectiveness, Alaska DEC reported "numerous" Alaska ARAR changes, while EPA reported no changes to chemical-specific ARARs. The Refuge reported changes to ARARs and "to be considered" related to the land transfer status for three OU B-1 sites. Changes to ARARs are addressed in this 5-year review in Section 7.2.

With regard to changed site conditions that could impact remedy protectiveness, EPA referred to the weather damage at several landfills, which was subsequently repaired. Alaska DEC noted that site SA 76 was currently being used for refuse collection by the City of Adak, although this land use does not currently affect the protectiveness of the remedy at this site.

The Refuge reported no complaints or violations requiring their response. EPA noted two incidents of ordnance-related items being brought to the downtown area by individuals on Adak, and noted that the Navy had addressed these incidents. Alaska DEC also noted these incidents and brought up the discovery of ordnance-related items during dredging. Alaska DEC also pointed out the recently discovered petroleum plume in the area known as "Area 303" and referred to Navy action to investigate this plume.

Alaska DEC reported continuing community concerns regarding the Palisades and Metals Landfills, and the metal-barrel retaining wall near the Metals Landfill. The Refuge reported community concerns regarding remedial actions for PCBs and petroleum in the Sweeper Creek drainage.

EPA suggested that the Navy make completion of OU B-1 and OU B-2 remedial work a higher priority. The Refuge requested a larger supply of hiking maps showing ordnance awareness information. Alaska DEC suggested that the Ordnance Awareness program needs to do a better job of reaching out to island visitors.

None of the agency respondents had suggestions regarding how monitoring of the remedies is being conducted.

Alaska DEC expressed concern that the OU B-1 remedy had not been fully implemented and that the remedy was therefore not currently protective. EPA concurred that not all of the remedial actions selected in the OU B-1 ROD have been implemented. The Refuge expressed a related concern, noting that the draft OU B-1 ROD amendment makes assumptions regarding future land use that were not accurate and that this impacts the effectiveness of the OU B-1 remedy.

6.6.4 Community

Eight community members provided interview responses. Respondents included the Adak city manager, a representative of A/PIA, the City of Adak power plant operator, the EPA tribal coordinator for Adak, and several volunteer citizens of Anchorage and Adak. All of the respondents reported feeling well informed about environmental cleanup activities on Adak. Several respondents, however, pointed out that at times the volume of information can be overwhelming and encouraged report writers to provide succinct summaries of findings in lay terms. Several respondents expressed a desire for “bottom line” conclusions regarding human health risks (e.g., is it safe for children to play in certain areas) and for site-specific information to always be placed in the context of the entire remediation effort. Several respondents made specific recommendations regarding presentation materials and content. One respondent noted that island visits by Navy personnel were very effective at conveying information and, by implication, recommended more such visits.

Several respondents noted multiple trespassing incidents into restricted ordnance areas and a propensity for local individuals to ignore warning signs and bring ordnance-related items into the downtown area. One respondent attributed some of these incidents to broken signage and fences. Most respondents indicated that the ordnance-related incidents had been dealt with.

Community concerns were reported with regard to exposed metal debris at the Metals Landfill and with regard to petroleum contamination. Concerns were also raised regarding funding limitations on completing cleanups in a timely manner and long-term government commitments to follow through with remediation.

One respondent believed that the remediation efforts to date have had positive results in the community and are generally appreciated.

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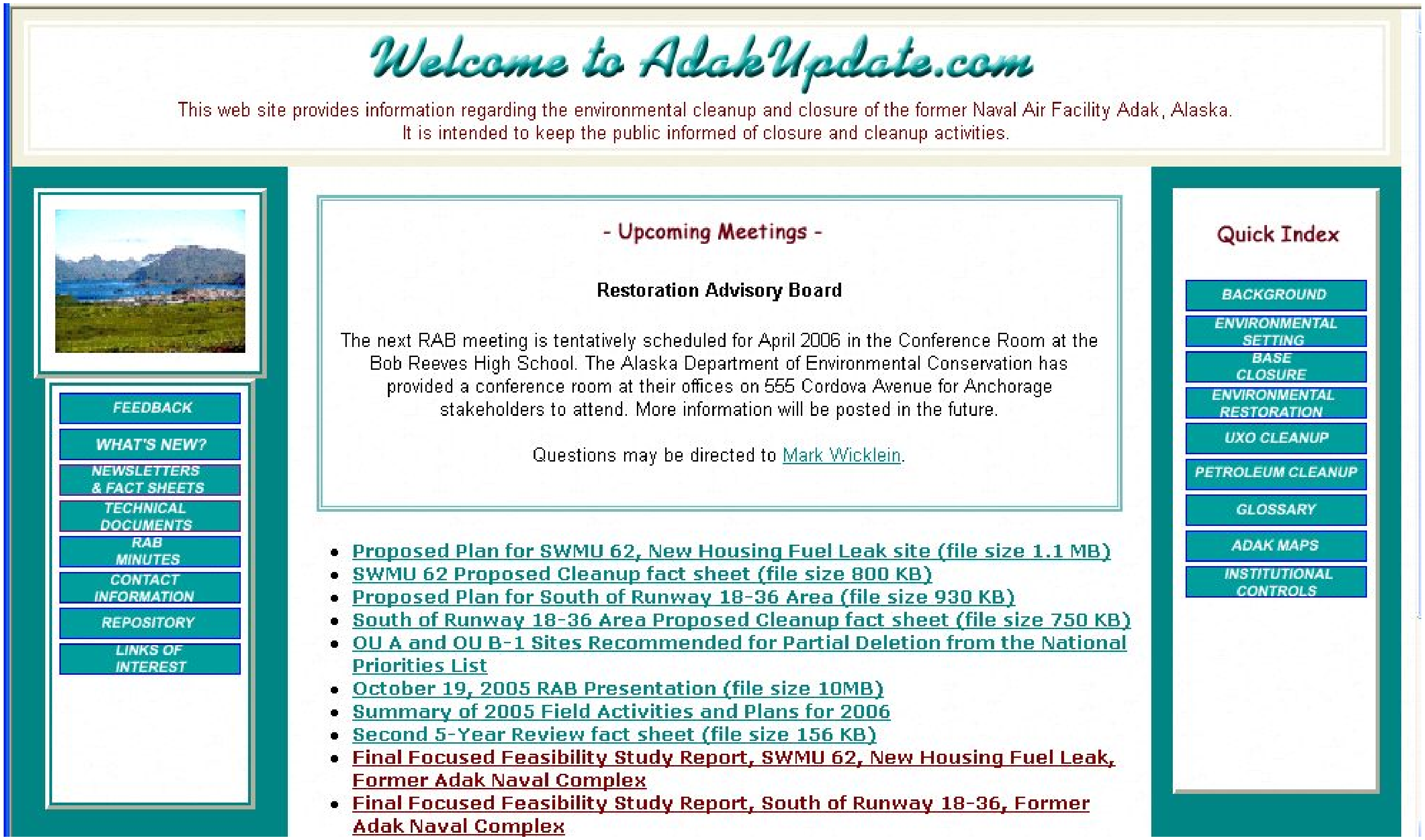
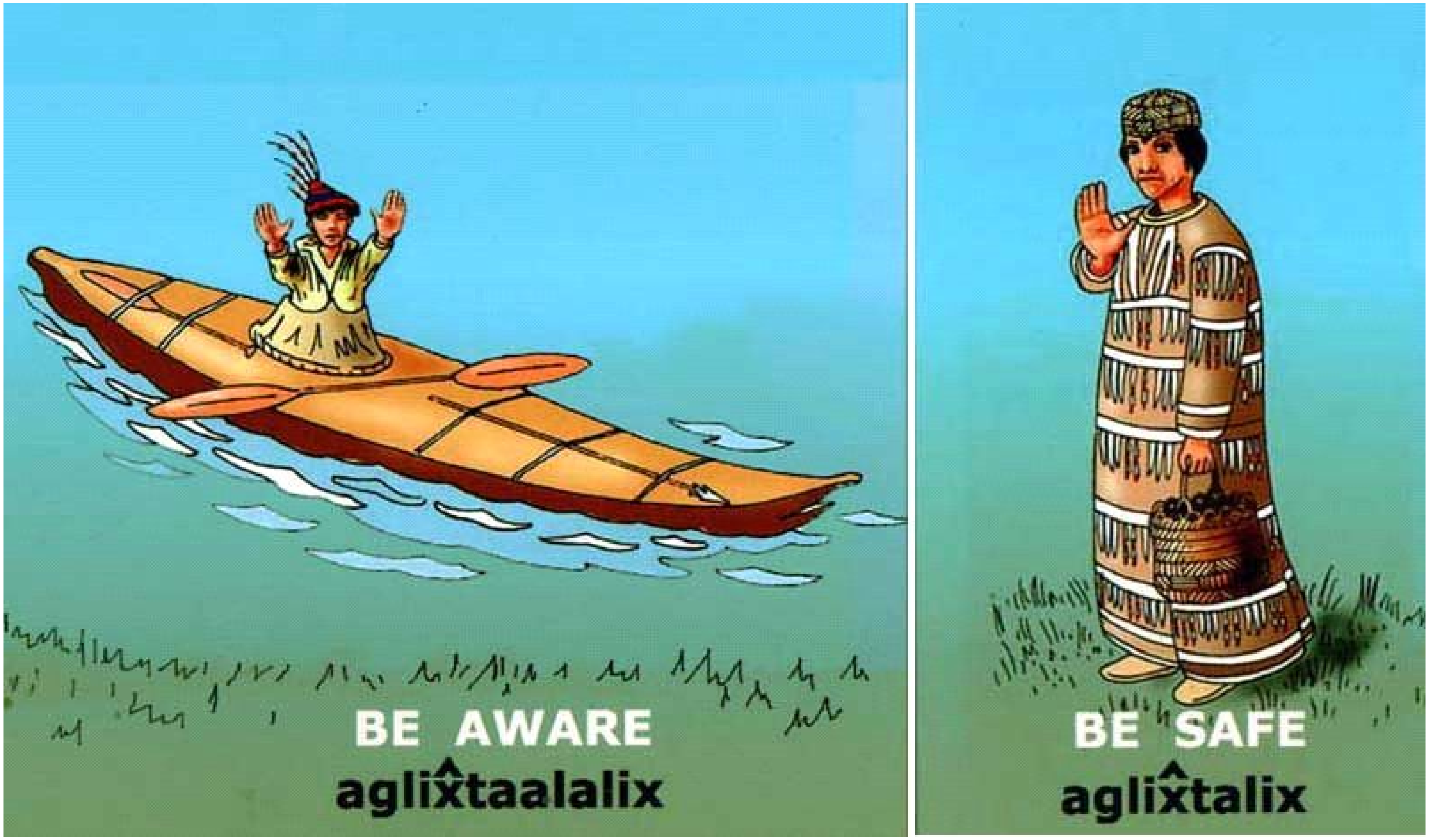


U.S.NAVY	Figure 6-1 AdakUpdate.com Home Page	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT



U.S.NAVY

Figure 6-2
Community-Friendly Icons

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Adak Island, AK
SECOND FIVE-YEAR REVIEW OF
RECORDS OF DECISION REPORT

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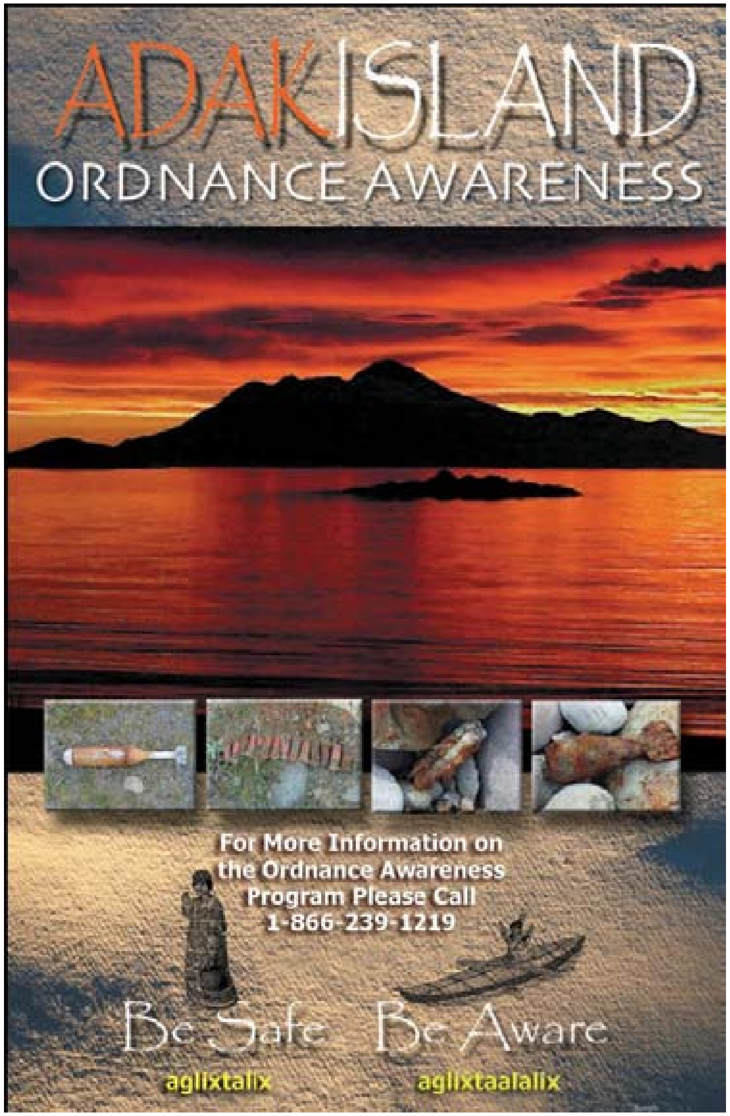

U.S.NAVY

Figure 6-3
Example of Ordnance Awareness Poster

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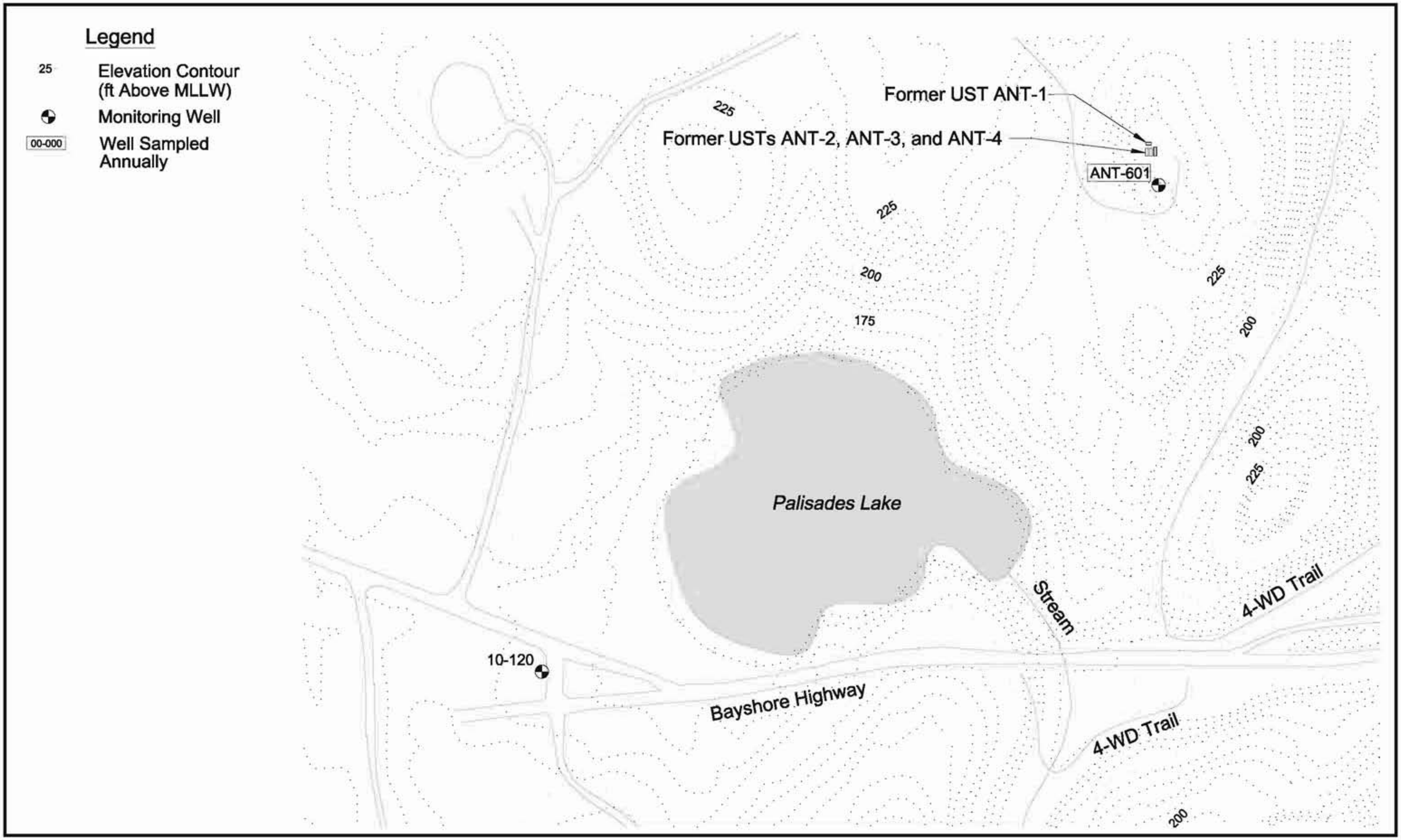
SECOND FIVE-YEAR REVIEW OF
RECORDS OF DECISION REPORT



U.S. NAVY

N

0 75 150 300
SCALE IN FEET

Figure 6-4
Antenna Field
USTs ANT-1, ANT-2, ANT-3, and ANT-4

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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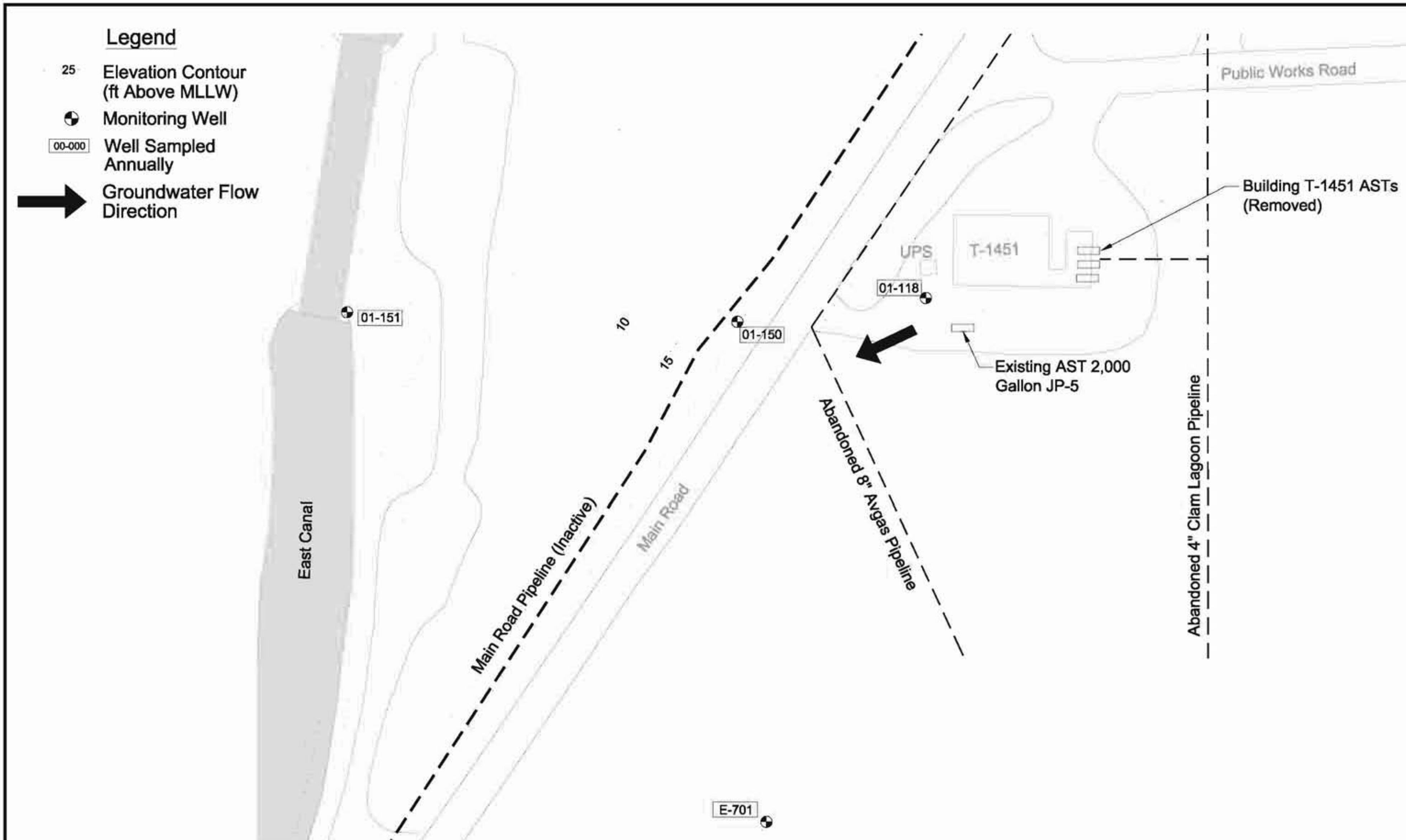

U.S. NAVY

Figure 6-5
Former Power Plant
Building T-1451

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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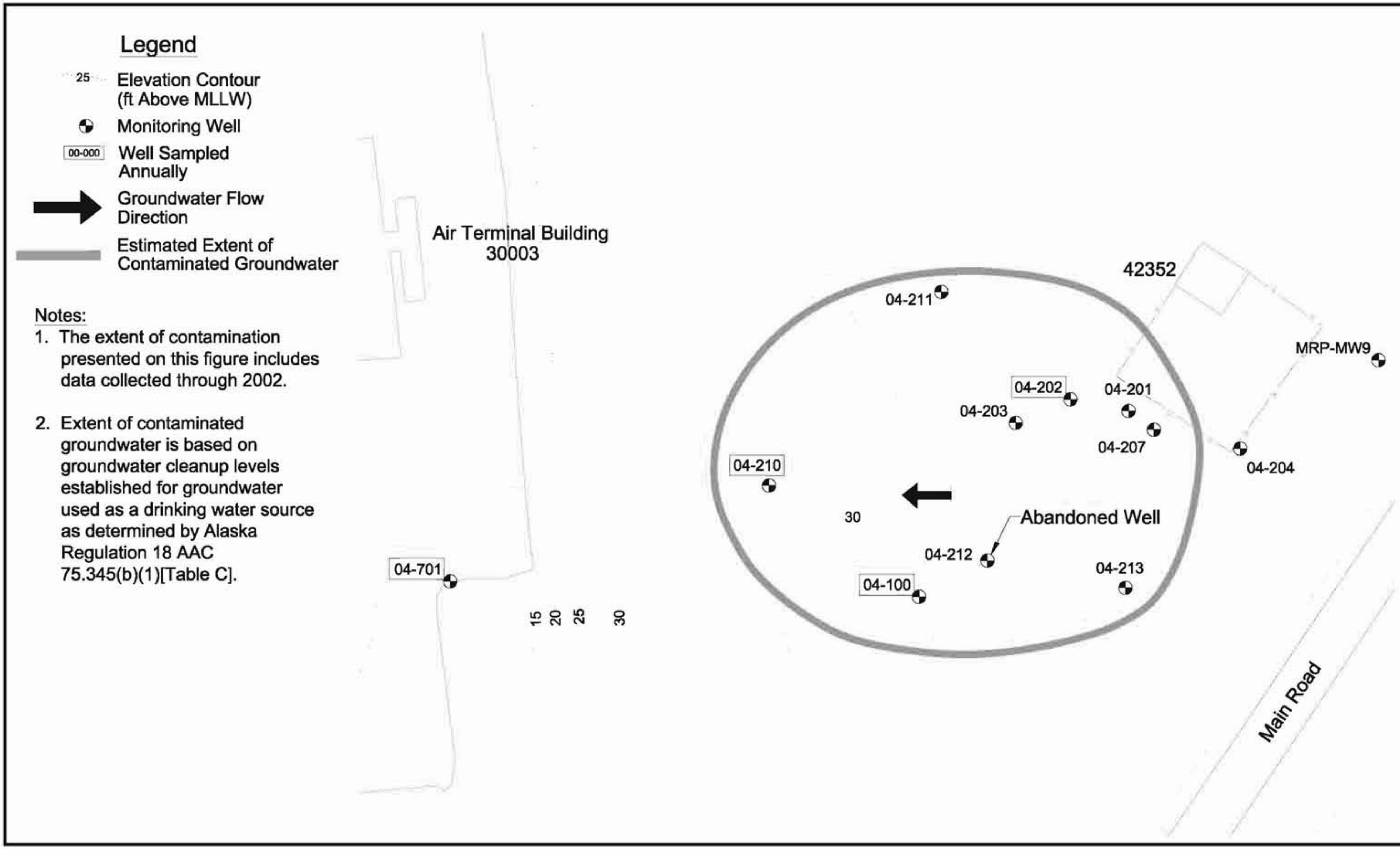

U.S. NAVY

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SCALE IN FEET

Figure 6-6
GCI Compound
UST GCI-1

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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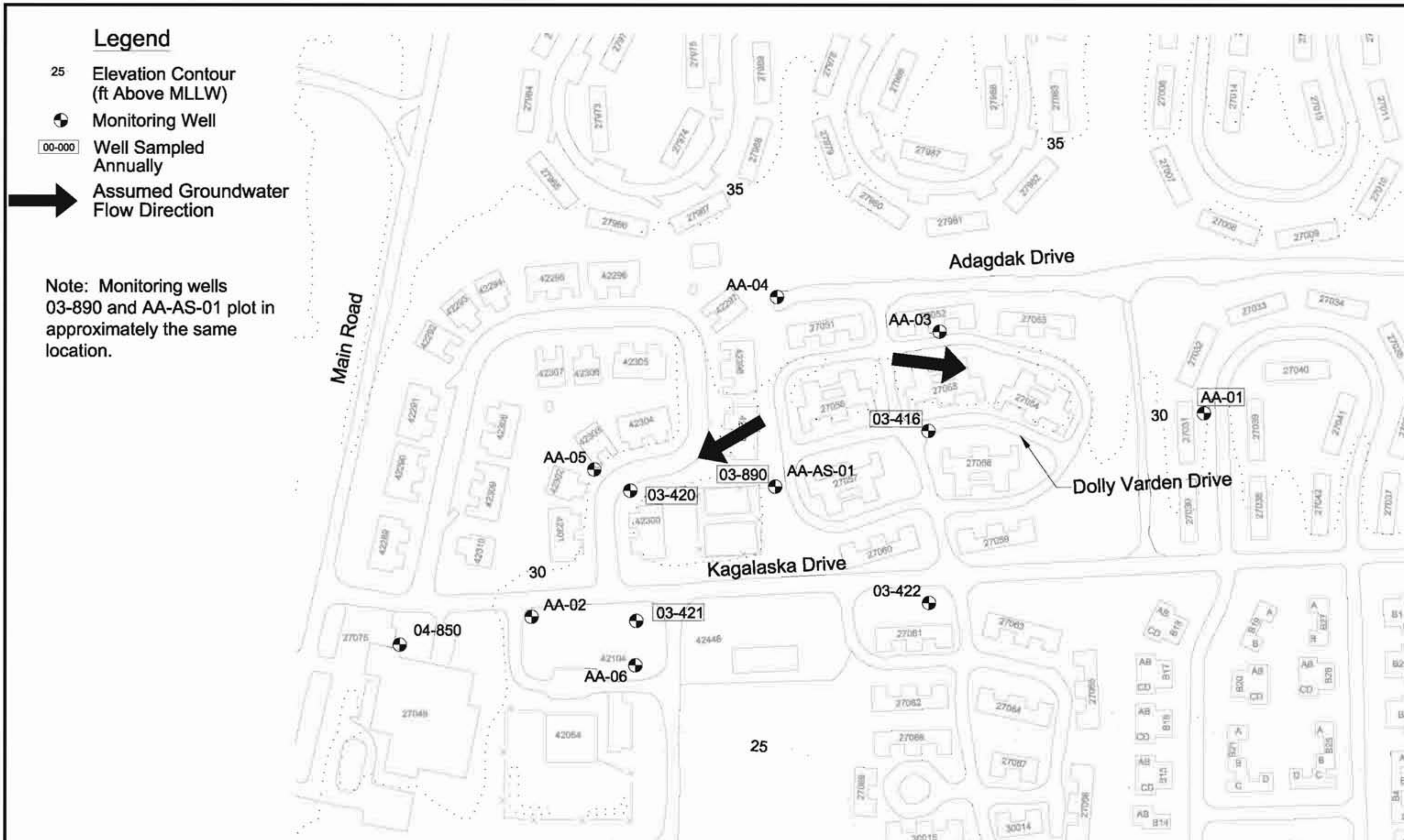

U.S. NAVY	N 0 125 250 500 SCALE IN FEET	**Figure 6-7** **Housing Area (Arctic Acres)**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-7 HOUSING ARCTIC.dwg
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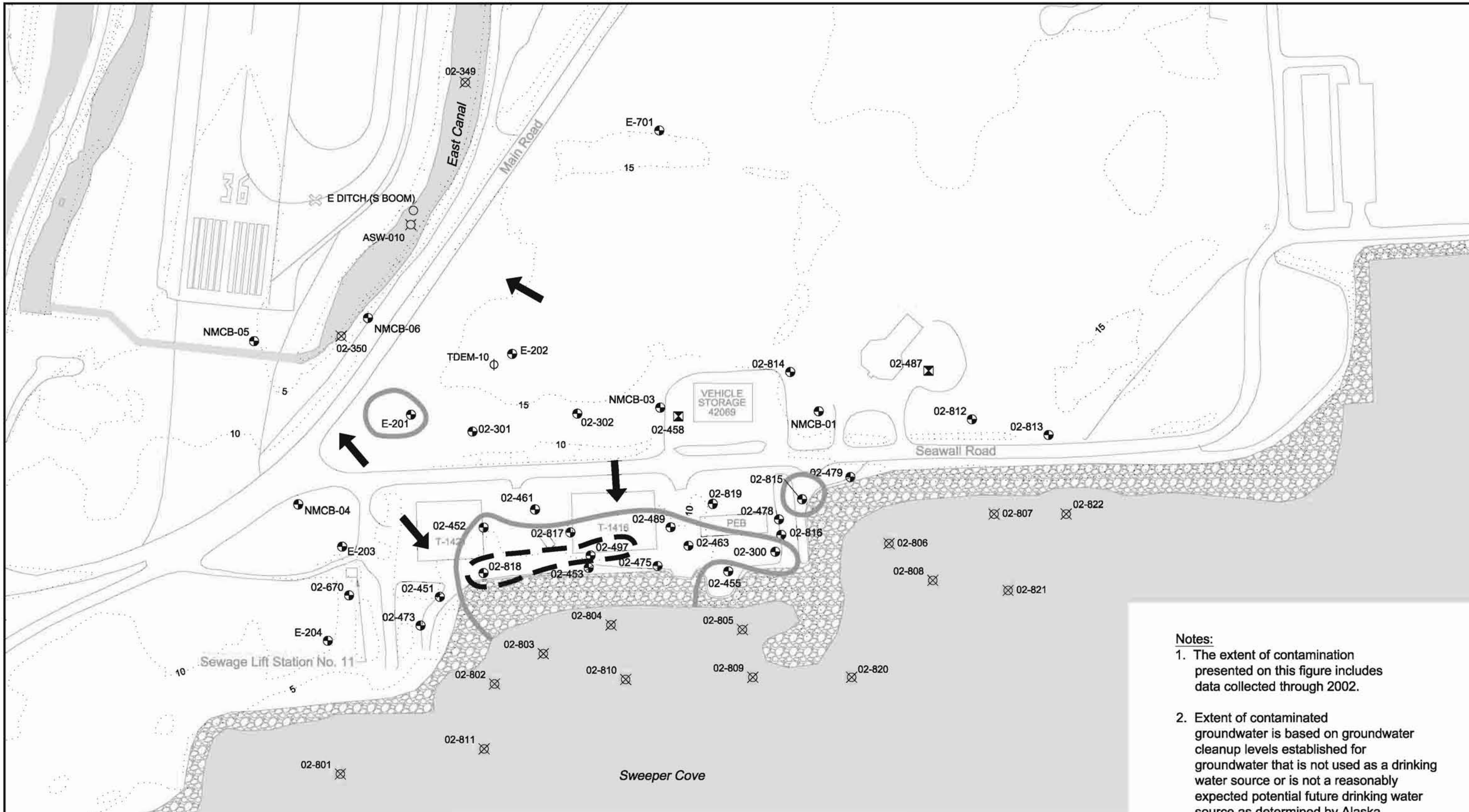

Notes:

1. The extent of contamination presented on this figure includes data collected through 2002.
2. Extent of contaminated groundwater is based on groundwater cleanup levels established for groundwater that is not used as a drinking water source or is not a reasonably expected potential future drinking water source as determined by Alaska Regulation 18 AAC75.345(b)(2) [10 times Table C levels].

LEGEND

- Monitoring Well
- Geoprobe Well
- Sediment and Surface Water Samples
- Surface Water Sample
- Sediment Sample
- Approximate Extent of Riprap
- Groundwater Flow Direction
- Estimated Extent of Contaminated Groundwater
- Estimated Extent of Free Product Based on Measurements From August 1, 2004 Through December 4, 2004

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\FIG 6-8 NMCB.dwg
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U.S. NAVY

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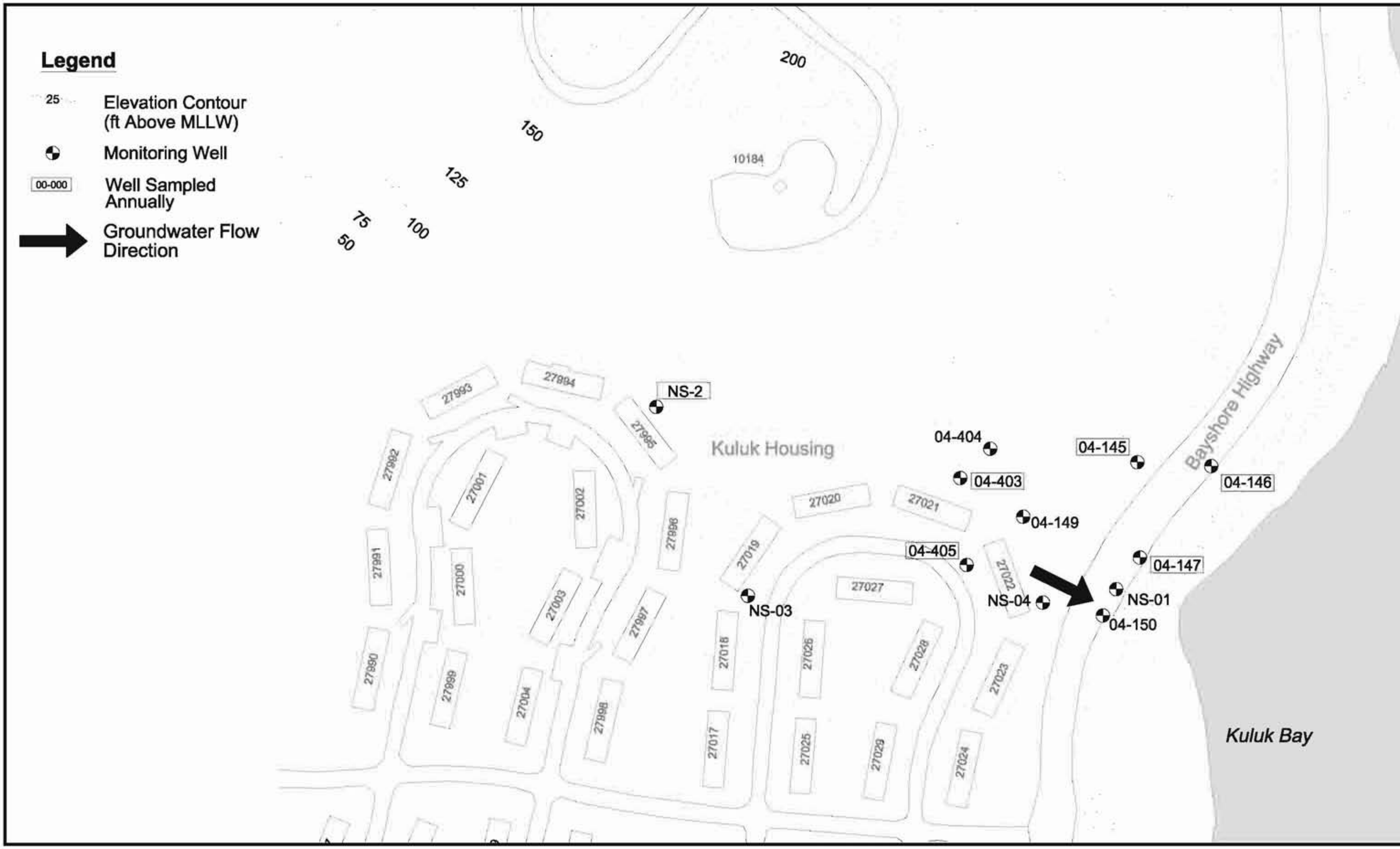
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

0 50 100 200
SCALE IN FEET

Figure 6-8
NMCB Building Area, T-1416 Expanded Area



U.S. NAVY	N 0 50 100 200 SCALE IN FEET	**Figure 6-9** **NORPAC Hill Seep Area**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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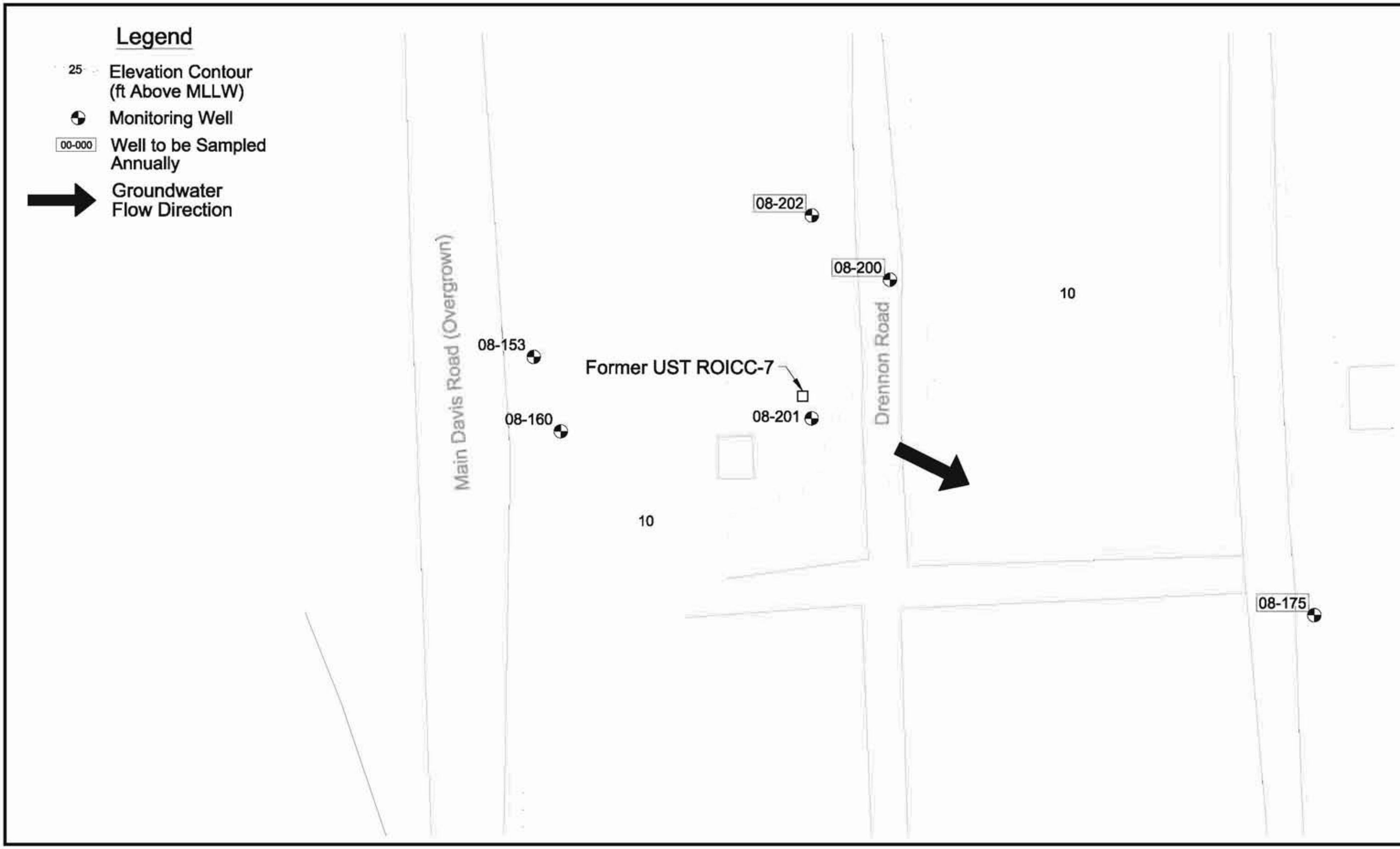

U.S. NAVY

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SCALE IN FEET

Figure 6-10
ROICC Contractor's Area
UST ROICC-7

Delivery Order 0001
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SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

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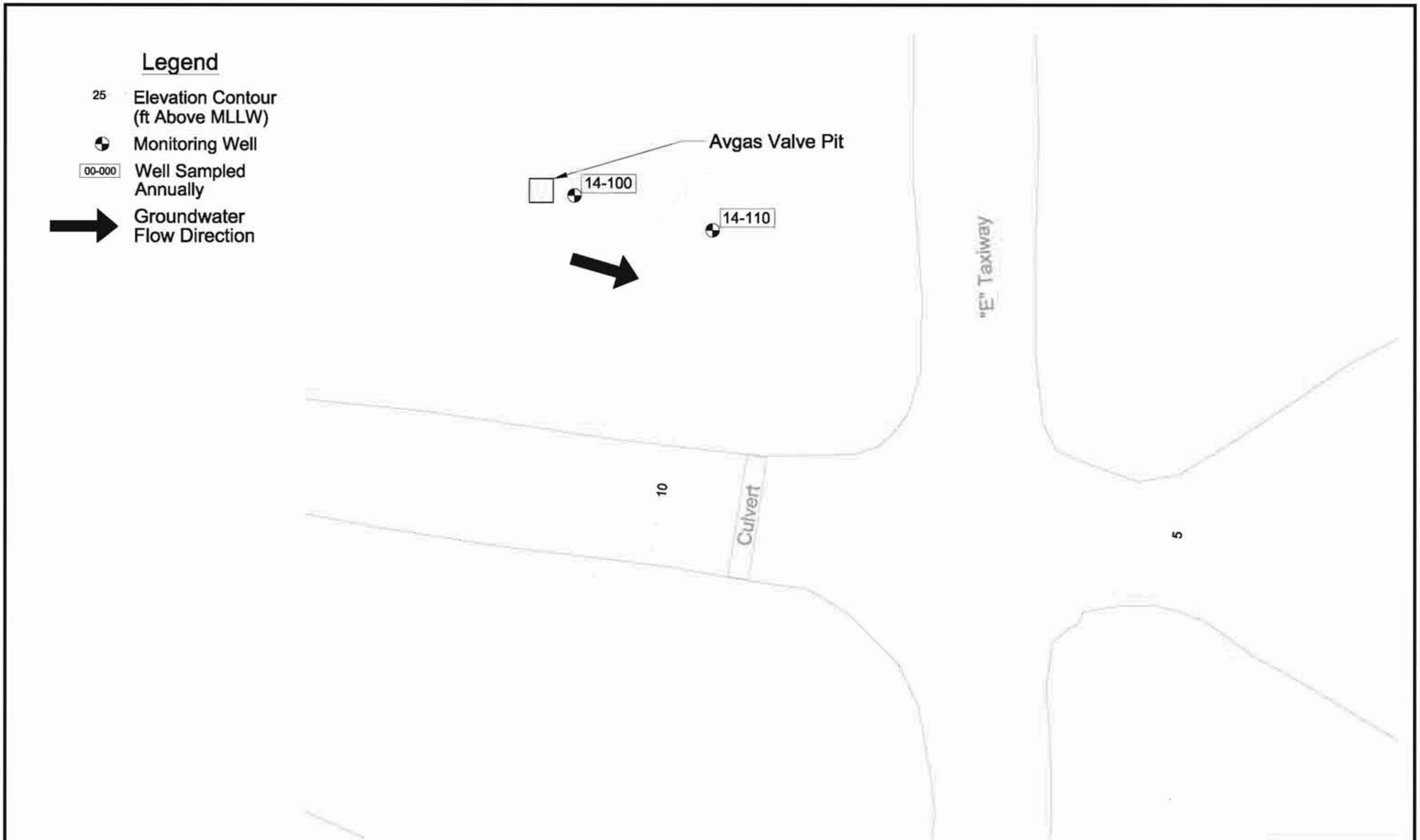

U.S. NAVY

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SCALE IN FEET

Figure 6-11
Runway 5-23 Avgas Valve Pit

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-11 RUNWAY 5-23.dwg
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Legend

25 Elevation Contour (ft Above MLLW)

Monitoring Well

Geoprobe Well

00-000 Well Sampled Annually

Estimated Extent of Contaminated Groundwater

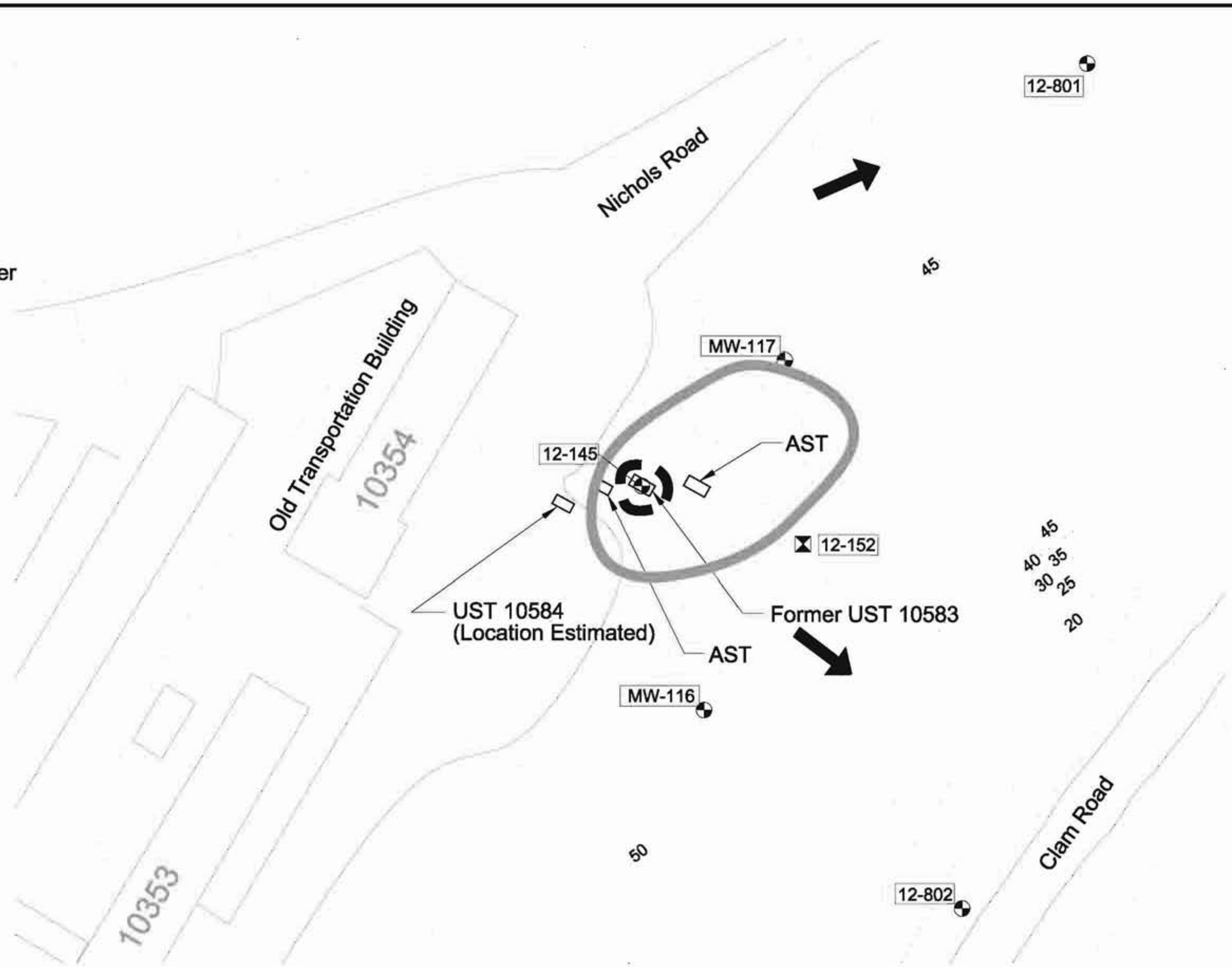
Estimated Extent of Free Product

Groundwater Flow Direction

Notes:

1. The extent of contamination presented on this figure includes data collected through 2002.

2. Extent of contaminated groundwater is based on groundwater cleanup levels established for groundwater that is not used as a drinking water source or is not a reasonably expected potential future drinking water source as determined by Alaska Regulation 18 AAC 75.345(b)(2)[10 times Table C levels].



U.S. NAVY

N

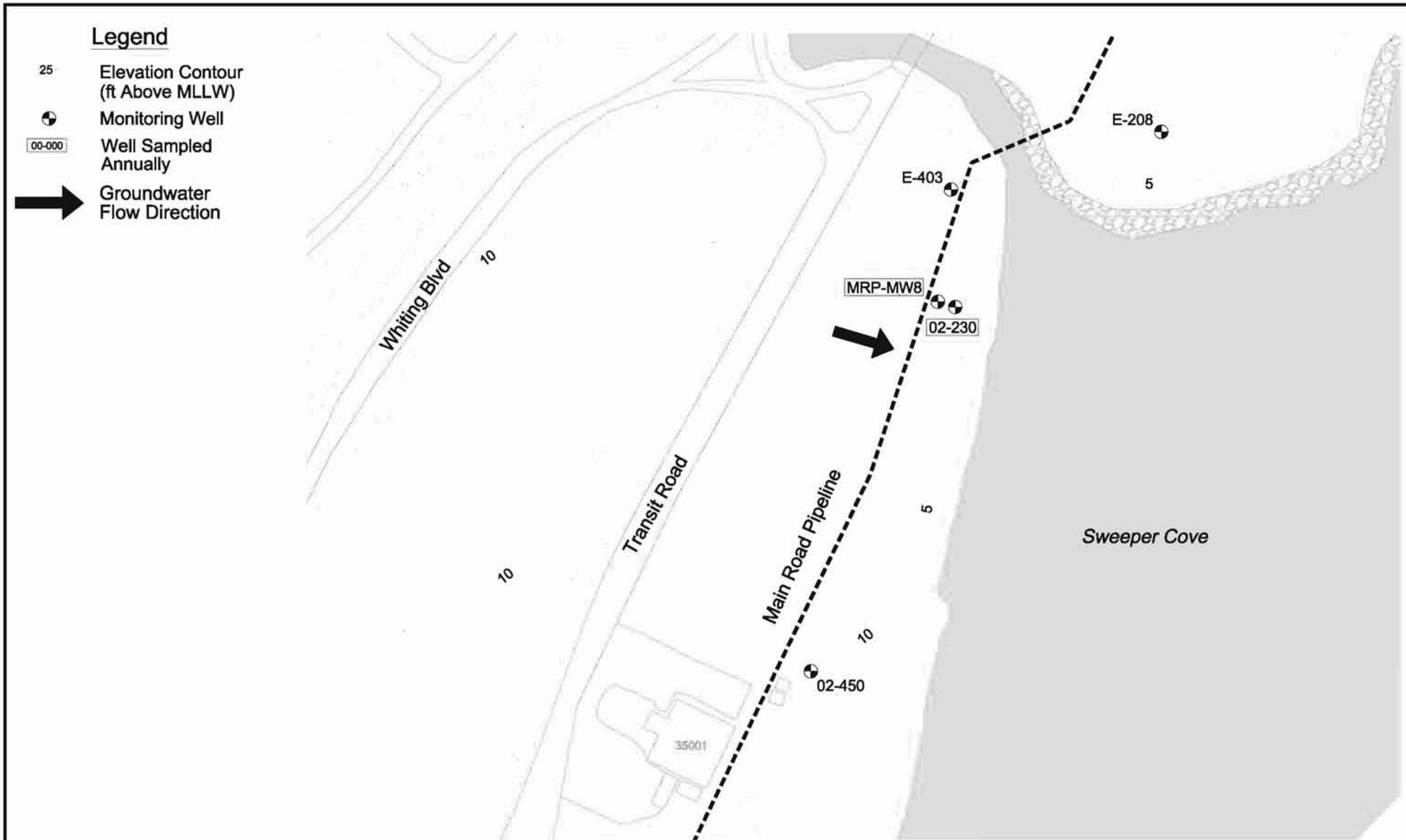
0 50 100 200

SCALE IN FEET

Figure 6-12
SA 78, Old Transportation Building
USTs 10583, 10584, and ASTs

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-12 SA 78.dwg
EDIT DATE: 04/07/06 AT: 10:58



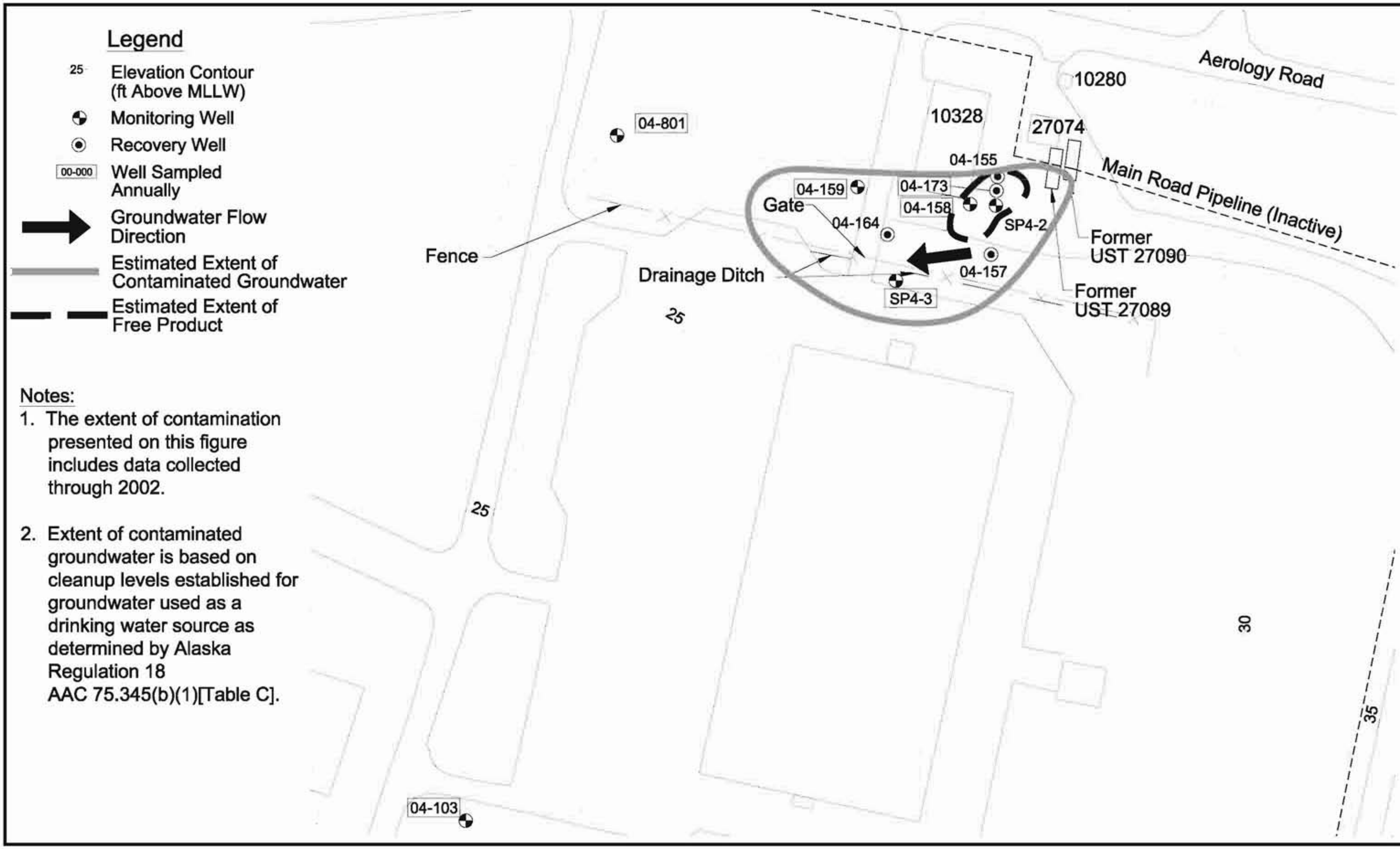
U.S. NAVY

0 50 100 200
SCALE IN FEET

Figure 6-13
SA 79, Main Road Pipeline, South End

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF
RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-13 SA 79 South.dwg
EDIT DATE: 04/07/06 AT: 10:59



Notes:
1. The extent of contamination presented on this figure includes data collected through 2002.
2. Extent of contaminated groundwater is based on cleanup levels established for groundwater used as a drinking water source as determined by Alaska Regulation 18 AAC 75.345(b)(1)[Table C].

U.S. NAVY

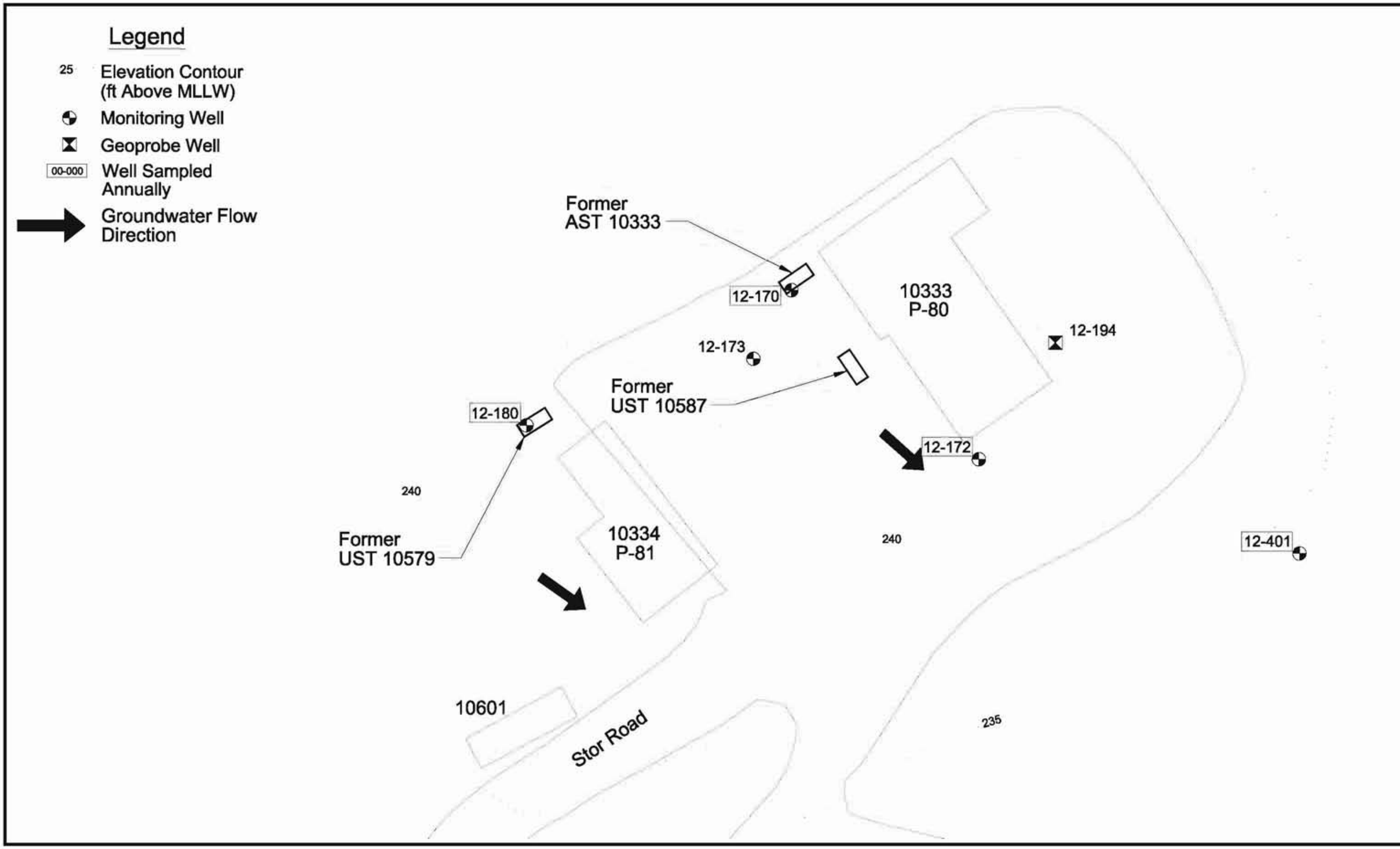
N

0 30 60 120
SCALE IN FEET

Figure 6-14
SA 80, Steam Plant 4
USTs 27089 and 27090

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-14 SA 80.dwg
EDIT DATE: 04/07/06 AT: 11:00



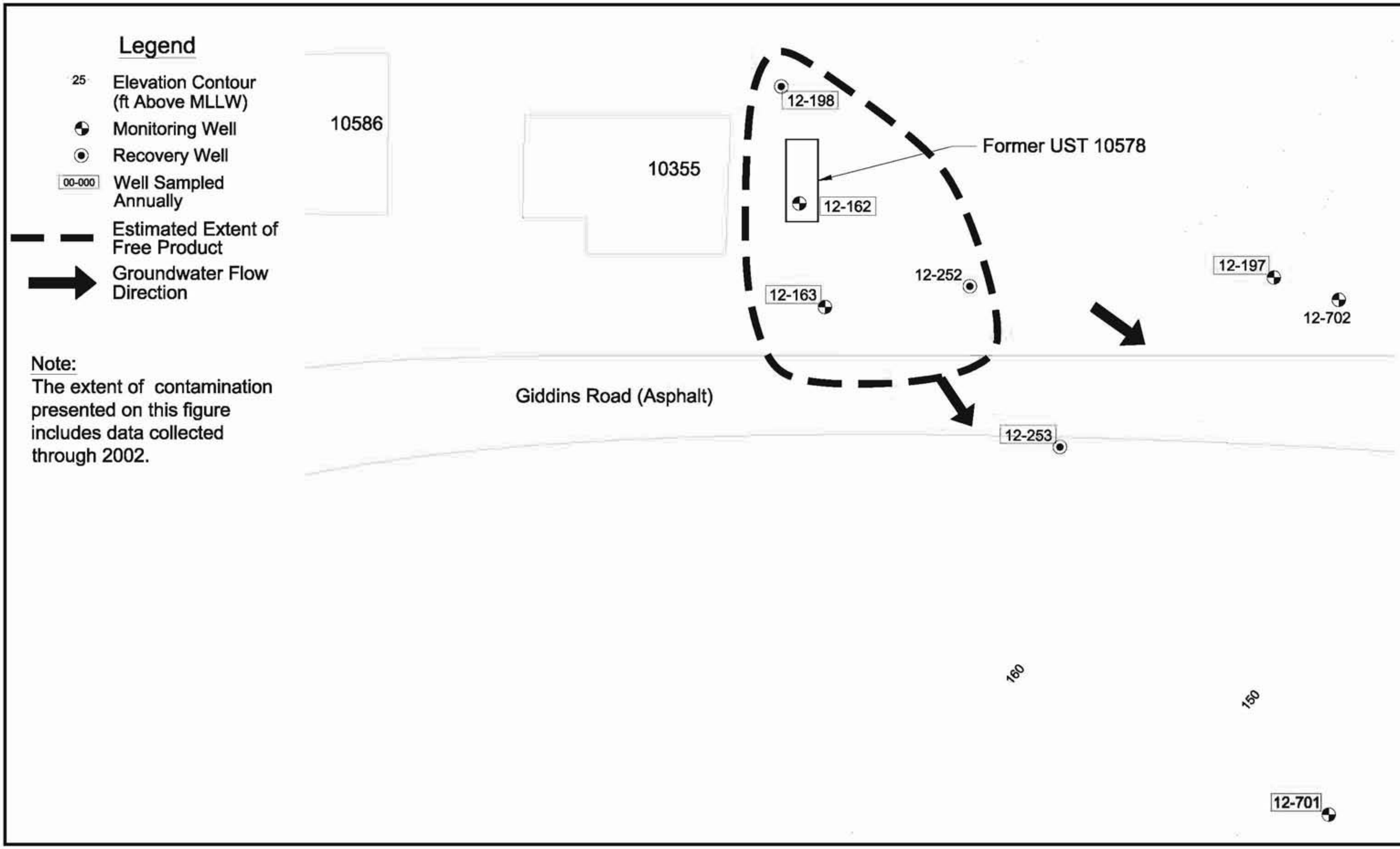
U.S. NAVY

0 25 50
SCALE IN FEET

Figure 6-15
SA 82, P-80/P-81 Buildings

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-15 SA 82.dwg
EDIT DATE: 04/07/06 AT: 11:02



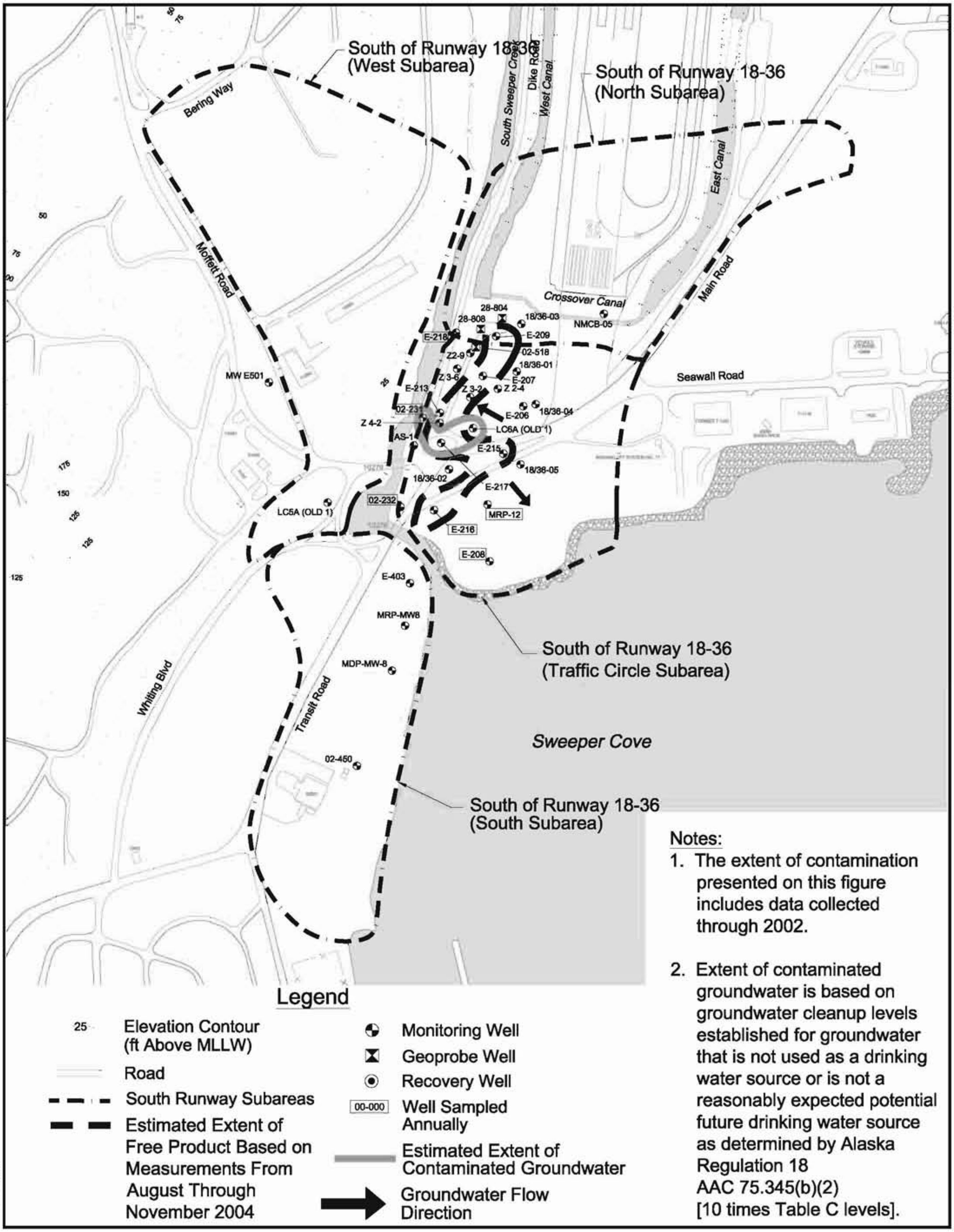
U.S. NAVY

0 15 30
SCALE IN FEET

Figure 6-16
SA 88, P-70 Energy Generator
UST 10578

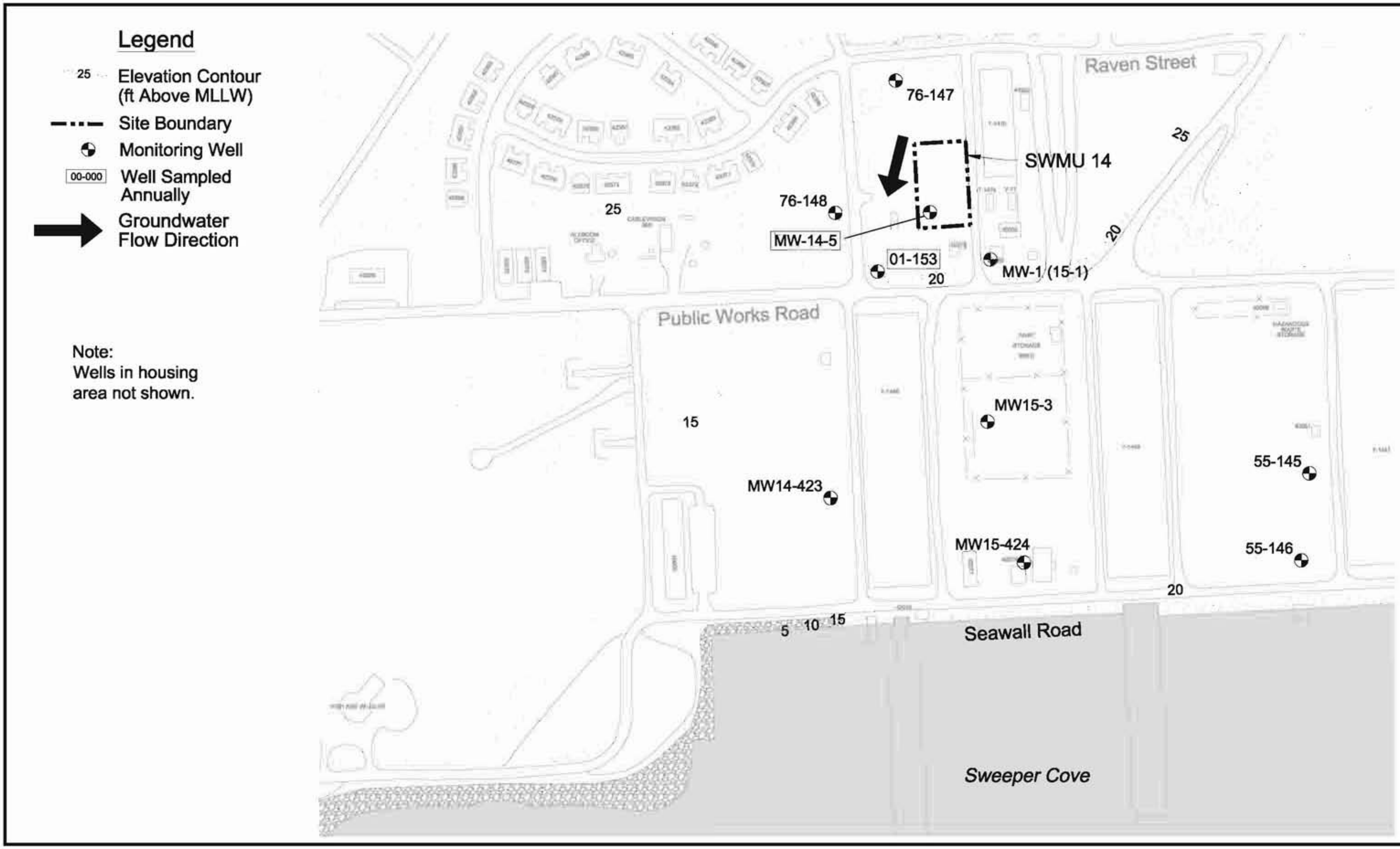
Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-16 SA 88.dwg
EDIT DATE: 04/07/06 AT: 11:03



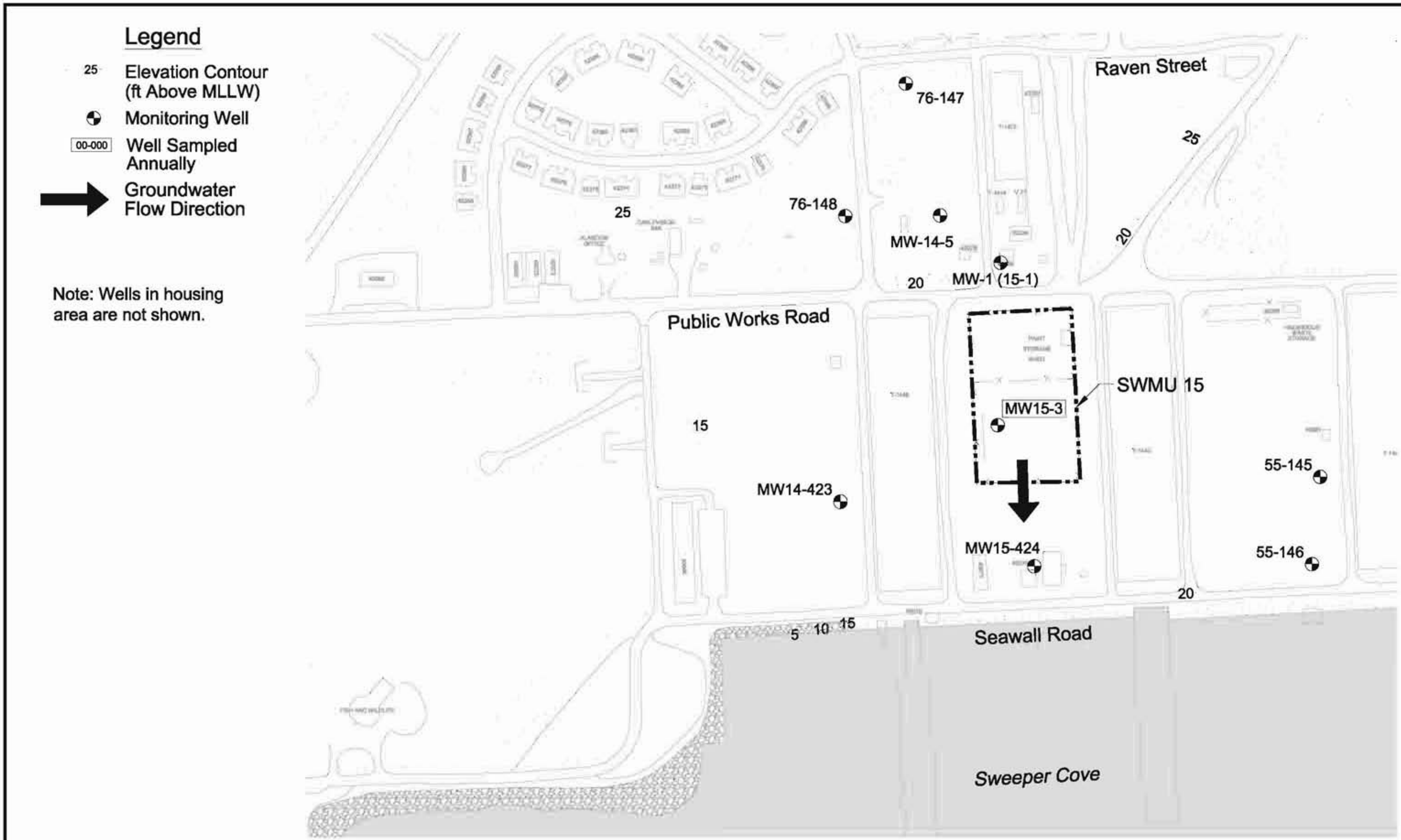
U.S. NAVY	0 125 250 500 SCALE IN FEET	**Figure 6-17** **South of Runway 18-36 Area**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-17 S.OF RUNWAY.dwg
EDIT DATE: 04/10/06 AT: 14:40



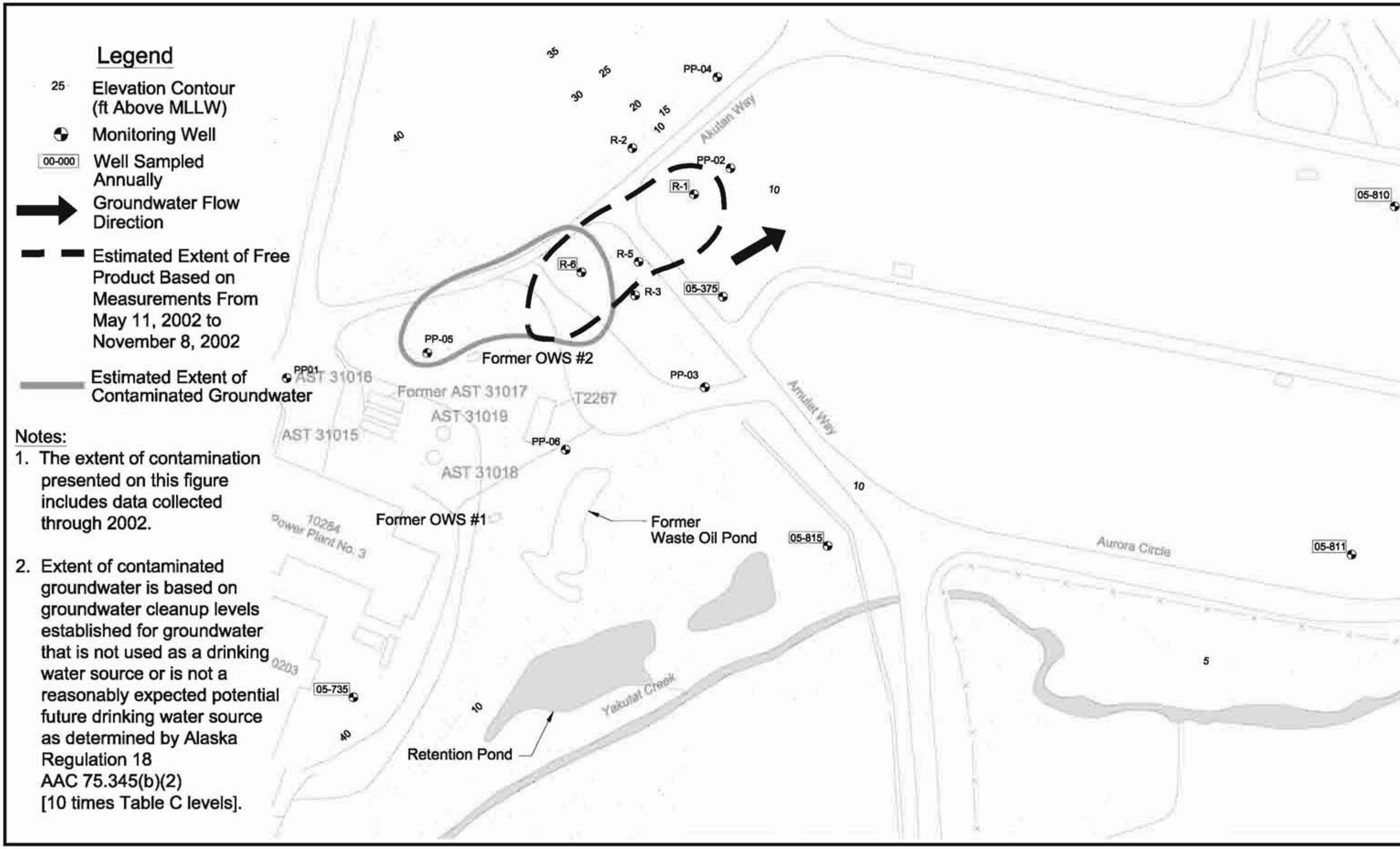
U.S. NAVY	0 100 200 400 SCALE IN FEET	**Figure 6-18** **SWMU 14, Old Pesticide Disposal Area**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-18 SWMU 14.dwg
EDIT DATE: 04/07/06 AT: 11:08



U.S. NAVY	0 100 200 400 SCALE IN FEET	**Figure 6-19** **SWMU 15, Future Jobs/Defense Reutilization Marketing Office**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-19 SWMU 15.dwg
EDIT DATE: 04/07/06 AT: 11:09



Notes:

1. The extent of contamination presented on this figure includes data collected through 2002.
2. Extent of contaminated groundwater is based on groundwater cleanup levels established for groundwater that is not used as a drinking water source or is not a reasonably expected potential future drinking water source as determined by Alaska Regulation 18 AAC 75.345(b)(2) [10 times Table C levels].

U.S. NAVY

N

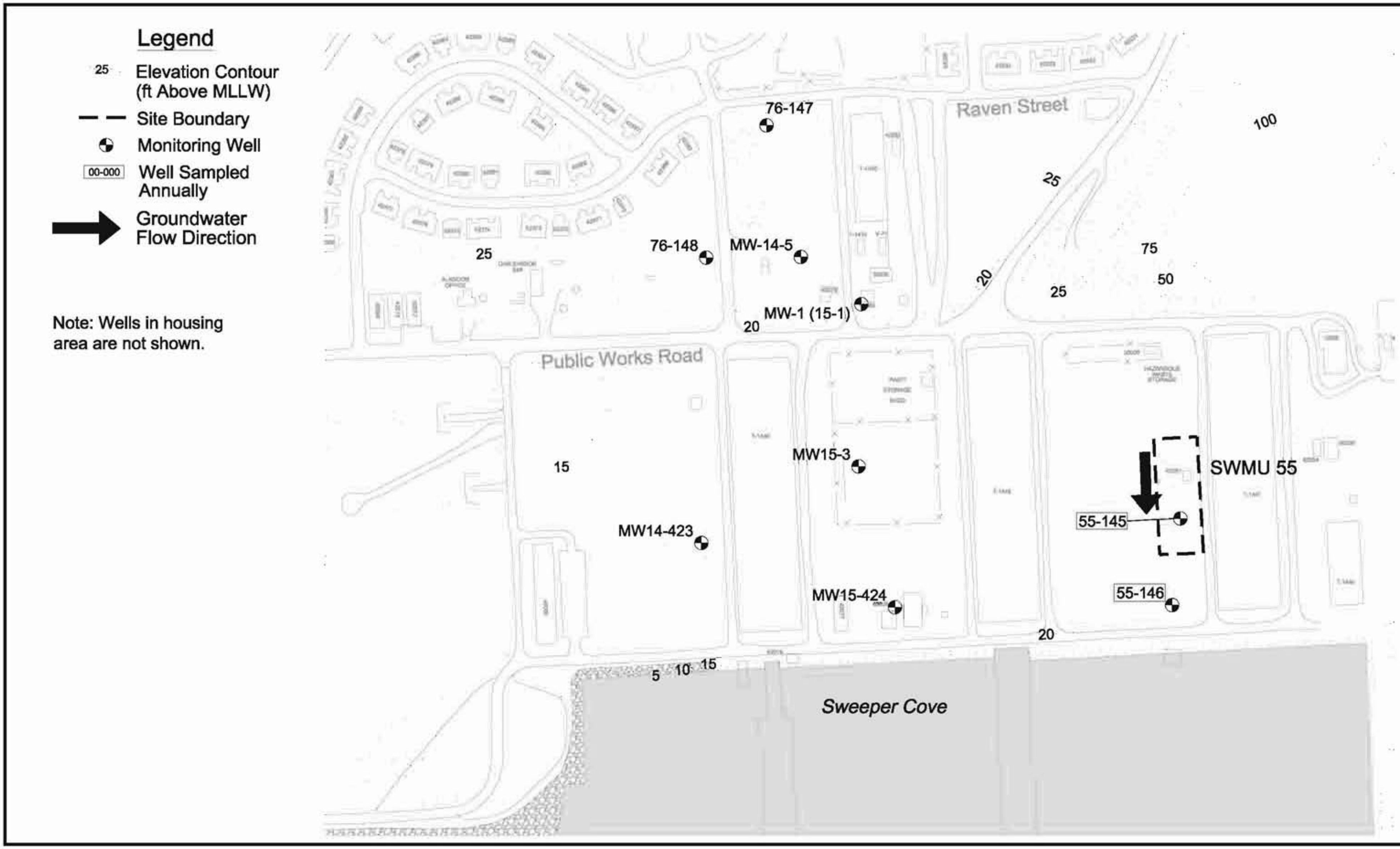
0 75 150

SCALE IN FEET

Figure 6-20
SWMU 17, Power Plant 3

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF
RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-20 SWMU 17.dwg
EDIT DATE: 04/07/06 AT: 11:11



U.S. NAVY	0 100 200 400 SCALE IN FEET	**Figure 6-21** **SWMU 55, Public Works Transportation Department Waste Storage Area**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-21 SWMU 55.dwg
EDIT DATE: 04/07/06 AT: 13:19

Legend

25 Elevation Contour (ft Above MLLW)

Monitoring Well

Geoprobe Well

Recovery Well

00-000 Well Sampled Annually

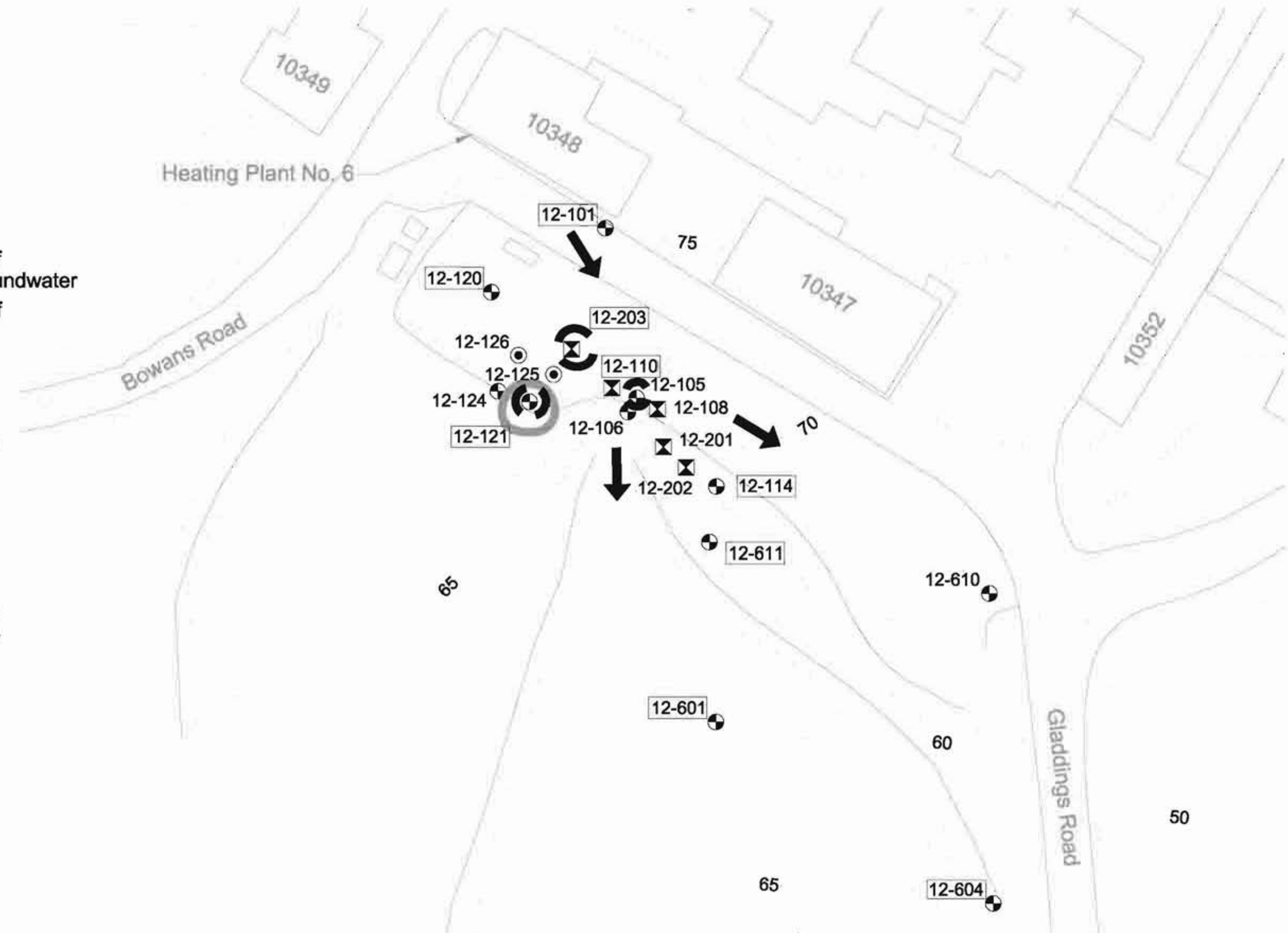
Estimated Extent of Contaminated Groundwater

Estimated Extent of Free Product

Groundwater Flow Direction

Notes:

1. The extent of contamination presented on this figure includes data collected through 2002.
2. Extent of contaminated groundwater is based on groundwater cleanup levels established for groundwater that is not used as a drinking water source or is not a reasonably expected potential future drinking water source as determined by Alaska Regulation 18 AAC 75.345(b)(2)[10 times Table C levels].



U.S. NAVY

N

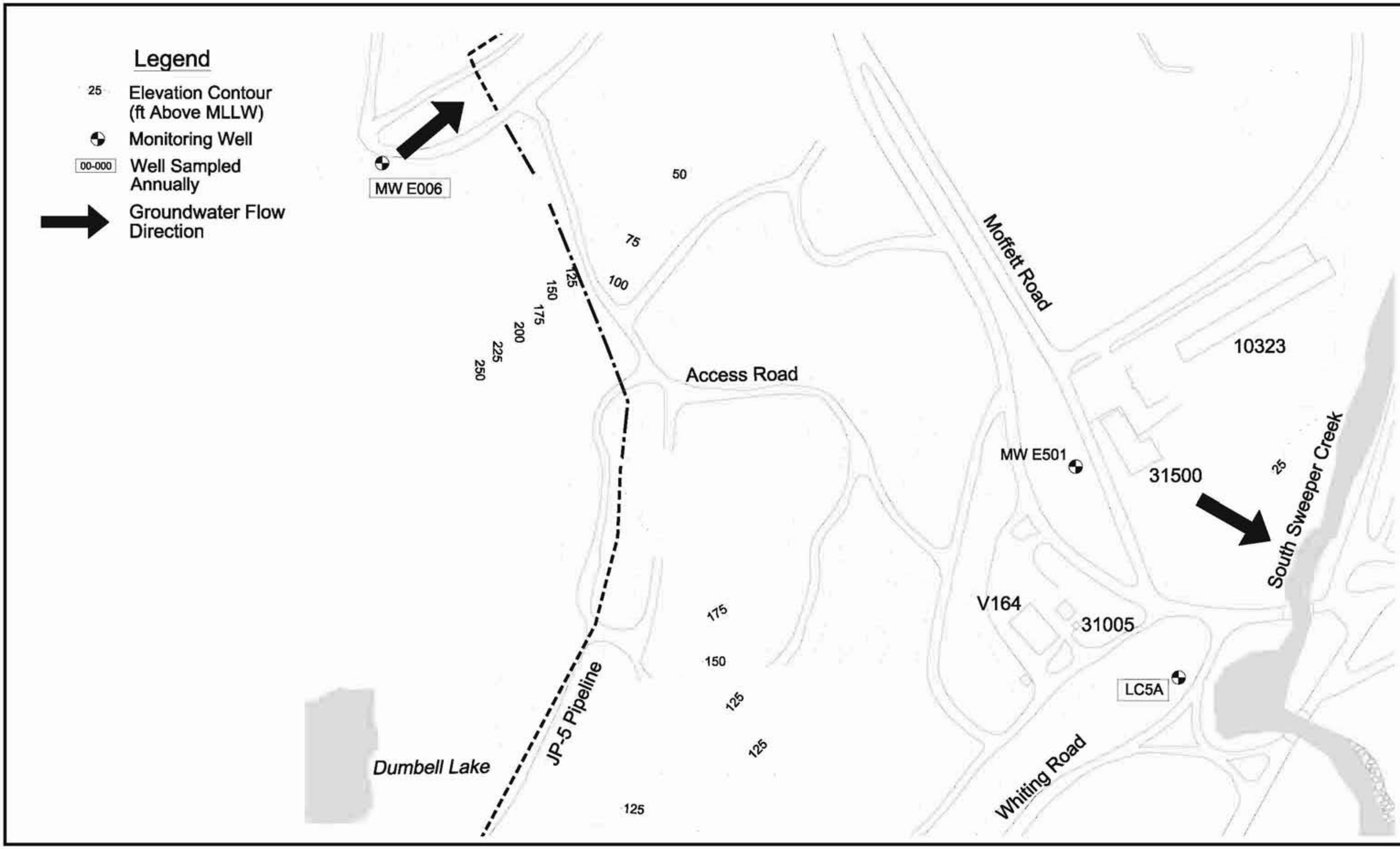
0 50 100 100

SCALE IN FEET

Figure 6-22
SWMU 58/SA 73
Heating Plant 6

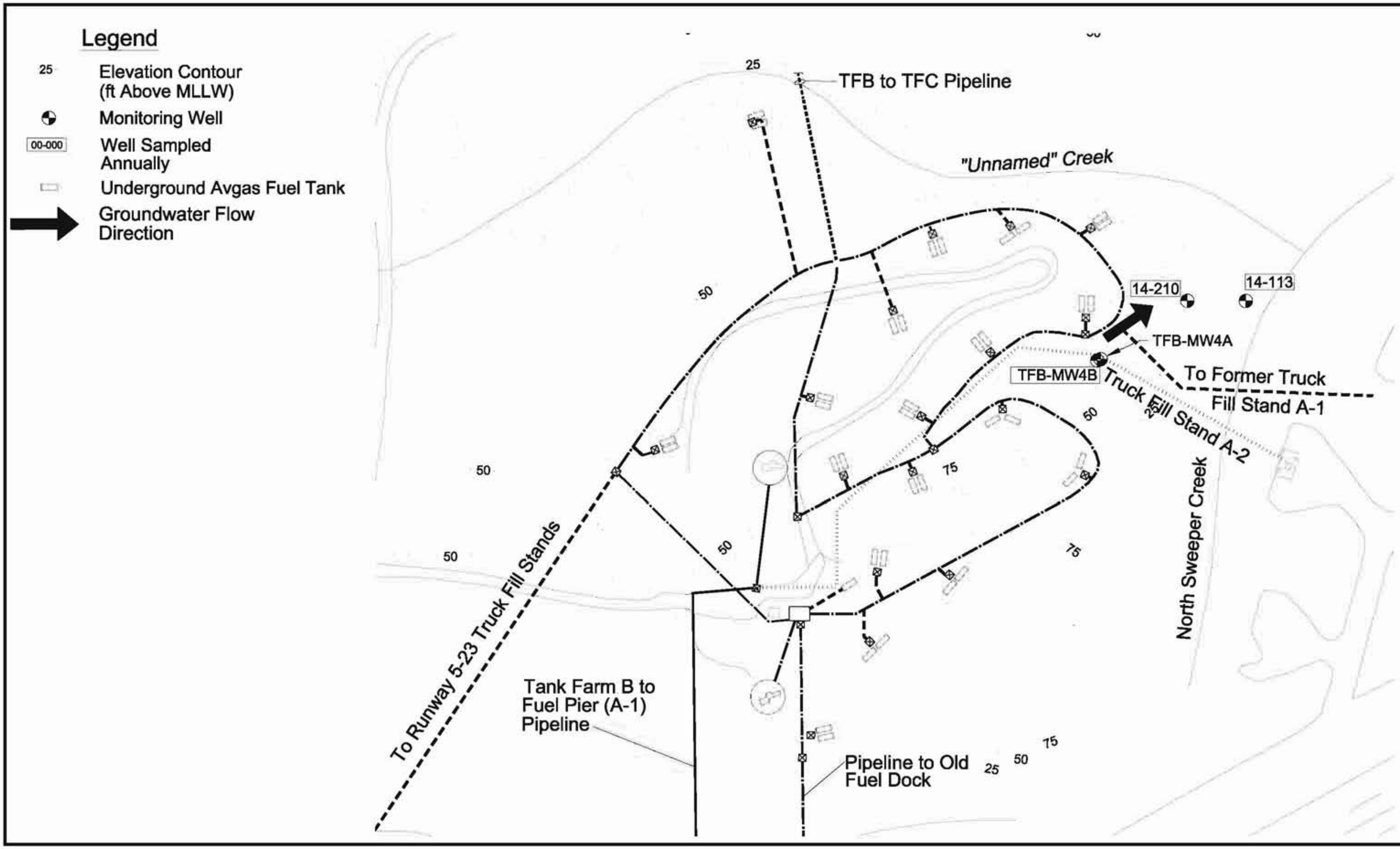
Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-22 SWMU 58.dwg
EDIT DATE: 04/07/06 AT: 13:20



U.S. NAVY	0 150 300 SCALE IN FEET	**Figure 6-23** **SWMU 60, Tank Farm A**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-23 SWMU 60.dwg
EDIT DATE: 04/07/06 AT: 13:21



U.S. NAVY

N

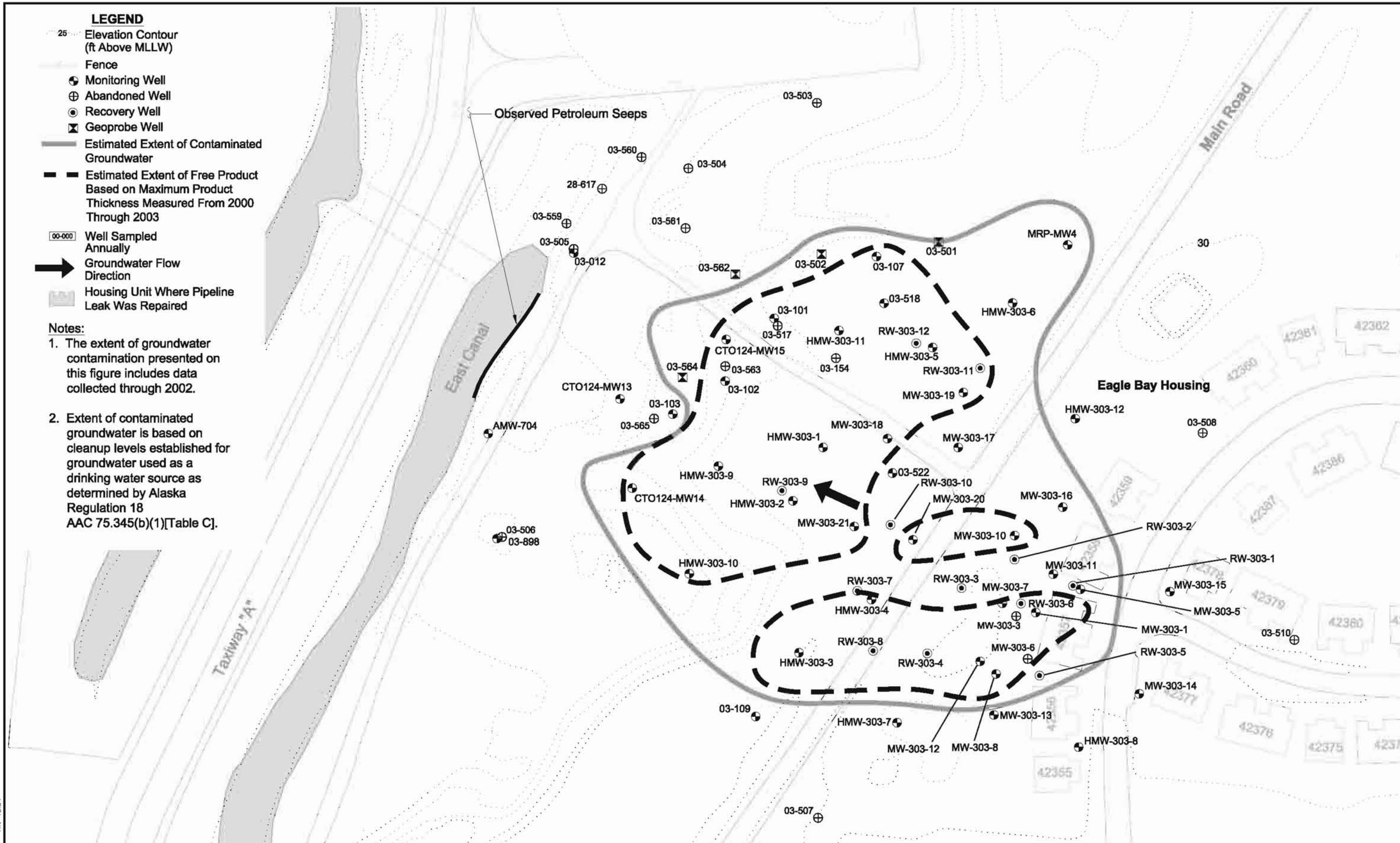
0 150 300

SCALE IN FEET

Figure 6-24
SWMU 61, Tank Farm B

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-24 SWMU 61.dwg
EDIT DATE: 04/07/06 AT: 13:22



U.S. NAVY

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

0 60 120
SCALE IN FEET

Figure 6-25
SWMU 62, New Housing Fuel Leak Site, Eagle Bay Housing Area

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\FIG 6-25 SWMU 62 Eagle.dwg
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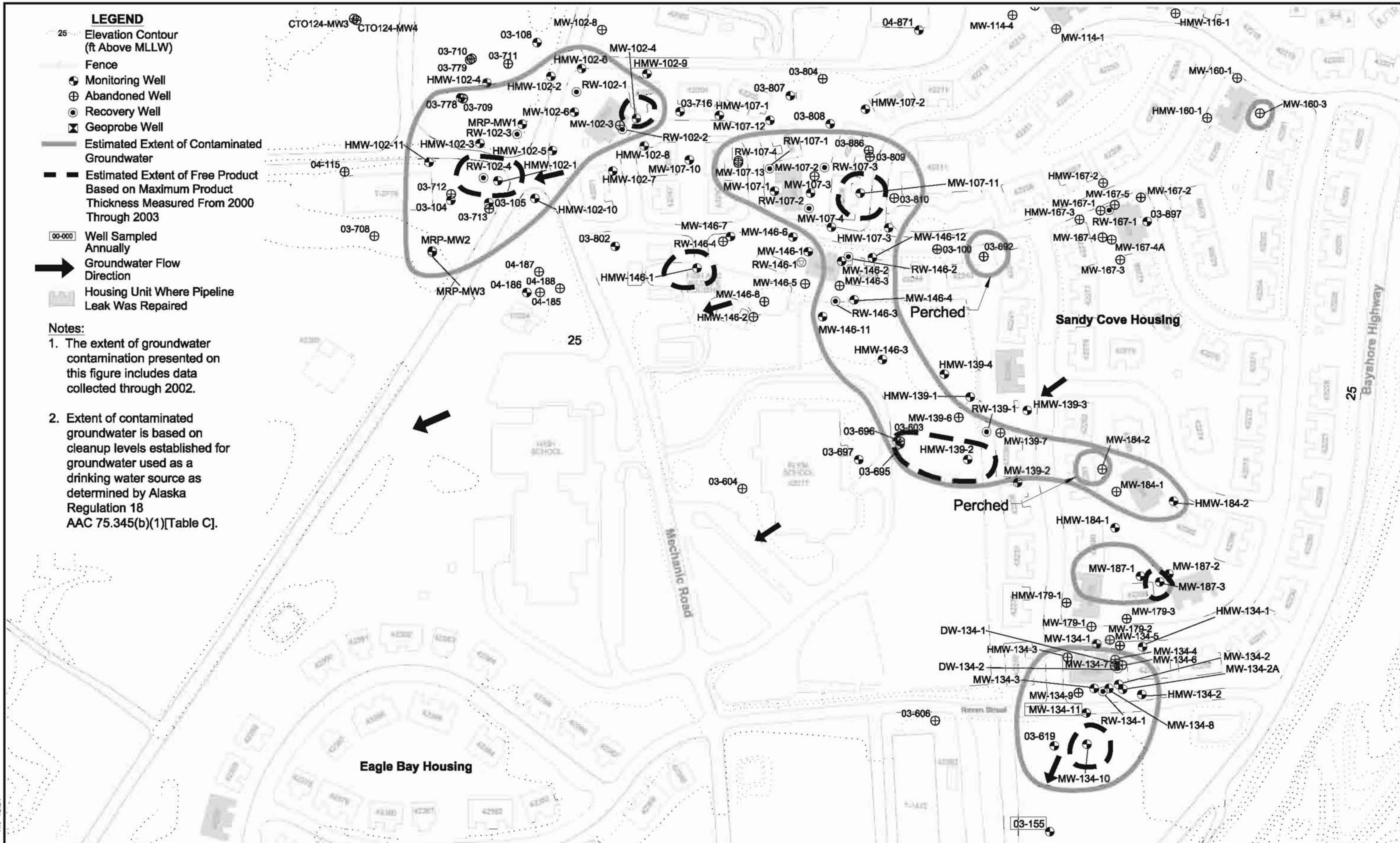


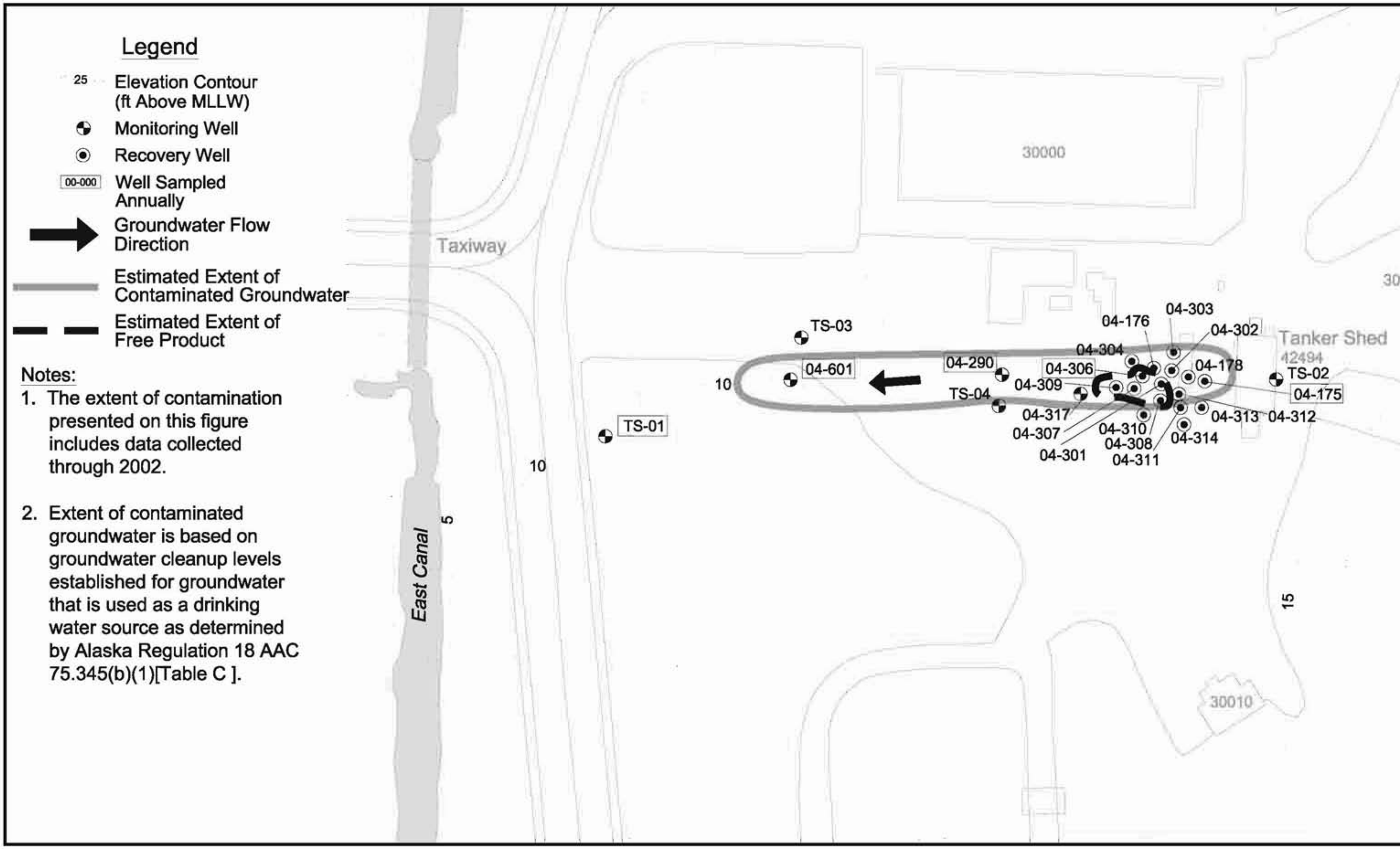
U.S. NAVY

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

0 50 100 200
SCALE IN FEET

Figure 6-26
SWMU 62, New Housing Fuel Leak Site, Sandy Cove Housing Area

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\FIG 6-26 SWMU 62 Sandy.dwg
EDIT DATE: 11/15/06 AT: 13:24



U.S. NAVY

N

0 75 150

SCALE IN FEET

Figure 6-27
Tanker Shed, UST 42494

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-27 TANKER SHED.dwg
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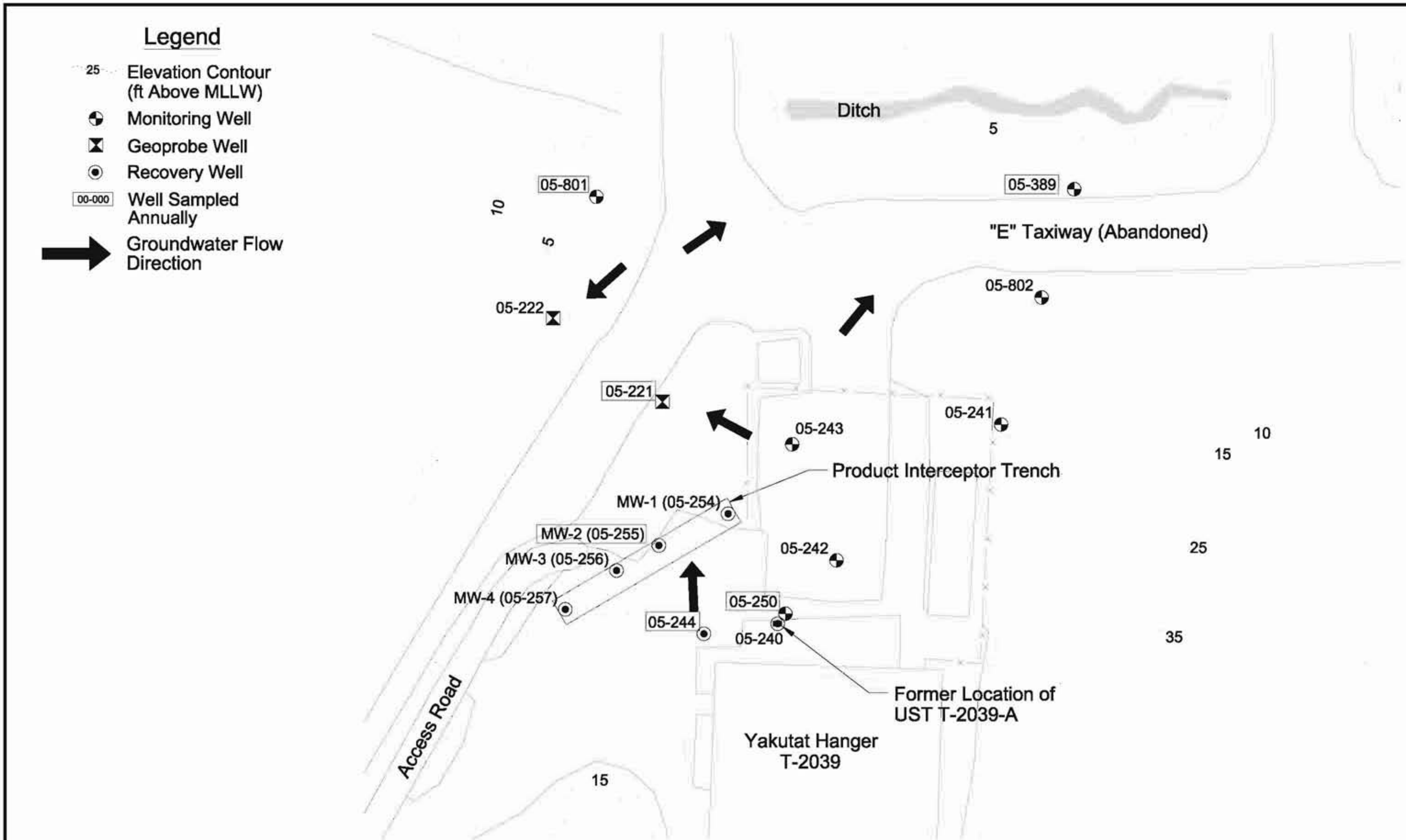


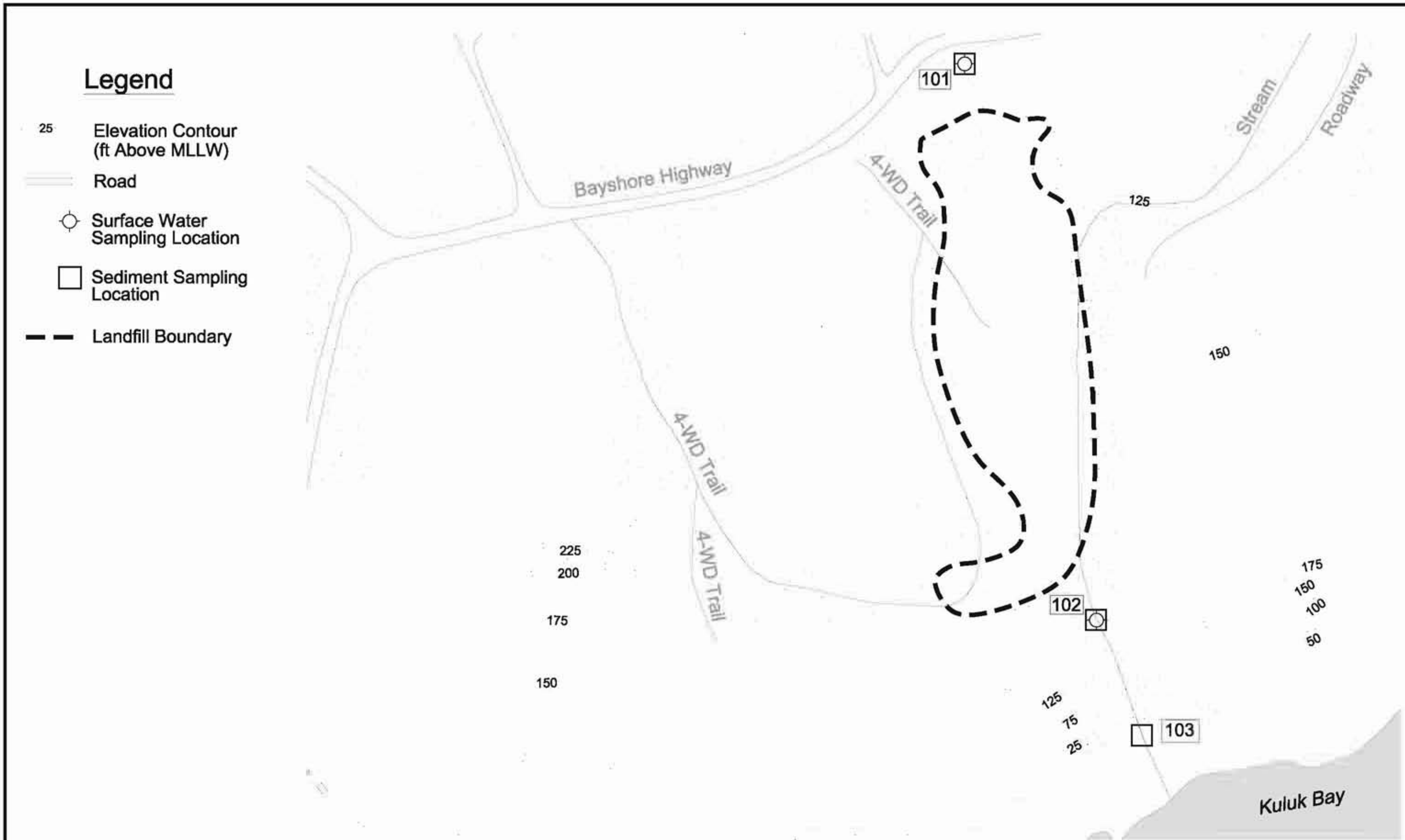
U.S. NAVY

0 25 50 100
SCALE IN FEET

Figure 6-28
Yakutat Hangar
UST T-2039-A

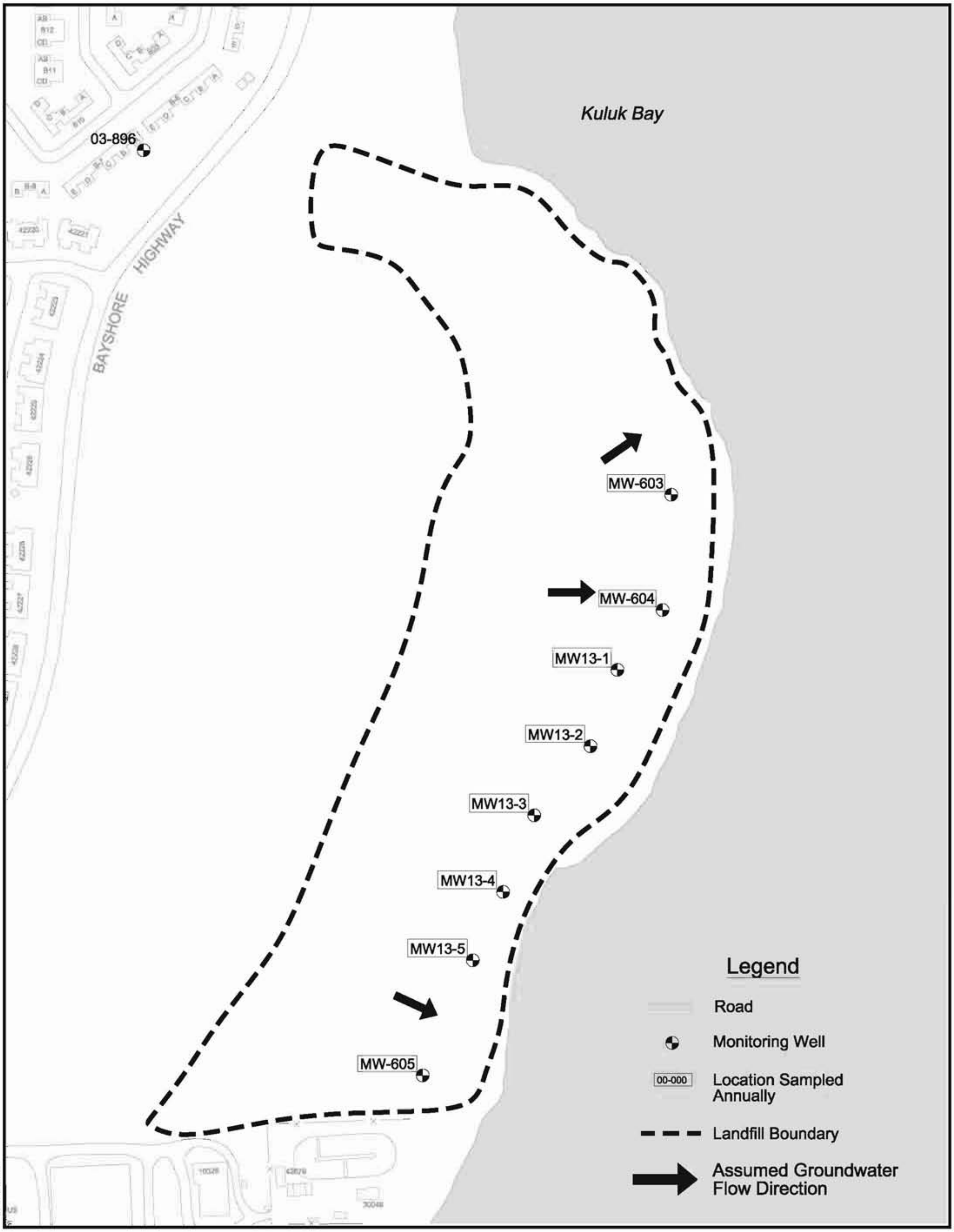
Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-28 YAKUTAT HANGAR.dwg
EDIT DATE: 11/14/06 AT: 09:34



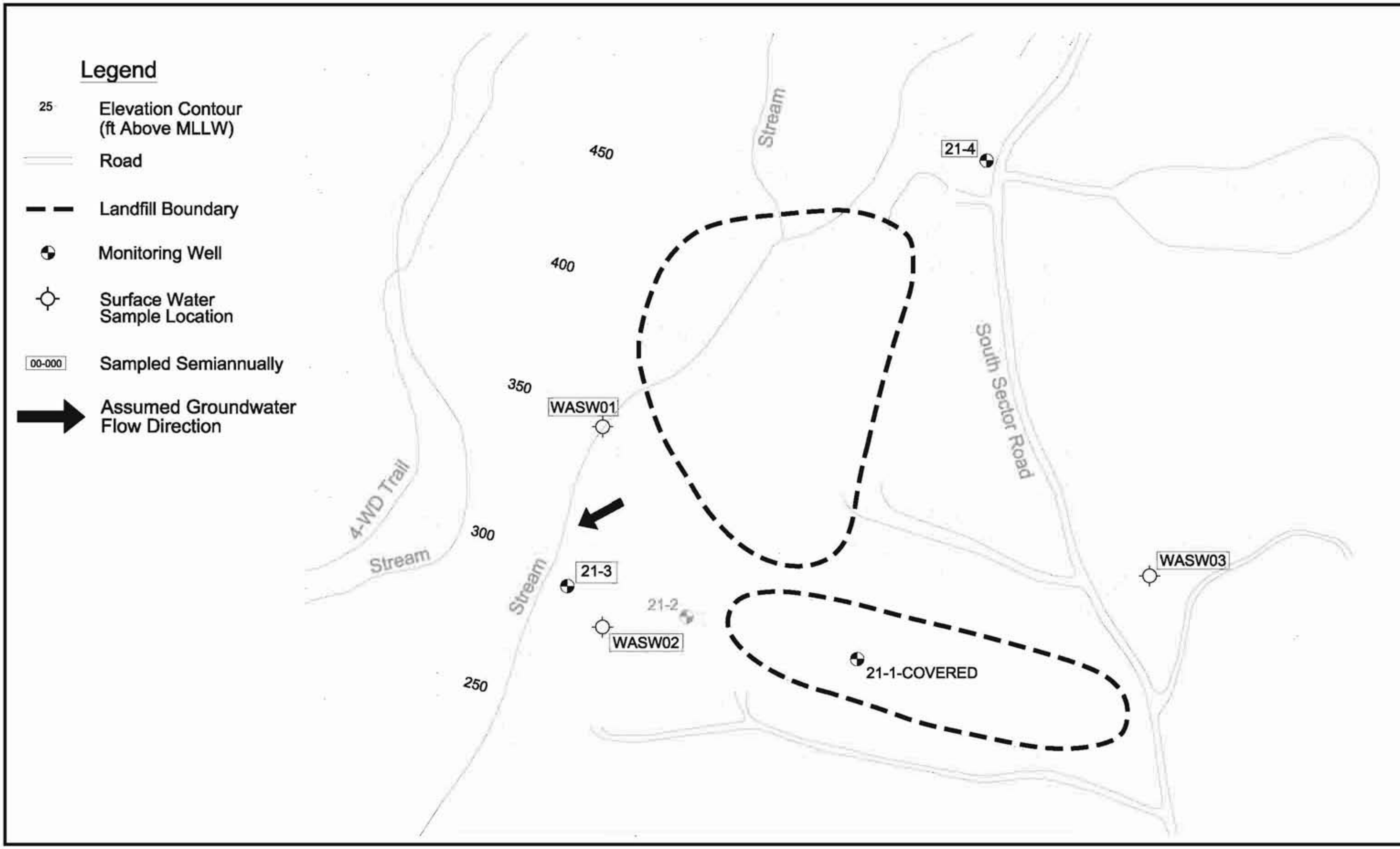
U.S. NAVY	0 150 300 SCALE IN FEET	**Figure 6-29** **SWMU 11, Palisades Landfill**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-29 SWMU 11.dwg
EDIT DATE: 11/10/06 AT: 14:04



U.S. NAVY	0 150 300 SCALE IN FEET	**Figure 6-30** **SWMU 13, Metals Landfill**	Delivery Order 0001 Adak Island, AK SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-30 SWMU 13.dwg
EDIT DATE: 11/14/06 AT: 09:33



U.S. NAVY

Figure 6-31
SWMUs 18/19, White Alice Landfill

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-31 SWMU 18-19.dwg
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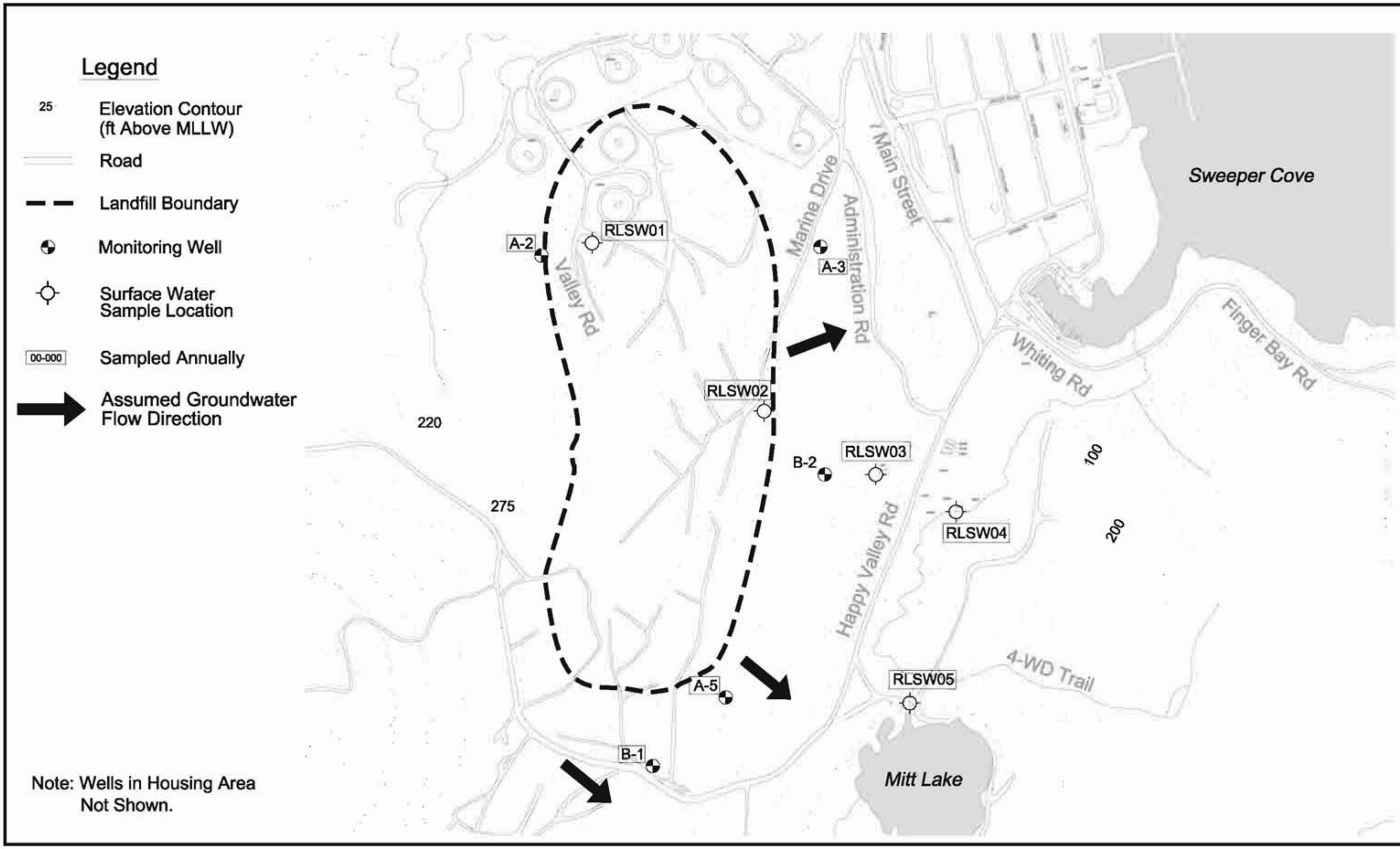

U.S. NAVY

N

0 200 400 800
SCALE IN FEET

Figure 6-32
SWMU 25, Roberts Landfill

Delivery Order 0001
Adak Island, AK
SECOND FIVE-YEAR REVIEW OF RECORDS OF DECISION REPORT

FILENAME: T:\ADAK\IDIQ\Sub-Tasks\DO 1\2ND 5 YR ROD REVIEW\Fig 6-32 SWMU 25.dwg
EDIT DATE: 11/14/06 AT: 09:32

Table 6-1
Educational Awareness Results

	Aware		No Opinion	Unaware	
	Strongly Agree	**Agree**		**Disagree**	**Strongly Disagree**
I am aware that land use restrictions apply to some areas on Adak	10	4			
I am aware that there is a fish consumption advisory on Adak	2	3	1	3	5
I am aware of the ordnance safety awareness video, and have seen it	5	2	2	2	3
I am aware of the institutional control excavation notification	3	7			4
I am aware of the toll free telephone number and email address to contact for additional information on the topics above		1	3	3	7

7.0 TECHNICAL ASSESSMENT

7.1 FUNCTIONALITY OF REMEDY

This section answers the question, “Is the remedy functioning as intended by the decision documents?” The functionality of the remedy components applicable to each site is summarized by OU in the sections that follow.

7.1.1 Functionality of Remedy for Operable Unit A

All of the remedy components (listed by site in Tables 4-2 and 4-4) are functional for most of the OU A sites. The landfill caps and covers have been constructed and are regularly inspected and maintained. The ponds at SWMU 17 have been drained, dredged, and restored. Impacted sediment has been removed from South Sweeper Creek, and limited soil removals have been completed at most of the petroleum sites selected for this remedy component. Interim remedial action product recovery has been performed at the 14 free-product recovery petroleum sites. The final remedy has been implemented at 10 of the 14 sites, and progress has been made toward the final remedies for the four remaining free-product recovery petroleum sites.

An ICMP is in place, and IC inspections occur annually. Deficiencies are identified and corrective action is consistently taken. The 2005 IC inspection report recommended repairs and or upgrades to the Engineering Controls at SWMU 2, 13, and 25 as discussed in Section 6.5. The inspection and associated follow-up is functioning as intended. Long-term monitoring has been initiated and is ongoing. The long-term monitoring goals and requirements are periodically revisited to maintain focus on the endpoint goals. The Navy and U.S. Geological Survey have shown that natural attenuation of petroleum compounds is occurring on Adak, and natural attenuation monitoring is part of the long-term monitoring program.

The remedy components are not fully functional at the following OU A petroleum sites:

- ASR-8 Facility, where soil removal is planned for 2008
- SA 77 Fuels Facility Refueling Dock, Small Drum Storage Area, where soil removal is planned for 2008
- SA 88, P-70 Energy Generator

Although the limited soil removal at site SA 77 is not complete, the IC component of the remedy for this site is functioning to protect human health and the environment. At site ASR-8, the remedy is expected to be functional following the limited soil removal in 2008.

At SA 88, free-product recovery was implemented as the OU A ROD interim remedy, and limited groundwater monitoring was selected as the final remedy. Monitoring results from 2005, however, revealed the presence of significant free-product in several wells at the site. The measured free product thicknesses imply that the selected limited groundwater monitoring final remedy is unlikely to functionally meet the endpoint criteria in a reasonable time frame.

7.1.2 Functionality of Remedy for Operable Unit B-1

Since the transfer of the former Navy complex to the Aleut Corporation and the City of Adak, two incidents of unauthorized access to the remaining access restricted area have occurred. Two other incidents of non-reporting of encounters with munitions related items are also known to have occurred. While none of these incidents have resulted in exposure to an explosive hazard, the Navy has taken steps to improve the effectiveness of its existing program of ordnance education and awareness as well as access barriers and notices (see Section 6.2.3).

- A worker for an on-island fish processor took military munitions scrap into the City of Adak in his pickup truck and delivered them to the local police officer. The likely source of the items was the access restricted area surrounding Lake Andrew. The items were determined to be OE Scrap and were disposed of by EOD Det MU 11 Whidbey by open detonation on Adak. The Navy took immediate action to prevent a reoccurrence by placing boulders and reinforcing existing gates and locks on access roads. Additional warning signs were placed on the property. The Navy wrote a letter to the City of Adak and Adak Seafoods to convey the Navy's concerns regarding the violation of posted access restrictions. There was also an extended discussion of this incident at a RAB meeting.

- In late 2004 Navy learned that an individual employed by Samson Barge & Tug had trespassed onto Parcel 4 and retrieved shell casings. The matter was discovered when he approached the local police chief inquiring about possible restrictions in bringing casings aboard a commercial aircraft. Navy contacted the Chief of Police to obtain information with a view toward referring the matter for criminal prosecution. The Chief of Police asked the Navy not to take any action, as he believed the matter had been sufficiently addressed. The Chief related that the individual was new to Adak and given the number of signs on Adak prohibiting entry into buildings obviously transferred to TAC, the individual did not understand that the signs regarding Parcel 4 were current. Navy agreed and contacted TAC as to signs on buildings, etc. that should be removed.

On two other occasions, proper procedures were not followed in reporting and responding to an encounter with military munitions scrap. In February 2005, Navy was informed that a contractor had discovered expended 90mm cartridge cases while performing dredging operations to improve the small boat harbor at Adak for the City of Adak. The items were expended and did not pose a safety hazard. However, it was determined that the contractor had not received the Adak UXO Awareness Training. The Navy understood after these incidents that steps were needed to improve the effectiveness of the awareness program. The Navy worked with local authorities to set in place new procedures concerning the management of MEC items found (from on-island notification to disposal by Fort Richardson), and an on-island resident with UXO experience was contracted to distribute additional awareness/educational materials. In addition, the Navy continues to work with Adak stakeholders to improve the effectiveness of the ordnance awareness program.

The second instance of improper reporting and response to a potential encounter with military munitions occurred in 2005. In this case, 165 105-mm illumination rounds without cartridge cases were discovered in the vicinity of the White Alice trail head. Navy advised the City of Adak to make contact with EOD, Ft. Richardson, AK to determine the need for response in accordance with procedures previously established. The City of Adak elected not to report the discovery to Ft. Richardson as required under established procedures. In October 2006, pursuant to a request by NAVFAC NW, EOD Det MU 11, Whidbey went to Adak to conduct a sweep of the Lake Andrew Seawall and dispose of other munitions related items. As the initial notification indicated 25-30 items and there were actually 165 smoke pots, 10 MI smoke grenades and 6 propellant charges, EOD did not have sufficient high explosive to consume all of the rounds. Consequently, 65% of all ordnance were consumed and EOD determined that the remaining ordnance items did not pose an immediate safety hazard.

Another incident involving management of MEC items occurred at the end of the 2004 field season. In September 2004 a 20 mm projectile was discovered during the performance of QC efforts by the Navy’s contractor in AOC LJ-01. After consultation with NAVFAC NW, EOD Det MU 11 Whidbey Island, and the Navy’s contractor, the item was placed in an appropriate container and reburied in the access-restricted area (Parcel 4) . In January 2005 the item was moved to another location within the access restricted area located because Navy felt the location was ‘too well known’ the item might be tampered with or removed. In September of 2005, during a response trip to dispose of the 20mm round, EOD was unable to locate the item and was, therefore, unable to dispose of the item. EOD Det MU 11 Whidbey Island determined that the item could be readily relocated with the aid of a metal detector (which was not available to them during their response trip). EOD Det MU 11 Whidbey Island further determined that the item posed no significant explosive safety hazard at its burial location in the access-restricted area. In October of 2005, NAVFAC NW personnel located the projectile, reburied the item ,and marked the location to assist EOD Det MU 11 Whidbey Island in finding the item at their next response visit planned for 2006

The Navy has elected not to disclose the location of the item to anyone (including regulatory agencies) that does not have a "need to know" its location to accomplish proper disposal of the item. The Navy has recommended corrective action in terms of planning of future EOD Det responses to Adak to improve the effectiveness of future responses to MEC on Adak Island (see after action report and Endorsement for Sept 2005 EOD response).

While no munitions were involved, Navy is aware of one instance where a group of people employed by USFWS disobeyed the access restrictions to Parcel 4 and went to Lake Andrew for the purpose of collecting sea shells. Navy personnel advised the FWS supervisor of the violation and reiterated that the access restrictions also applied to FWS employees.

The chemical sampling and soil removal component of the selected remedy at specific OU B-1 sites has been completed and has functioned to reduce the potential ordnance-related chemical risk and, thus, prevent future residents and recreational users from being exposed to explosives-related contamination in soils above the cleanup levels.

The selected remedies have been completed at 30 of the 50 action sites during the 2001 and 2002 field seasons (U.S. Navy 2002b and 2003h). Alaska DEC and EPA have not yet concurred with the remedial actions documented in the 2004 after action report (U.S. Navy 2005j), and therefore the remedy cannot be considered complete at the sites addressed during the 2004 field season. Sites addressed during the 2004 field season include sites within and outside of Parcel 4. OU B-1 sites within the boundaries of Parcel 4 are no longer planned for transfer by the Navy to TAC or USFWS, and remedial requirements for OU B-1 sites within the boundaries of Parcel 4, where remedial actions have not yet been completed, are under review by the Navy, EPA, and Alaska DEC. The Navy has recommended no further actions for the OU B-1 sites outside of Parcel 4 addressed during the 2004 field season, and these recommendations are under review by Alaska DEC and EPA. Alaska DEC and EPA have agreed that site C1-02 does not require further action (due to remoteness/impracticability). However, the documented OU B-1 ROD remedy for this site is not complete.

7.1.3 Operation and Maintenance Costs

Operation and maintenance costs generally declined over this 5-year review period, as active free-product recovery efforts were discontinued (with agency concurrence) and passive free-product recovery at many sites met the endpoint criteria.

Monitoring costs began to rise towards the end of this 5-year review period, as remedies were implemented and sites were added to the monitoring program.

The trends in operation, maintenance, and monitoring costs are not indicative of any remedy problems.

7.2 CONTINUED VALIDITY OF ROD ASSUMPTIONS

This section answers the question, "Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?" Therefore, this section reviews any changes to ARARs used to establish remediation goals (RGs) in the RODs and reviews any changes to risk assessment assumptions (exposure and toxicity) to evaluate the protectiveness of the remedy.

The findings documented in this section are that changes in the ARARs, exposure, and toxicity assumptions that have occurred since the RODs were signed do not affect the protectiveness of the remedy. Concentrations of many chemicals in groundwater remain above the RGs within the downtown area of Adak at the majority of locations where long-term monitoring is occurring, resulting in the need for continued ICs to prevent exposure and the need for ongoing monitoring. Although some of the RGs might be lower if selected today, the remedy components continue to protect against exposures, just as they did at the time the ROD was signed. ICs preventing exposure and ongoing monitoring will need to continue until COC concentrations in groundwater are below the RGs. The endpoint criteria being used to evaluate sediment concentrations at SWMU 11 are likely unnecessarily restrictive and should be revised to more closely reflect potential health risks due to sediment exposures at SWMU 11.

7.2.1 Review of Applicable or Relevant and Appropriate Requirements

In the preamble to the NCP, EPA stated that ARARs are generally "frozen" at the time of ROD signature, unless new or modified requirements call into question the protectiveness of the selected remedy. Five-year review guidance (USEPA 2001) indicates that the question of interest in developing the 5-year review is not whether a standard identified as an ARAR in the ROD has changed in the intervening period, but whether this change to a regulation calls into question the protectiveness of the remedy. If the change in the standard would be more stringent, the next stage is to evaluate and compare the old and the new standards and their associated risk. This comparison is done to assess whether the currently calculated risk associated with the standard identified in the ROD is still below the ROD-specified acceptable excess cancer risk range maximum of 1×10^{-5}. If the old standard is not considered protective, a new cleanup standard may need to be adopted after the 5-year review through CERCLA's processes for modifying a remedy.

During the first 5-year review for Adak, no substantive changes were found to ARARs that would call into question the protectiveness of the remedy. For this 5-year review, all the ARARs identified in the RODs for OU A and OU B-1 were reviewed for changes that could affect the assessment of whether the remedy is protective.

Some ARARs that were used in the determination of cleanup levels have been amended since publication of one or both of the two RODs. These regulations are the following:

- Alaska 18 AAC 75 cleanup levels (Alaska DEC 2005a)
- Federal and state drinking water regulations (MCLs) (USEPA 2004a)
- Federal national recommended water quality criteria for protection of surface water (USEPA 2004b)

The result of the amendments to the regulations is sometimes the lowering of a numeric ARAR. In these instances, the revised ARAR must be evaluated to determine whether there is a negative effect on the protectiveness of the remedy. In other instances, the ARAR remains unchanged, or has been raised.

Operable Unit A – CERCLA Sites

As discussed in earlier sections, the CERCLA sites were divided into three broad categories: landfills, sites requiring ICs because of excess health risks (either human or ecological), and sites requiring active cleanup. Two landfills, Roberts and White Alice Landfills (SWMUs 25 and 18/19) are included in this discussion, although they are being addressed under the State's solid waste disposal regulations, rather than CERCLA. Numeric RGs were established for groundwater, surface water, marine tissue, and for the sediment removals conducted at SWMU 17. For on-going monitoring of sediments at SWMU 11 (a landfill), no RGs were established in the ROD, but the long-term monitoring program (U.S. Navy 2005c, Appendix F) has established "criteria endpoints" that have been used to evaluate the sediment results. No RGs were established in the ROD for soil at CERCLA sites. Changes to ARARs, RGs, and endpoint criteria due to changes in the regulations are discussed below by media.

Groundwater. For all groundwater that could be used as drinking water, the ROD established RGs as the MCLs. Additionally, for all groundwater, regardless of its potential use as a drinking water source, the ROD established state and federal surface water quality standards as RGs at groundwater monitoring locations between impacted areas and downgradient surface water. Ongoing groundwater monitoring is occurring at SWMUs 14, 15 and 55 and at three of the four landfills with active monitoring (SWMUs 13, 18/19, and 25). The groundwater COCs identified in the OU A ROD because of exceedances above MCLs are the following:

- Benzene
- Bis(2-ethylhexyl)phthalate
- GRO
- Lead
- Methylene chloride
- Tetrachloroethene
- Ethylbenzene
- Thallium
- Toluene
- Trichloroethene

Table 7-1 compares current ARAR values for the groundwater pathway with those presented in Section 10.3 of the OU A ROD (U.S. Navy, USEPA, and Alaska DEC 2000). There have been no changes to the MCLs for the COCs listed in the ROD.

The ongoing long-term groundwater monitoring occurring at the site has evaluated a much longer list of chemicals than the ROD COCs, varying by specific well and SWMU. This longer list of analytes was intended to include all detected chemicals in the analytical program (U.S. Navy 2005c, Appendices A and B). Potential changes in ARARs for these additional chemicals were not evaluated in this 5-year review, because these chemicals are not COCs.

Although there have been no MCL changes to the ROD COCs, in some cases state and federal surface water quality standards for the COCs have changed. Where these standards have changed, the standards are now lower for some chemicals and higher for others. Surface water criteria changes are noted in Table 7-2. Changes to surface water criteria do not affect the protectiveness of the remedy, because (1) all the groundwater monitoring at the CERCLA sites is of water that could be used as a drinking water source, and, thus, concentrations of COCs would have to meet MCLs before monitoring could be discontinued, and (2) with the exception of lead, all surface water ARARs shown on Table 7-2 are at higher concentrations than their respective MCLs.

Surface Water. No specific COCs were provided in the OU A ROD for the surface water monitoring that the ROD required at landfill SWMUs 11, 13, 18/19, and 25. However, the ROD stated that surface water monitoring for SWMUs 11 and 13 should follow the requirements listed for groundwater. Consequently, the CMP established the state water quality standards (18 AAC 70) as the endpoint criteria and developed a list of COCs based on detected chemicals. Federal water quality criteria were used if no state criteria were available. Table 7-2 lists the COCs and endpoint criteria established in the CMP and compares current ARAR values for the surface water COCs and endpoint criteria presented in the long-term monitoring plan in the CMP (U.S. Navy 2005c, Appendix F). The endpoint criteria in the CMP have been used as indicators for whether surface water at SWMUs 11, 18/19, and 25 requires continued monitoring or whether COCs in surface water can be considered to be without an appreciable human or ecological health risk. For the majority of the surface water COCs, state and federal surface water quality standards have changed. Where these standards have changed, the standards are now lower for some chemicals and higher for others. These ARAR changes do not affect the protectiveness of the remedy, because the COCs are no longer being detected for the majority of these chemicals, or detections are low and relatively infrequent.

Sediment. Cleanup levels for sediment removal at the SWMU 17 waste oil pond were based on 18 AAC 75 soil criteria for the site COCs: PCBs (1 mg/kg), antimony (3 mg/kg), and mercury (1.24 mg/kg). Soil criteria were used to determine when cleanup was complete, because the pond's water and sediment were removed and the remaining material would be soil, not sediment. Sediment that was removed was treated until DRO and RRO concentrations met disposal requirements for Roberts Landfill (100 mg/kg and 2,000 mg/kg, respectively). Neither cleanup levels nor treatment levels have changed since the OU A ROD was signed. PCBs were the only COC in sediments in the retention pond (also at SWMU 17) and the sediments in South Sweeper Creek. The PCB cleanup level used at those locations was also 1 mg/kg, based on state soil criteria. This value has also not changed. Therefore, the sediment removal remedies implemented at SWMU 17 and South Sweeper Creek remain protective.

Both fresh and marine sediments are part of the long-term monitoring at SWMU 11, as required by the ROD. No COCs or RGs were established in the ROD. Therefore, the risk-based levels used to screen sites in the PSE-2 process (U.S. Navy 1996a) were selected as the endpoint criteria for SWMU 11 sediments, and COCs were selected based on historical chemical detections. Table 7-3 presents the endpoint criteria listed in Appendix F of the CMP and indicates whether they were based on human or ecological health. The lower of the two values was selected as the endpoint criteria. The risk basis of the endpoint criteria has changed since the ROD was signed. The differences in risk estimates between the signing of the ROD and today are discussed further in Section 7.2.2. Table 7-3 provides generic (rather than site specific) risk-based values that could be applied to sediments if risk-based values were to be developed today. In all cases for the values based on human health, endpoint criteria would be at least one to three orders of magnitude higher. For ecological health, the PCB value would be three orders of magnitude higher, and the other three ecologically based values would not change. Because the new values are higher, the remedy remains protective.

Marine Tissue. The ROD established risk-based RGs for fish and shellfish in Kuluk Bay and Sweeper Cover. PCBs were the only COC. The PCB RGs of 0.0065 mg/kg and 0.031 mg/kg for fish and shellfish, respectively, would not be different if the risk-based levels were calculated today.

Operable Unit A – Petroleum Sites

Separate RGs were established for the petroleum and CERCLA sites. Table 7-4 lists the ROD RGs for the petroleum COCs in soil and groundwater. The ROD petroleum RGs were all based on Alaska state regulations 18 AAC 75.340, 341, and 345. Table 7-4 also indicates which values have changed since the signing of the ROD. Few chemicals had changes, and none of those changes affects the protectiveness of the remedy. Specific changes are discussed below by media.

Sixty-two petroleum sites were withdrawn from the OU A ROD via the OU A ROD Amendment 1, signed in 2003, and are being administered by State-lead cleanup regulations. Of the 62 sites removed from the OU A ROD, 46 sites were further action sites and 16 were no further actions sites. All OU A ROD cleanup levels for the petroleum sites were based on state regulations. Therefore, for sites that have been previously remediated to the OU A ROD RG levels, the Amendment does not affect cleanup or the protectiveness of the remedy.

Soil. Though some of the soil cleanup levels have changed for some chemicals, only DRO soil petroleum levels were driving factors for petroleum sites. Sites where soil petroleum concentrations exceeded 18 AAC 75 soil criteria for DRO were selected for limited soil removal. The 18AAC 75 soil cleanup level for DRO has not changed.

Groundwater. The ARARs are defined for groundwater as a source of drinking water and as a contributor to surface water. Naphthalene is the only chemical listed in the OU A ROD for which the new ARAR value is lower (more stringent). The 18 AAC 75 groundwater cleanup level for naphthalene for the drinking water pathway is currently 0.7 mg/L, the previous cleanup level was 1.46 mg/L. This value change does not affect the protectiveness of the remedy, as a long as ICs remain in place.

Free-Product Petroleum Sites—No Unacceptable Risk Sites

For the 14 free-product sites, site-specific RGs have been calculated based on risk assessments conducted according to Alaska DEC guidance (Alaska DEC 2000). These risk-based cleanup levels are different than the Alaska cleanup levels shown in Table 7-4. The following 10 of the 14 free-product sites were determined to pose no unacceptable risk to human health or the environment under current land use conditions. The remaining four free-product petroleum sites are discussed separately below.

- GCI Compound
- SA 80, Steam Plant 4
- Tanker Shed
- SA 78, Old Transportation Building

- SA 82, P-80/P-81 Buildings
- SA 88, P-70 Energy Generator
- SWMU 58, Heating Plant 6
- SA 73, Heating Plant 6
- Yakutat Hangar
- NORPAC Hill Seep Area

The RGs for these 10 sites were selected and approved by Alaska DEC in the *Final Decision Document for Petroleum Sites with No Unacceptable Risk* (U.S. Navy and Alaska DEC 2005a). It should be noted that although SWMU 58 and SA 73 were established as separate sites, they are both located at Heating Plant 6 and are addressed as a single site. The RGs selected for these 10 sites are discussed below.

Soil. Under the Alaska DEC Method Four cleanup levels for soil, site-specific alternative cleanup levels (ACLs) may be proposed based upon results of the risk assessment conducted for an individual site. Proposed ACLs are submitted to the Alaska DEC for approval. These ACLs are designated for an individual site if the Alaska DEC agrees that they are protective of human health, safety, and welfare and of the environment (18 AAC 75.340[f]). Because the risk assessments for these 10 sites established that the concentrations in soil do not pose a risk to humans or the environment above target health goals at their present contamination level, no separate ACLs were calculated, and, by default, the existing contaminant levels at each site become the site-specific RGs. The risk assessment findings of no unacceptable risk remain valid, providing that the assumed land uses for the site, as per the Adak Reuse Plan, do not change.

Groundwater. RGs specified for groundwater at these 10 free-product petroleum sites are based on the use of groundwater as a drinking water source (18 AAC 75.345[b][1], Table C), or 10 times these levels if the groundwater is not reasonably expected to be a potential future source of drinking water (18 AAC 75.345[b][2]). Groundwater at the GCI Compound, SA 80, and Tanker Shed sites is considered to be a reasonably expected potential future source of drinking water. Groundwater cleanup levels for these sites are those specified in Table C of 18 AAC 75.345(b)(1) (see Table 7-4). Groundwater at the seven remaining sites is not considered to be a reasonably expected potential future source of drinking water. Groundwater cleanup levels for these sites are 10 times the levels specified in Table C of the Alaska regulations (see Table 7-4).

Free-Product Petroleum Sites—Unacceptable Risk Sites

The remaining four free-product petroleum sites were determined to pose unacceptable risk to human health and/or the environment and were evaluated separately from the 10 free-product sites discussed above. The decision document for one of these sites, the NMCB Building Area, was finalized in January 2006 (U.S. Navy and Alaska DEC 2006). The decision documents for two of these sites (South of Runway 18-36 Area and SWMU 62, New Housing Fuel Leak Site) are in progress. While the decision documents for these two sites have not yet been finalized and approved by Alaska DEC, cleanup decisions have been proposed and discussed with the Agency. The proposed RGs for these sites are discussed below. The SWMU 17, Power Plant 3 site is still in the focused feasibility stage of the process, and no RGs have been proposed as of yet. Therefore, RGs for SWMU 17, Power Plant 3 is not discussed in this 5-year review.

Soil. For South of Runway 18-36 Area, the risk assessment established that the concentrations in soil do not pose a risk to humans or the environment above target health goals at their present contamination level. Therefore, as discussed above for the no-risk sites, no separate ACLs were calculated for the South of Runway 18-36 Area site and, by default, the existing contaminant levels at the site become the site-specific RGs (U.S. Navy and Alaska DEC 2005b). The RGs for the NMCB Building Area and SWMU 62, New Housing Fuel Leak sites are summarized below. For NMCB Building, the RGs are based on the ACLs calculated for DRO and GRO in soil protective of construction worker exposures to soil (U.S. Navy and Alaska DEC 2006). The RGs for the SWMU 62, New Housing Fuel Leak site are based on the ACLs calculated for DRO in soil protective of child residential exposures (U.S. Navy and Alaska DEC 2005c).

- NMCB Building Soil RGs:
  - DRO = 31,000 mg/kg
  - GRO = 1,700 mg/kg

- SWMU 62, New Housing Fuel Leak Soil RGs:
  - DRO = 6,100 mg/kg

Groundwater. RGs specified for groundwater at these three free-product petroleum sites are based on the use of groundwater as a drinking water source (18 AAC 75.345[b][1], Table C), or 10 times these levels if the groundwater is not reasonably expected to be a potential future source of drinking water (18 AAC 75.345[b][2]). Groundwater at the SWMU 62, New Housing Fuel Leak site is considered to be a reasonably expected potential future source of drinking water. Groundwater cleanup levels for this site are those specified in Table C of 18 AAC 75.345(b)(1) (see Table 7-4). Groundwater at NMCB Building Area and the South of Runway 18-36 Area sites is not considered to be a reasonably expected potential future source of drinking water. Groundwater cleanup levels for these sites are 10 times the levels specified in Table C of the Alaska regulations (see Table 7-4).

Surface Water and Sediment. For surface water bodies of the state, Alaska regulation 18 AAC Chapter 70 establishes water quality standards based on water use classes and subclasses. Waters of Sweeper Cove and the lower reach of South Sweeper Creek fall within the marine water class and the following subclasses: water supply aquaculture; secondary recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife. The water quality standards established for this use class (and these subclasses) specify that total aqueous hydrocarbons in the water column may not exceed 15 µg/L and that total aromatic hydrocarbons in the water column may not exceed 10 µg/L. In addition, there may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that cause deleterious effects to aquatic life. Surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration (18 AAC 70.020[b][17[A][i], 18 AAC 70.020[b][17][B][ii], and 18 AAC 70.020[b][18][C]). The canals of the airport ditch system, including the West Canal, fall within the fresh water class and the secondary recreation subclass. The water quality standards established for this use class and subclass specify that petroleum hydrocarbons, oils, and grease may not cause a film, sheen, or discoloration on the surface or floor of the water body or adjoining shorelines, and surface waters must be virtually free from floating oils (18 AAC 70.020[b][5][B][ii]). These water quality standards apply to both the NMCB Building Area and the South of Runway 18-36 Area (U.S. Navy and Alaska DEC 2006 and 2005b).

For the South of Runway 18-36 Area site, because Alaska State Regulations do not establish surface water cleanup levels for individual chemicals, DRO, or GRO, the results of the ecological risk assessment were used to establish additional risk-based cleanup levels for chemicals in surface water that may result in a potential risk to ecological receptors (U.S. Navy and Alaska DEC 2005b). These risk-based cleanup levels summarized below are additional RGs for surface water and do not replace the total aqueous hydrocarbons and total aromatic hydrocarbons criteria specified in 18 AAC Chapter 70:

- DRO = 0.014 µg/L
- GRO = 114 µg/L
- Indeno(1,2,3-cd)pyrene = 0.28 µg/L

Likewise, Alaska State Regulations do not establish chemical-specific cleanup levels for sediment. Therefore, for the South of Runway 18-36 Area, sediment cleanup levels were established based on the results of the ecological risk assessment (U.S. Navy and Alaska DEC 2005b). Risk-based cleanup levels were only established for those chemicals that could potentially pose an unacceptable risk to ecological receptors from exposure to sediment in South Sweeper Creek. The RGs for sediment of the South of Runway 18-36 Area are summarized below:

- DRO = 90.6 mg/kg
- GRO = 12.2 mg/kg
- 2-methylnaphthalene = 0.0202 mg/kg
- Phenanthrene = 0.225 mg/kg

Operable Unit B-1

Soil. Table 7-5 compares current ARARs values for the soil pathway with those presented in Table 8-1 in the OU B-1 ROD (U.S. Navy, USEPA, and Alaska DEC 2001). The current PRG for one chemical, 2,4,6-trinitrotolune, is lower than the value listed in the ROD. The former Region 9 PRG was 18 mg/kg; the current value is 16 mg/kg. Soil sampling results from 2001 and 2002 were well below the new cleanup level. Therefore, the selected RGs and remedies with respect to chemical contamination remain protective.

7.2.2 Review of Risk Assessment Assumptions

Risk assessment assumptions (both human and ecological) were also reviewed as part of the requirement to assess the protectiveness of the remedy. The 14 petroleum site risk assessments were finalized in recent years, and risk assumptions for these sites are current for this 5-year review. Therefore, the discussions in this section apply mainly to the CERCLA sites for which remediation decisions were based on the results of historical risk assessments from as long ago as 1995. It is these sites where changes in risk assessment assumptions might affect the protectiveness of the remedy. Important risk assessment assumptions can be divided into two broad categories: (1) assumptions regarding chemical toxicity, and (2) assumptions regarding chemical exposure. Also discussed in this section are the risk-based endpoint criteria used to evaluate chemical results in sediment at SWMU 11.

Toxicity Criteria

The toxicity criteria were reviewed for those chemicals where RGs and endpoint criteria are site-specific risk-based concentrations. The only risk-based RGs are those established for fish and shellfish tissue in Kuluk Bay and Sweeper Cove and the sediment endpoint criteria established for SWMU 11. There have been no changes to toxicity criteria used to calculate the risk-based RGs or endpoint criteria. The toxicity criteria for PCBs (used to calculate fish tissue RGs) and the human health risk-based criteria shown on Table 7-3 have not changed since the ROD was signed, based on a review of the latest toxicity criteria presented in EPA's Integrated Risk Information System (IRIS), EPA's on-line data base of toxicity criteria. Therefore, no toxicity criteria changes have occurred. For the ecological risk-based criteria shown on Table 7-3 (PCBs, antimony, chromium, and nickel), toxicity criteria were reviewed and some criteria have new information. The new information for the ecological criteria is discussed in the section below titled "Use of PSE-2 Risk-Based Screening Levels as Endpoint Criteria for SMWU 11 Sediment."

Exposure Parameters for Human Health

Risk assessments were conducted for the sites within OU A (the CERCLA sites). This section focuses on human health exposure parameters because the land use changes discussed here would not affect ecological receptors. Ecological exposures have not significantly changed since the ROD was signed. At the time the risk assessments were completed, Adak was an active military facility. Therefore, the risk calculations for human health assumed that the maximum length of time for exposures on Adak was 15 years for civilians and 5 years for military personnel. Therefore, the residential exposure calculations included a 15-year exposure duration (6 years as a child and 9 years as an adult), and the occupational and recreational exposures were assumed to be 5 years in duration. EPA’s default exposure duration for residential and occupational exposures is 30 years and 25 years, respectively. Because the land use on Adak has changed from an active military installation to regular civilian use, EPA default exposure durations are more appropriate for evaluating health risks. Because risk and hazard calculations are linear, a doubling of the exposure duration (from 15 to 30 years) would result in a doubling of the estimated health risks and hazards. Estimated risks for occupational and recreational exposures would thus increase by a factor of five (from 5 years to 25 years). An increase in risks and hazards by factors of two to five would affect the protectiveness of the remedy if under the following circumstances:

- Sites were inappropriately selected for NFA based on risks below target health goals, and risks would be above target health goals if risks were doubled or increased by a factor of five

- Sites with ICs that allow commercial use but not residential would be unsafe for commercial use if commercial risks were increased by a factor of five

- Sites were remediated using risk-based cleanup levels that were based on a 15-year or 5-year exposure duration and, thus, contamination may have been left in place that would exceed a 30-year or 25-year risk-based cleanup level

These three bullets and the potential for increased risks and hazards pertaining to CERCLA sites are discussed further in the following paragraphs.

Sites Selected for NFA. The process by which sites were selected for NFA during the PSEs, 1 and 2 (U.S. Navy 1996a, 1996b, 1995i, and 1995j) was sufficiently health protective, such that even a five-fold increase in exposure would not result in a health risk at a site that was selected as NFA. The first step in the process involved screening maximum concentrations against EPA Region 10 residential RBSCs. The Region 10 RBSCs assumed a 30-year exposure duration with a target cancer goal of 1×10^{-7} and a hazard quotient of 0.1. The target cancer goals in the ROD were 1×10^{-5} and the target hazards were 1.0. Therefore, because the risk equations are linear as noted above, an RBSC calculated assuming a target cancer goal of 1 x 10^{-7} would be 100 times lower than an RBSC calculated assuming a goal of 1 x 10^{-5} (i.e., the larger the target risk goal, the larger the acceptable concentration), and the exposure duration matches current land uses. Consequently, any sites that were selected as NFA because no chemicals exceeded Region 10 RBSCs would not represent a health risk under current conditions and were appropriately designated as NFA.

For sites where maximum chemical concentrations exceeded a Region 10 screening value, a 95 percent upper confidence limit was calculated (or the maximum concentration was used if the data set was small). The value was compared first to Adak-specific residential values and then, if there were exceedances and the site was not residential, to recreational or occupational RBSCs (U.S. Navy 1996a). All risks and hazards were considered additive and a site was only eliminated as a concern if the total risk was less than 1 x 10^{-6} or the total hazard was less than 1.0. As with the EPA region 10 RBSCs, the Adak-specific RBSCs were also derived assuming a target cancer goal of 1 x 10^{-7} and a target hazard goal of 0.1. The use of a lower target risk goal than the ROD requires provided an adequate margin of safety to select sites, even though the exposure time may have been underestimated. Thus, sites were appropriately selected as NFA during the PSE process.

For the sites that “failed” the PSE process and underwent further investigation, the majority were selected as requiring a remedy and have been appropriately addressed in the ROD. For the remaining sites, either the minimal risks were addressed through an interim action, or concentrations are too low to be a health concern (these sites are discussed in Section 4 of the ROD).

Sites Selected for Instructional Controls. Thirteen sites were selected in the ROD for ICs, because risk assessment findings showing residential risks in excess of target health goals (Table 7-2 in the ROD). Two of the 13 had only ecological risks, which would not be affected by changes in human land use assumptions. One site (SWMU 55) is included only because of groundwater risks, assuming use of the water as a drinking source. The conclusions regarding this site are not affected by changes in land use, because chemicals in groundwater would be required to meet MCLs before ICs would be removed. The remaining 10 sites were found to have human health risks based on residential land use due to soil only (6 sites) or a combination of soil and groundwater exposures (4 sites). Soils at these sites were deemed to represent an acceptable risk for industrial/commercial exposures, but not for residential. All of the residential soil risks were between 7 x 10^{-6} and 6 x 10^{-5} and either do not exceed a 1 x 10^{-5}, or only slightly exceed a 1 x 10^{-5} target goal for residential exposures. Thus, they are very unlikely to represent a health risk for commercial/industrial workers under current land use conditions, and the remedies remain protective.

Active Remediation Sites. Risk-based values were selected as cleanup goals only for Kuluk Bay and Sweeper Cove. These cleanup goals in fish and shellfish tissue were calculated assuming a 30-year exposure, and none of the other exposure parameters in the equation has changed. Thus, the cleanup goals are appropriate and the remedies in place are protective.

Use of PSE-2 Risk-Based Screening Levels as Endpoint Criteria for SWMU 11 Sediment

As shown on Table 7-3, all the sediment endpoint criteria being used at SWMU 11 would be much higher if selected today. For PCBs in sediment at SWMU 11, the endpoint criteria based on ecological health was 0.005 mg/kg and was derived using a lowest effect concentration selected as a screening level during the PSE-2 process (U.S. Navy 1996a). Screening concentrations are typically more conservative than cleanup levels and are used only to assess whether a site requires further investigation, not to establish whether a health risk is actually present. Thus, the ROD established 1 mg/kg for PCBs in sediment at South Sweeper Creek as an “action level” that was sufficiently protective of ecological health. The 1 mg/kg action level for freshwater sediment was determined an appropriate risk-based remedial goal for freshwater sediments during the feasibility study (U.S. Navy 1997a). The feasibility study evaluated every site with an ecological HI greater than 1.0 to determine if there were ecologically significant risks, and only benthic invertebrates were identified as being affected by PCBs. No higher food chain effects were observed (see discussion on pages 6-23 to 6-24 of the ROD [U.S. Navy, USEPA, and Alaska DEC 2000]). Continuing to monitor freshwater sediment until a PCB concentration of 0.005 mg/kg is reached is unnecessary to protect ecological health.

The PCB value of 0.005 mg/kg is also unnecessarily protective of marine sediment. The most commonly accepted sediment benchmarks for marine environments are those used by the National Oceanographic and Atmospheric Administration and reported in Long et al. (1995). An “effects range low” (ERL) benchmark is defined by Long et al. (1995) as the concentration of a chemical in sediment below which adverse effects were rarely observed among sensitive species. An “effects range medium” (ERM) benchmark is defined as the concentration of a chemical in sediment above which effects are frequently or always observed among most species. The range between the ERL and ERM is assumed to represent the range in which effects are occasionally observed (MacDonald 1994). ERMs, rather than ERLs, should be used to predict toxicity of samples because of the lower Type I error (i.e., false positives) associated with them (Ingersoll et al. 1996). However, ERLs can be used to efficiently identify concentrations below which toxicity is rarely observed. Therefore, both the ERL (0.023 mg/kg dry weight) and the ERM (0.018 mg/kg dry weight) for total PCBs are commonly used criteria in ecological risk assessments. The ERL of 0.023 mg/kg dry weight is likely sufficiently protective as an endpoint criterion for PCBs in marine sediments at SWMU 11.

For the remaining three metals (antimony, chromium, and nickel), with endpoint criteria in sediment based on ecological health, the criteria were all lowest effect concentrations from the literature and were used for screening during the initial evaluation of sites on Adak to determine whether further work was required at a particular site. As such, exceedances of these endpoint criteria are unlikely to represent a health risk. However, the criteria are protective, and no changes are necessary to ensure the protectiveness of the remedy.

Similar arguments to those discussed above for ecological criteria could be made for the cPAHs, where the RBSC values were the EPA Region 10 values, assuming a 1×10^{-7} target cancer risk goal. Table 7-3 indicates how much higher current EPA Region 9 PRG values would be for the PAHs assuming a 1×10^{-6} target risk goal (Region 10 is no longer publishing their own RBSCs, but mandates the use of the Region 9 values for screening purposes). Alaska soil cleanup levels are even higher. Therefore, long-term monitoring of sediment at SWMU 11 should be reviewed to assess whether there are any exceedances under current cleanup levels and whether the monitoring program needs to be continued for this media.

7.3 NEW INFORMATION

This section is in response to the question "Has any other information come to light that could call into question the protectiveness of the remedy?" No other information reviewed during this 5-year review, apart from what is included previously in this document, affects the protectiveness of the remedy.

7.4 TECHNICAL ASSESSMENT SUMMARY

The OU A ROD remedy components are functional at all OU A sites except the following:

- ASR-8 Facility, where soil removal is planned for 2008
- SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area, where soil removal is planned for 2008
- SA 88, P-70 Energy Generator

The remedy is not fully functional at these sites, because limited soil removals are not yet complete (ASR-8 Facility and SA 77), or site conditions have been found that do not match the assumptions used in the remedy selection (free product found at SA 88). Final remedies are not yet executed for four OU A sites. However, progress towards the final remedies has been made.

For OU B, MEC awareness programs and other MEC ICs are functional with regard to informing the public. However, they cannot be concluded to be 100 percent functional in protecting human health from MEC, because members of the public are not always responsive to the message.

The chemical sampling and soil removal component of the selected remedy at specific OU B-1 sites has been completed and has functioned to reduce the potential ordnance-related chemical risk and, thus, prevent future residents and recreational users from being exposed to explosives-related contamination in soils above the cleanup levels. MEC clearance has not been completed at all of the OU B-1 sites (see Figure 3-2).

Changes in the ARARs, exposure, and toxicity assumptions that have occurred since the RODs were signed do not affect the protectiveness of the remedy. Concentrations of many chemicals in groundwater remain above the RGs within the downtown area of Adak at the majority of locations where long-term monitoring is occurring, resulting in the need for continued ICs to prevent exposure and the need for ongoing monitoring. Although some of the RGs might be lower if selected today, the remedy components continue to protect against exposures, just as they did at the time the ROD was signed. ICs to prevent exposure and ongoing monitoring will need to continue until COC concentrations in groundwater are below the RGs. The endpoint criteria being used to evaluate sediment concentrations at SWMU 11 are likely unnecessarily restrictive and should be revised to more closely reflect potential health risks from sediment exposures at SWMU 11.

7.5 ISSUES

Table 7-6 lists the issues identified as a result of the 5-year review technical assessment of the remedies at Adak.

Table 7-1
Endpoint Criteria for Groundwater at CERCLA Sites

			Protection of Surface Water			
			State		Federal	
Analyte	**Alaska Cleanup Levels 18 AAC 75.345 (µg/L)[a]**	**Federal MCLs (µg/L)**	**Chronic**	**HH (Organisms Only) (µg/L)**	**Chronic**	**HH (Organisms Only) (µg/L)**
Benzene	5	5	--	--	--	710
Bis(2-ethylhexyl)phthalate	6	--	--	--	--	**22** (59)
Ethylbenzene	700	700	--	**29,000** (3,280)	--	--
Lead	15	15	3.2 TR at 100 mg/L hardness	--	--	--
Methylene chloride	5	--	--	--	--	59,000
Tetrachloroethene	5	5	--	--	--	33
Thallium	2	2	--	**6.3** (48)	--	4.7
Toluene	1,000	1,000	--	**200,000** (424,000)	--	150,000
GRO	1,300	--	--	--	--	--
Trichloroethene	5	5	--	--	--	**300** (810)

[a]Cleanup levels shown are applicable if groundwater is a source of drinking water at the site. A concentration equal to 10 times the concentration shown may be used if Alaska Department of Environmental Conservation determines groundwater is not a current source of drinking water.

Notes:
Bolded valves are the revised numbers, and the numbers in parentheses are the endpoint criteria listed in the CMP.
AAC - Alaska Administrative Code
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
HH - human health
MCLs - maximum contaminant level
µg/L - microgram per liter
mg/L - milligram per liter
TR - total recoverable

Table 7-2
Endpoint Criteria for Fresh Surface Water at SWMUs 11, 18/19, and 25

Analyte	Alaska Water Quality Standards, 18 AAC 70[a]	
	Aquatic Life - Chronic (µg/L)	**Human Health - Organisms Only (µg/L)**
Semivolatile Organic Compounds		
Benzo(a)pyrene	None	**0.18[c]** (0.31[b])
Benzo(b)fluoranthene	None	**0.18[c]** (0.31[b])
Benzo(g,h,i)perylene	None	None
Benzo(k)fluoranthene	None	**0.18[c]** (0.31[b])
Bis(2-ethylhexyl)phthalate	None	**22[c]** (59[b])
Pesticides/Aroclors		
PCBs	0.014	**0.00064[c]** (0.0045[b])
Volatile Organic Compounds		
1,1-Dichloroethene	None	**None** (320)
Benzene	None	**None** (710[b])
Cis-1,2-dichloroethene	None	None
Toluene	None	**200,000** (424,000)
Trans-1,2-dichloroethene	None	**140,000** (None)
Trichloroethene	None	**300[c]** (810)
Ethylbenzene	None	**29,000** (3,280)
Total xylenes	None	None
Inorganics		
Antimony	None	**4,300** (45,000)
Arsenic	**150** (190 [As III]) dis	1.4[b]
Beryllium	**None** (190)	**None** (1.4)
Cadmium	**0.3 TR** (1.1 TR) at 100 mg/L hardness	None
Chromium III	**86 TR** (210 TR) at 100 mg/L hardness	None
Chromium VI	11 TR	None
Copper	**9.3 TR** (12 TR) at 100 mg/L hardness	None
Lead	3.2 TR at 100 mg/L hardness	None
Mercury	**0.77 dis** (0.012 TR)	**0.051** (0.15)
Nickel	**52 TR** (160 TR) at 100 mg/L hardness	**4,600** (100)
Selenium	5 TR	**11,000** (None)
Silver	None	None
Thallium	None	**6.3** (48)
Zinc	**120 TR** (110 TR) at 100 mg/L hardness	**69,000** (None)

[a]Criteria existing in 18 AAC 70 when Record of Decision for Operable Unit A and landfills were signed. (Changes to some of these criteria were adopted in an 18 AAC 70 amendment on March 24, 2003, but these changes are not shown in this table.)

[b] Human health criteria for carcinogens come from EPA promulgation of human health criteria for carcinogens for Alaska at the 10^{-5} risk level in the National Toxics Rule (40 CFR 131.36), in accordance with on-line Alaska

Table 7-2 (Continued)
Endpoint Criteria for Fresh Surface Water at SWMUs 11, 18/19, and 25

Department of Environmental Conservation guidance at <www.state.ak.us/dec/dawq/wqs/documents/carcinogens.htm>, accessed April 10, 2003.

[c]Human health criteria came from EPA National Recommended Water Quality Criteria and are based on a carcinogenicity of 10^{-5} risk.

Notes:
Bold values are the revised numbers and the numbers in parentheses are the endpoint criteria listed in the CMP.
EPA - U.S. Environmental Protection Agency
dis - dissolved
µg/L - microgram per liter
mg/L - milligram per liter
PCBs - polychlorinated biphenyls
TR - total recoverable

Table 7-3
Endpoint Criteria for Freshwater/Marine Sediments for SWMU 11

Analyte	CMP Endpoint Criteria (mg/kg)[a]	Basis	Current Alaska Soil Cleanup (Ingestion of Soil) (mg/kg)	Current Region 9 PRG Residential Soil (mg/kg)	Background From RI/FS 1997 (mg/kg)
Semivolatile Organic Compounds					
Benzo(a)anthracene	0.0875	HH RBSC[c]	9	0.62	--
Benzo(a)pyrene	0.00875	HH RBSC[c]	0.9	0.062	--
Benzo(b)fluoranthene	0.0875	HH RBSC[c]	9	0.62	--
Benzo(g,h,i)perylene	821	HH RBSC[c]	2,500[d]	--	--
Benzo(k)fluoranthene	0.875	HH RBSC[c]	93	6.2	--
Bis(2-ethylhexyl)phthalate	4.56	HH RBSC[c]	490	35	--
Indeno(1,2,3-cd)pyrene	0.0875	HH RBSC[c]	9	0.62	--
Pesticides/Aroclors					
Aroclor 1260	0.005	Eco RBSC[c]	1	--	--
Total Inorganics					
Antimony	2	Eco RBSC[c]	--	--	10 (1.5)[b]
Arsenic	0.0365	HH RBSC[c]	4.5	0.39	5.46 (7.5)[b]
Chromium	80 (260)[b]	Eco RBSC[c]	--	--	12.91 (6.04)[b]
Nickel	30	Eco RBSC[c]	--	--	10.05 (5.01)[b]

[a]Units are in mg/kg total organic carbon (normalized concentration). To normalize to a total organic carbon (TOC) concentration, the dry-weight concentration of each parameter is divided by the decimal fraction representing the percent TOC content of the sediment. For the purposes of ecological risk assessment and comparison to certain regulations, it is necessary to carbon normalize certain chemicals. If the TOC content of the environmental sample is less than 0.5 percent, then the dry-weight concentration of the chemical parameter is used. For a TOC content greater than 0.5 percent, the carbon normalized value is used. In the absence of organic carbon data, a default value of 1 percent is used.
[b]The value listed is for freshwater sediment and the value in parenthesis is for marine sediment.
[c]Final preliminary source evaluation 2 guidance document for Adak (U.S. Navy 1996a).
[d]No soil cleanup level is available for this compound. The value for pyrene is used as a surrogate.

Notes:
CMP - Comprehensive Monitoring Plan (U.S. Navy 2005c)
Eco - ecological
HH - human health
mg/kg - milligram per kilogram
PRG - preliminary remediation goal
RBSC - risk-based screening concentration
RI/FS - remedial investigation/feasibility study (U.S. Navy 1997d)

Table 7-4
Soil and Groundwater Remediation Goals for Petroleum Sites

Chemical	Soil RGs[a]			Groundwater RGs[a]	
	Ingestion (mg/kg)	Inhalation (mg/kg)	Migration to Groundwater (mg/kg)	Groundwater Cleanup Level (mg/L)	10 Times Groundwater Cleanup Level (mg/L)
Acenaphthene	5,000	NA	190	2.2	22
Anthracene	24,900	NA	3,900	11	110
Antimony	33	NA	3	0.006	0.06
Aroclor 1254	1	1	1	0.0005	0.005
Aroclor 1260	1	1	1	0.0005	0.005
Benzene	230 (120)	6.4	0.02	0.005	0.05
Benzo(a)anthracene	9	NA	5.5	0.001	0.01
Benzo(b)fluoranthene	9	NA	17	0.001	0.01
Benzo(k)fluoranthene	93	NA	170	0.01	0.1
Benzo(a)pyrene	0.9	NA	2.4	0.0002	0.002
Bis(2-ethylhexyl)phthalate	490	NA	1,100	0.006	0.06
Chrysene	930	NA	550	0.1	1
Dibenzo(a,h)anthracene	0.9	NA	5	0.0001	0.001
DRO	8,250	12,500	230	1.5	15
Ethylbenzene	8,300	89	5	0.7	7
Fluorene	3,300	NA	240	1.46	14.6
GRO	1,400	1,400	260	1.3	13
Indeno(1,2,3-c,d)pyrene	9	NA	50	0.001	0.01
Lead	NA (400)	NA (400)	NA	0.015	0.15
Mercury	NA	13	1.24	0.002	0.02
Naphthalene	3,300 (1700)	NA (92)	38 (19)	1.46 (0.7)	14.6
Phenathrene	NA	NA	NA	NA	NA
Pyrene	2,500	NA	1,400	1.1	11
RRO	8,300	22,000	9,700	1.1	11
Toluene	17,000	180	4.8	1	10
Xylenes (total)	166,000	81	69	10	100

[a]Based on 18 AAC 75.340, 341, and 345.

Notes:
Bolded chemicals have new soil or groundwater cleanup levels, which are in parentheses.
DRO - diesel-range organics (per Method AK 102)
GRO - gasoline-range organics (per Method AK 101)
mg/kg – milligrams per kilogram
mg/L - milligram per liter
NA - not available
RGs - remediation goals
RRO - residual-range organics (per Method AK 103)

Table 7-5
Soil Cleanup Level for Ordnance Compounds, OU B-1 ROD

Chemical	ROD-specified Cleanup Level (mg/kg)	Current Cleanup Level (mg/kg)
Dinitrotoluene (mixture)	0.72	0.72
2,4,6-Trinitrotoluene	18	**16**
Nitroglycerin	35	35
Nitroguanidine	6100	6100
Tetryl (trinitrophenylmethylnitramine)	610	610
RDX (cyclonite)	4.4	4.4

Notes:
Bold values have changed.
Values are Region 9 Preliminary Remediation Goals.
mg/kg - milligram per kilogram

Table 7-6
Issues

Issue	Affects Protectiveness?	
	Current	**Future**
The endpoint criteria being used to evaluate sediment concentrations at SWMU 11, Palisades Landfill, are likely unnecessarily restrictive and should be revised to more closely reflect potential health risks from sediment exposures at SWMU 11.	No	No
The OU A ROD remedy is not complete at the ASR-8 Facility and SA-77 Fuels Facility Refueling Dock, Small Drum Storage Area sites.	Yes	Yes
The OU B-1 ROD remedy is not complete at sites in the Mount Moffett area, and the regulatory agencies have not concurred with the remedial actions implemented during 2004.	Yes	Yes
The ordnance awareness training program is not fully functioning as intended by the ROD.	Yes	Yes
Land use controls are not fully functioning at the OU B sites.	Yes	Yes
Issues related to communication with stakeholders were raised by the interviewees during this 5-year review and by interviewees during the 2005 institutional controls inspections.	No	No
Alaska Department of Transportation and Public Facilities noted a need for written excavation procedures for the airport.	Yes	Yes
Free product found in one surface water protection well at the NORPAC Hill Seep Area site in 2005 could indicate a threat to surface water.	No	Yes
The final remedy for site SA 88, P-70 Energy Generator is unlikely to function as anticipated, based on the free-product thicknesses measured in wells at the site during 2005.	No	Yes
Gasoline-range organics and benzene levels in groundwater samples from surface water protection wells at SWMU 61, Tank Farm B, could indicate a threat to surface water.	No	Yes

Notes:
OU - operable unit
ROD - record of decision
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit
UST - underground storage tank

8.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

This section presents the recommendations and follow-up actions identified as a result of the 5-year review process. Table 8-1 summarizes the recommendations. In general, the recommendations focus on completing the remedies for the remaining OU A and OU B-1 sites and continuing to improve ordnance awareness training materials and communication with the public and other stakeholders. A specific recommendation is made to revise endpoint criteria used to evaluate sediment concentrations at SWMU 11, Palisades Landfill, to more closely reflect potential health risks from sediment exposures at SWMU 11. Specific recommendations are also made regarding sites were free product was found after selection of the final remedy, when the remedy did not anticipate the presence of free product.

Table 8-1
Recommendations and Follow-Up Actions

Recommendation/ Follow-Up Action	Oversight Agency	Milestone Date	Follow-Up Action: Affects Protectiveness	
			Current	Future
Revise endpoint criteria used to evaluate sediment concentrations at SWMU 11, Palisades Landfill, to more closely reflect potential health risks from sediment exposures at SWMU 11.	EPA, Alaska DEC	May 2007	No	No
Implement recommendations and/or required repairs indicated in the 2005 IC inspection Report for SWMUs 2, 4, 13, 25, and 29.	EPA, Alaska DEC	December 2006	Yes	Yes
Complete limited soil removal component of OU A remedy at the ASR-8 Facility and SA 77.	Alaska DEC	December 2008	Yes	Yes
Evaluate, select, and implement additional land use controls to protect human health at OU B-1 and OU B-2 sites, where the selected remedy is not complete, while a remedy is selected (OU B-2) and a revised remedy is evaluated (OU B-1). Incorporate the selected land use controls in the next revision of the Institutional Control Management Plan.	EPA, Alaska DEC	March 2008	Yes	No
Resolve with regulators the MEC clearance approach for Mount Moffett sites and the issues related to the 2004 after action report for OU B-1 remedy implementation.	EPA, Alaska DEC	December 2007	Yes	Yes
Continue to improve the ordnance awareness training program.	EPA, Alaska DEC	Ongoing	Yes	Yes
Provide a sufficient supply of ordnance awareness hiking maps at the Refuge	EPA, Alaska DEC	Ongoing	Yes	Yes
Address communication issues raised by stakeholders: • Ensure that ordnance discoveries and disposition are fully communicated to regulators. • Ensure that key project documents are distributed to all stakeholders. • Strive for improved dissemination of information to the public. See public interview responses for specific suggestions, such as report summaries presented in lay terms. • Increase information provided to the public regarding issues raised during the interview process (such as the Palisades and Metals Landfills).				

Table 8-1 (Continued)
Recommendations and Follow-Up Actions

Recommendation/ Follow-Up Action	Oversight Agency	Milestone Date	Follow-Up Action: Affects Protectiveness	
			Current	Future
• Increase public awareness of the fishing advisory through improved dissemination of information.	EPA, Alaska DEC	Ongoing	No	No
Work with Alaska Department of Transportation and Public Facilities to resolve their concern regarding written excavation procedures for the airport.	EPA, Alaska DEC	December 2007	Yes	Yes
Because of the free product measured in the surface water protection well at the NORPAC Hill Seep Area site in 2005, add visual inspections for seeps and sheens to the annual monitoring protocol starting in 2006.	Alaska DEC	September 2006	No	Yes
Re-evaluate the selected final remedy for site SA 88, P-70 Energy Generator, considering the free product measured in wells at this site in 2005.	Alaska DEC	December 2007	No	Yes
Conduct visual monitoring of shoreline and surface water for petroleum seeps and sheens at SWMU 61 in the vicinity of wells 14-113 and 14-210.	Alaska DEC	October 2007	No	No
Implement future monitoring recommendations detailed in Section 6.4.	Alaska DEC	October 2007	No	No

[1]NAVFAC NW is the party responsible for implementing the recommendations/follow-up actions.

Notes:
CMP - Comprehensive Monitoring Plan
DEC - Department of Environmental Conservation
EPA - U.S. Environmental Protection Agency
MEC - munitions and explosives of concern
NAVFAC NW - Naval Facilities Engineering Command Northwest
OU - operable unit
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit
UST - underground storage tank

9.0 CERTIFICATION OF PROTECTIVENESS

9.1 PROTECTIVENESS OF OU A REMEDIES

The OU A sites are grouped in the sections below for the purposes of discussing protectiveness.

9.1.1 OU A Sites Where the Remedy Is Complete and Protective

The OU A remedy remains protective for the sites selected for NFA or NFRAP, and sites where the remedy is complete, but an NFA/NFRAP designation has not been made (such as South Sweeper Creek) (Table 9-1). At these sites, the NFA status selected in the ROD, the NFA/NFRAP status selected in later documents, or the completeness of the remedy are not called into question by new information, including changes in ARARs or risk assessment assumptions. ICs still apply to some of these sites because of their location within the downtown area, where area-wide land use controls apply. The 19 sites that achieved NFA or NFRAP status during this 5-year review period will not be discussed in detail in the next 5-year review. These 19 sites are:

- Amulet Housing, Well AMW-706 Area
- Amulet Housing, Well AMW-709 Area
- Boy Scout Camp, West Haven Lake (UST BS-1)
- Contractor’s Camp Burn Pad
- Finger Bay Quonset Hut, UST FBQH-1
- Girl Scout Camp (UST GS-1)
- MAUW Compound (UST 24000-A)
- Mount Moffett Power Plant 5 (USTs 10574 through 10577)
- NAVFAC Compound (USTs 20052 and 20053)
- Navy Exchange Building (UST 30027-A)
- New Roberts Housing, UST HST-7C
- Officer Hill and Amulet Housing, UST 31047-A
- Officer Hill and Amulet Housing (UST 31049-A)
- Officer Hill and Amulet Housing (UST 31052-A)
- Quarters A (UST 42200)
- ROICC Contractor’s Area, UST ROICC-8
- ROICC Warehouse, UST ROICC-2
- ROICC Warehouse, UST ROICC-3
- Yakutat Hangar, USTs T-2039-B and T-2039-C

9.1.2 OU A Sites Where the Remedy Is Not Complete, but Expected to Be Protective

At the ASR-8 Facility and SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area sites, the limited soil removal component of the selected remedy is not complete. The remedy at these two sites is expected to be protective when this remedy component is complete. In the interim, exposure pathways that could result in unacceptable risks are being controlled. For SA 77, exposure pathways are controlled through the implementation of the ICMP.

At the sites listed below, the remedy is expected to be protective when the final remedy is complete. In the interim, exposure pathways that could result in unacceptable risks are being controlled through the implementation of the ICMP.

- NMCB Building T-1416 Expanded Area
- South of Runway 18-36 Area
- SWMU 17, Power Plant 3
- SWMU 62, New Housing Fuel Leak

9.1.3 OU A Sites Where the Remedy Is Operating and Expected to Be Protective

The OU A remedy for the sites listed in Table 9-2 is expected to be protective when the operating OU A remedy (monitored natural attenuation in many cases) is complete. In the interim, exposure pathways that could result in unacceptable risks are being controlled through implementation of the ICMP. Potential changes in site conditions that could affect protectiveness at these sites are also being monitored and evaluated through the annual groundwater monitoring program. Through this program, the ongoing natural attenuation of COCs is documented, and surface water protection wells are monitored to allow evaluation of COC migration and thereby ensure the protection of surface water. Free-product thickness is monitored at sites where free-product has been or could be a concern, and the monitoring protocols include free product removal when sufficient product thickness is measured.

For certain sites, such as those with landfill caps, ICs are an integral component of the remedy in perpetuity (e.g., excavation through a landfill cap is not expected to ever be permissible). For these sites, the IC component of the remedy is protective and is expected to remain so as long as the ICs are maintained, with documentation via annual inspections.

9.1.4 OU A Sites Requiring Follow-Up Actions to Ensure Future Protectiveness

At three of the sites where the final remedy consists of either limited groundwater monitoring or monitored natural attenuation, the discovery of free product during the 2005 monitoring event or the detection of dissolved petroleum concentrations above cleanup levels call into question the future protectiveness of the remedy. Follow-up actions are needed at the three sites listed below for the final remedy to be protective in the long term.

- NORPAC Hill Seep Area
- SA 88, P-70 Energy Generator, UST 10578
- SWMU 61, Tank Farm B

The recommended follow-up actions include re-evaluating the appropriateness of the limited groundwater remedy at SA 88 in light of the most recent data and adding visual inspection for seeps and sheens to the NORPAC Hill Seep Area and the SWMU 61 annual monitoring protocol for protection of surface water.

9.2 PROTECTIVENESS OF OU B-1 REMEDY

The remedy for OU B-1 is expected to be protective of human health and the environment upon completion. In the interim, additional measures are needed to control exposure pathways that could result in unacceptable risks. As recommended in Section 8, the Navy should maintain an ongoing improvement effort for the ordnance awareness training program. The Navy should also evaluate, select, and implement additional land use controls to protect human health at OU B-1 sites where the selected remedy is not complete. The Navy should incorporate the selected land use controls in the next revision of the ICMP.

Completion of the OU B-1 remedy is pending stakeholder concurrence on a revised remedial approach for the Mount Moffett sites and resolution of issues regarding the 2004 after action report. The remedy, once completed, is expected to be protective.

9.3 PROTECTIVENESS OF OU B-2 REMEDY

The remedy for OU B-2, when selected in the future ROD, is expected to be protective. In the interim, additional measures are needed to control exposure pathways that could result in unacceptable risks. As recommended in Section 8, the Navy should maintain an ongoing improvement effort for the ordnance awareness training program. The Navy should also evaluate, select, and implement additional land use controls to protect human health at OU B-2 sites. The Navy should incorporate the selected land use controls in the next revision of the ICMP.

Table 9-1
OU A Sites Where the Remedy Is Complete

Site	Regulatory Authority	Regulatory Designation	Timing of Regulatory Designation
CERCLA Sites			
South Sweeper Creek	CERCLA	Remedy complete	Post First Five-Year Review
SWMU 3, Clam Lagoon Landfill	CERCLA	NFA	OU A ROD
SWMU 5, North Davis Road Landfill	CERCLA	NFA	OU A ROD
SWMU 6, Andrew Lake Drum Disposal Area 1	CERCLA	NFA	OU A ROD
SWMU 7, Andrew Lake Drum Disposal Area 2	CERCLA	NFA	OU A ROD
SWMU 9, Black Power Club	CERCLA	NFA	OU A ROD
SWMU 21B, White Alice Lower Quarry	CERCLA	NFA	OU A ROD
SWMU 21C, White Alice East Disposal Area	CERCLA	NFA	OU A ROD
SWMU 24, Hazardous Waste Storage Facility — RCRA Closure under FFCA	RCRA	NFA	OU A ROD
SWMU 26, Mitt Lake Drum Disposal Area	CERCLA	NFA	OU A ROD
SWMU 27, Lake Leone Drum Disposal Area	CERCLA	NFA	OU A ROD
SWMU 28, Lake Betty Drum Disposal Area	CERCLA	NFA	OU A ROD
SWMU 30, Magazine 4 Landfill	CERCLA	NFA	OU A ROD
SWMU 42, GSE Steam Clean Oil/Water Separator	CERCLA	NFA	OU A ROD
SWMU 43, AIMD Acid Battery Storage Area	CERCLA	NFA	OU A ROD
SWMU 51, NSGA Transportation Bldg. 10354 Waste Storage Area	CERCLA	NFA	OU A ROD
SWMU 54, NMCB Battery Storage	CERCLA	NFA	OU A ROD
SWMU 65, Contractor’s Camp Fire/Demolition Site	CERCLA	NFA	OU A ROD
SWMU 66, Palisades Lake PCB Spill	CERCLA	NFA	OU A ROD
SWMU 68, New Pesticide Storage Area	CERCLA	NFA	OU A ROD
SWMU 69, Ski Lodge Waste Pile	CERCLA	NFA	OU A ROD
SWMU 70, Davis Road Asphalt Drums	CERCLA	NFA	OU A ROD
SWMU 71, NSGA Fueling Facility	CERCLA	NFA	OU A ROD
SWMU 72, NSGA Transportation Building 10354	CERCLA	NFA	OU A ROD
SWMU 74, Old Batch Facility*	CERCLA	NFA	OU A ROD
SA 75, Asphalt Storage Area	CERCLA	NFA	OU A ROD
SA 77, Fuels Facility Refueling Dock, Small Drum Storage Area	RCRA	NFA	OU A ROD
SA 83, Former Chiefs Club Station	CERCLA	NFA	OU A ROD
SA 90, Husky Road Landfill	CERCLA	NFA	OU A ROD
SA 91, Airplane Crash Sites	CERCLA	NFA	OU A ROD
SA 92, Waste Ordnance Pile (Fin Field)	CERCLA	NFA	OU A ROD
SA 94, Chemical Weapons Disposal Area	CERCLA	NFA	OU A ROD
SA 95, Transformer Disposal Area	CERCLA	NFA	OU A ROD
Clam Lagoon	CERCLA	NFA	OU A ROD

Table 9-1 (Continued)
OU A Sites Where the Remedy Is Complete

Site	Regulatory Authority	Regulatory Designation	Timing of Regulatory Designation
Andrew Lake	CERCLA	NFA	OU A ROD
Petroleum Sites			
Administration Building (UST 30004-A)	SAERA	NFA	OU A ROD
Amulet Housing, Well AMW-706 Area	SAERA	NFRAP	Post First Five-Year Review
Amulet Housing, Well AMW-709 Area	SAERA	NFRAP	Post First Five-Year Review
Armory (UST 10311-A)	SAERA	NFA	OU A ROD
Artillery Battalion (USTs ART-1 and ART-2)	SAERA	NFA	OU A ROD
Bering Chapel (UST 42090-A)	SAERA	NFA	OU A ROD
Boy Scout Camp, West Haven Lake (UST BS-1)	SAERA	NFRAP	Post First Five-Year Review
Boy Scout Camp, South Haven Lake (UST BS-2)	SAERA	NFA	OU A ROD
CDAA Complex (USTs 10580 and 10654)	SAERA	NFA	OU A ROD
Clam Road Truck Fill Stand	SAERA	NFA	OU A ROD
Cold Storage Facility (AST T-1440)	SAERA	NFA	OU A ROD
Contractor’s Camp Burn Pad	SAERA	NFRAP	Post First Five-Year Review
Contractor’s Pad UST T-1706 (Navy Pad)	SAERA	NFA	OU A ROD
Drum Disposal Area at Tank Farm D	SAERA	NFA	OU A ROD
Elementary School (UST 42017-A)	SAERA	NFA	OU A ROD
Finger Bay Quonset Hut, UST FBQH-1	SAERA	NFRAP	Post First Five-Year Review
Girl Scout Camp (UST GS-1)	SAERA	NFA	Post First Five-Year Review
Housing Outfall Area (Sandy Cove)	SAERA	NFA	OU A ROD
Kuluk Housing (UST HST-6C)	SAERA	NFA	OU A ROD
Kuluk Recreation Center (UST 30034)	SAERA	NFA	OU A ROD
Line Crew Building (USTs 2776, 2776-B, and 2776-C)	SAERA	NFA	OU A ROD
Loran Station (USTs V149A, V149B, and V149C)	SAERA	NFA	OU A ROD
MAUW Compound (UST 24000-A)	SAERA	NFRAP	Post First Five-Year Review
MAUW Compound (UST 24032-B)	SAERA	NFA	OU A ROD
McDonald’s UST	SAERA	NFA	OU A ROD
Medical Center (UST 27088)	SAERA	NFA	OU A ROD
Mount Moffett Power Plant 5 (Used Oil AST)	SAERA	NFA	OU A ROD
Mount Moffett Power Plant 5 (Used Oil Pit)	SAERA	NFA	OU A ROD
Mount Moffett Power Plant 5 (USTs 10574 through 10577)	SAERA	NFRAP	Post First Five-Year Review
Mount Moffett Tower (Mogas AST and Used Oil AST)	SAERA	NFA	OU A ROD
NAVFAC Compound (USTs 20052 and 20053)	SAERA	NFRAP	Post First Five-Year Review
Navy Exchange Building (UST 30026)	SAERA	NFA	OU A ROD
Navy Exchange Building (UST 30027-A)	SAERA	NFRAP	Post First Five-Year Review
Navy Exchange Building (UST 30033)	SAERA	NFA	OU A ROD
New Roberts Housing, UST HST-7C	SAERA	NFRAP	Post First Five-Year Review

Table 9-1 (Continued)
OU A Sites Where the Remedy Is Complete

Site	Regulatory Authority	Regulatory Designation	Timing of Regulatory Designation
New Transportation Building (O/W 10644)	SAERA	NFA	OU A ROD
Petroleum Sites (Continued)			
New Transportation Building (UST 10590)	SAERA	NFA	OU A ROD
New Transportation Building (UST 10591)	SAERA	NFA	OU A ROD
NSGA Filling Station, Mogas and JP-5 ASTs	SAERA	NFA	OU A ROD
Officer Hill and Amulet Housing, UST 31047-A	SAERA	NFRAP	Post First Five-Year Review
Officer Hill and Amulet Housing (UST 31049-A)	SAERA	NFA	Post First Five-Year Review
Officer Hill and Amulet Housing (UST 31050-A)	SAERA	NFA	OU A ROD
Officer Hill and Amulet Housing (UST 31051-A)	SAERA	NFA	OU A ROD
Officer Hill and Amulet Housing (UST 31052-A)	SAERA	NFRAP	Post First Five-Year Review
Officer Hill and Amulet Housing (UST 31053-A)	SAERA	NFA	OU A ROD
Old Fuel Truck Shop (UST 10520-A)	SAERA	NFA	OU A ROD
Old Fuel Truck Shop (UST 10520-B)	SAERA	NFA	OU A ROD
Pantograph Pad (UST RT-1)	SAERA	NFA	OU A ROD
Pumphouse 5 Area	SAERA	NFA	OU A ROD
Quarters A (UST 42200)	SAERA	NFA	Post First Five-Year Review
ROICC Contractor’s Area (UST ROICC-5)	SAERA	NFA	OU A ROD
ROICC Contractor’s Area (UST ROICC-6)	SAERA	NFA	OU A ROD
ROICC Contractor’s Area, UST ROICC-8	SAERA	NFA	Post First Five-Year Review
ROICC Warehouse (UST ROICC-1)	SAERA	NFA	OU A ROD
ROICC Warehouse, UST ROICC-2	SAERA	NFA	Post First Five-Year Review
ROICC Warehouse, UST ROICC-3	SAERA	NFA	Post First Five-Year Review
ROICC Warehouse (UST ROICC-4)	SAERA	NFA	OU A ROD
SA 81, Gun Turret Hill	SAERA	NFA	OU A ROD
SA 84, Sand Shed	SAERA	NFA	OU A ROD
SA 85, New Baler Building	SAERA	NFA	OU A ROD
SA 86, Old Happy Valley Child Care Center	SAERA	NFA	OU A ROD
SA 87, Old Zeto Point Wizard Station	SAERA	NFA	OU A ROD
SA 89, Tank Farm C	SAERA	NFA	OU A ROD
SA 96, NORPAC Hill Debris Site	SAERA	NFA	OU A ROD
SA 97, Generator Debris Site	SAERA	NFA	OU A ROD
Sewage Life Station 10 (UST 42483-A)	SAERA	NFA	OU A ROD
Sewage Lift Station 11 (UST 42484-A)	SAERA	NFA	OU A ROD
Shack O-52 (UST O-52)	SAERA	NFA	OU A ROD
Shack 0-69 (UST B)	SAERA	NFA	OU A ROD
South Avgas Pipeline at North Sweeper Creek	SAERA	NFA	OU A ROD
SWMU 1, Andrew Lake OB/OD and Range	SAERA	NFA	OU A ROD
SWMU 12, Quartermaster Road Debris Disposal Area	SAERA	NFA	OU A ROD
SWMU 22, Avgas Drum Storage Area South of	SAERA	NFA	OU A ROD

Table 9-1 (Continued)
OU A Sites Where the Remedy Is Complete

Site	Regulatory Authority	Regulatory Designation	Timing of Regulatory Designation
Tank Farm 1			
Petroleum Sites (Continued)			
SWMU 24, Hazardous Waste Storage Facility	SAERA	NFA	OU A ROD
SWMU 31, Runway 18-36 Aviation Gas Drum Disposal	SAERA	NFA	OU A ROD
SWMU 34, Steam Plant 4 Used Oil AST	SAERA	NFA	OU A ROD
SWMU 35, Ground Support Equipment Building	SAERA	NFA	OU A ROD
SWMU 41, GSE Used Oil Storage Area	SAERA	NFA	OU A ROD
SWMU 44, AIMD Used Oil Storage Area	SAERA	NFA	OU A ROD
SWMU 45, Sewage Treatment Plan Petroleum Contamination (including SWMUs 46 through 50)	SAERA	NFA	OU A ROD
SWMU 55, Public Works Transportation Department Waste Storage Area	SAERA	NFA	OU A ROD
SWMU 56, Public Works Transportation Department Storage Tank	SAERA	NFA	OU A ROD
SWMU 57, Fuels Facility Refueling Dock	SAERA	NFA	OU A ROD
SWMU 64, Tank Farm D	SAERA	NFA	OU A ROD
SWMU 74, Old Batch Facility*	SAERA	NFA	OU A ROD
Telephone Exchange Building (UST 10324-A)	SAERA	NFA	OU A ROD
Telephone Substation T-100 (UST T-100-B)	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area A	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area B	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area C	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area D	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area E (Truck Fill Stand)	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area F	SAERA	NFA	OU A ROD
TFB to TFC Pipeline—Area G	SAERA	NFA	OU A ROD
TFC to NSGA Pipeline—Area A	SAERA	NFA	OU A ROD
TFC to NSGA Pipeline—Area B	SAERA	NFA	OU A ROD
TFC to NSGA Pipeline—Area C	SAERA	NFA	OU A ROD
TFC to NSGA Pipeline—Area D	SAERA	NFA	OU A ROD
TFC to NSGA Pipeline—Area E	SAERA	NFA	OU A ROD
USGS (NOAA) Building (USTs NOAA-A, -C, and -D)	SAERA	NFA	OU A ROD
Yakutat Hangar, USTs T-2039-B and T-2039-C	SAERA	NFA	OU A ROD

Notes:
*SWMU 74, Old Batch Facility is included as a no further action site for both CERCLA and petroleum.
AIMD - Aircraft Intermediate Maintenance Detachment
AST - aboveground storage tank
avgas - aviation gasoline

Table 9-1 (Continued)
OU A Sites Where the Remedy Is Complete

CDAA - circular disposed antenna array
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
FFCA – Federal Facilities Compliance Agreement
GSE - ground support equipment
JP-5 - jet petroleum No. 5
loran - long-range navigation
MAUW - modified advanced underwater weapons
mogas - motor vehicle gasoline
NFA - no further action
NFRAP - no further remedial action planned
NMCB - Naval Mobile Construction Battalion
NOAA - National Oceanic and Atmospheric Administration
NORPAC - North Pacific
NSGA - Naval Security Group Activity
OU - operable unit
RCRA – Resource Conservation and Recovery Act
ROICC - resident officer in charge of construction
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWMU - solid waste management unit
TFB - Tank Farm B
TFC - Tank Farm C
USGS - U.S. Geological Survey
UST - underground storage tank

Table 9-2
OU A Sites Where the Remedy Is Operating and Expected to Be Protective

Site Name	Regulatory Authority	Monitoring Type
Antenna Field, USTs ANT-1, ANT-2, ANT-3, and ANT-4	SAERA	MNA/IC
Former Power Plant, Building T-1451	SAERA	MNA/BKGD/ IC
GCI Compound, UST GCI-1	SAERA	MNA/IC/FP
Housing Area (Arctic Acres)	SAERA	MNA/IC
Kuluk Bay	CERCLA	MTM/IC
ROICC Contractor's Area, UST ROICC-7	SAERA	NAE
Runway 5-23 Avgas Valve Pit	SAERA	MNA/IC
SA 76, Old Line Shed Building	CERCLA	IC
SA 78, Old Transportation Building, USTs 10583, 10584, and ASTs	SAERA	MNA/SWP/BKGD/IC/FP
SA 79, Main Road Pipeline	CERCLA, SAERA	NAE/SWP
SA 80, Steam Plant 4, USTs 27089 and 27090	SAERA	MNA/IC/FP
SA 82, P-80/P-81 Buildings	SAERA	LM/SWP/IC/FP
Sweeper Cove	CERCLA	MTM/IC
SWMU 2, Causeway Landfill	CERCLA	IC
SWMU 4, South Davis Road Landfill	CERCLA	IC
SWMU 10, Old Baler Building	CERCLA	IC
SWMU 11, Palisades Landfill	CERCLA	PCM/IC
SWMU 13, Metals Landfill	CERCLA	PCM/IC
SWMU 14, Old Pesticide Disposal Area	CERCLA, SAERA	MNA/CGWM/IC
SWMU 15, Future Jobs/DRMO	CERCLA, SAERA	MNA/CGWM/IC
SWMU 16, Former Firefighting Training Area	CERCLA	IC
SWMUs 18/19, White Alice Landfill	Alaska DEC solid waste regulations	PCM/IC
SWMU 20, White Alice/Trout Creek Disposal Area	CERCLA	IC
SWMU 21A, White Alice Upper Quarry	CERCLA	IC
SWMU 23, Heart Lake Drum Disposal Area	CERCLA	IC
SWMU 24, Hazardous Waste Storage Facility	RCRA	IC
SWMU 25, Roberts Landfill	Alaska DEC solid waste regulations	PCM/IC
SWMU 29, Finger Bay Landfill	CERCLA	IC
SWMUs 52, 53, and 59, Former Loran Station	CERCLA	IC
SWMU 55, Public Works Transportation Department Waste Storage Area	CERCLA	CGWM/IC
SWMU 58 and SA 73, Heating Plant 6	SAERA	MNA/SWP/IC/FP
SWMU 60, Tank Farm A	SAERA	MNA/IC
SWMU 67, White Alice PCB Spill Site	CERCLA	IC

Table 9-2 (Continued)
OU A Sites Where the Remedy is Operating and Expected to Be Protective

Site Name	Regulatory Authority	Monitoring Type
Tanker Shed, UST 42494	SAERA	MNA/SWP/IC/FP
Yakutat Hangar, UST T-2039-A	SAERA	LM/SWP/IC/FP

Notes:
AST - aboveground storage tank
avgas - aviation gasoline
BKGD - background data
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CGWM - compliance groundwater monitoring
DEC - Department of Environmental Conservation
DRMO - Defense Reutilization and Marketing Office
FP - free product
IC - institutional control
LM - limited groundwater monitoring
MNA - monitored natural attenuation
MTM - marine tissue monitoring
NAE - natural attenuation evaluation
PCB - polychlorinated biphenyl
PCM - post-closure monitoring
RCRA - Resource Conservation and Recovery Act
ROICC - resident officer in charge of construction
SA - source area
SAERA - State-Adak Environmental Restoration Agreement
SWP - surface water protection monitoring
SWMU - solid waste management unit
UST - underground storage tank

10.0 NEXT REVIEW

The next 5-year review is scheduled for 2011.

11.0 REFERENCES

Alaska Department of Environmental Conservation (Alaska DEC). 2005a. Guidance on Cleanup Levels (Alaska 18 AAC 75.341, 18 AAC 75.345). Oil and Hazardous Pollution Control Regulations. October 16, 2005

———. 2005b. *Requirements for Site Closure*, *Adak Naval Air Station*. Letter to Jim Brown of NAVFAC NW from Jason Weigle, Alaska DEC. Dated November 23, 2005.

———. 2005c. *Girl Scout Camp UST GS-1*, *Approval of Site Closure*. Letter to Jim Brown of NAVFAC NW from Jason Weigle, Alaska DEC. Dated November 23, 2005.

———. 2005d. *Officer Hill and Amulet Housing, UST 31049-A*, *Approval of Site Closure*. Letter to Jim Brown of NAVFAC NW from Jason Weigle, Alaska DEC. Dated November 23, 2005.

———. 2005e. *Quarter A*, *UST 42200, Approval of Site Closure*. Letter to Jim Brown of NAVFAC NW from Jason Weigle, Alaska DEC. Dated November 23, 2005.

———. 2000. *Risk Assessment Procedures Manual*. June 8, 2000.

EMCON. 1996. *Final Addendum to the Release Investigation Work Plan, Naval Air Facility (NAF) Sites, Adak, Alaska.* Bothell, Washington. June 1996.

———. 1995. *Final Tank Farm A Release Investigation Report, Naval Air Facility Adak, Adak, Alaska.* Prepared for U.S. Navy, Project 0611-002.08(03). Bothell, Washington. April 5, 1995.

Foster Wheeler Environmental Corporation (Foster Wheeler) 1997a. “Recent Landfill Capping at SWMU 67 That Will Be Documented During the Fall and Winter 1997/98.” Unpublished.

———. 1997b. *Source Investigation and Recovery Trench Installation Report, Investigation and Response Action, Yakutat Hobby Complex, Naval Air Facility, Adak, Alaska.* Delivery Order 0073. Prepared for U.S. Navy under Contract No. N44255-93-D-4050. May 1997.

———. 1994 through 1997. *Progress Reports South Runway Remediation Yakutat Interceptor Trench Operation and Maintenance and Power Plant #3 Monitoring Activities, Adak Naval Air Facility*. Delivery Order 0070. Prepared for U.S. Navy under Contract No. N44255-93-D-4050. Poulsbo, Washington. June 1997.

Hertzog, D. 1988. Personal Communication regarding a release at SWMU 15. November 1988.

Ingersoll, C. G., P. S. Haverland, E. L. Brunson, T. J. Canfield, F. J. Dwyer, C. E. Henke, N. E. Kemble, and D. R. Mount. 1996. *Calculation and Evaluation of Sediment Effect Concentrations for the Amphipod Hyalella Azteca and the Midge Chironomus Riparius*. EPA 905-R96-008. September 1996.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. "Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments." *Env. Manage.* 19(1):81-97.

MacDonald, D. D. 1994. *Approach to the Assessment of Sediment Quality of Florida Coastal Waters. Volume 1 - Development and Evaluation of Sediment Quality Assessment Guidelines*, 126 pp. Report prepared for the Florida Department of Environmental Protection, Tallahassee, Florida. November 1994.

Naval Energy and Environmental Support Activity (NEESA). 1986. *Initial Assessment Study of Naval Air Station, Naval Security Group Activity, and Naval Facility, Adak, Alaska.* NEESA 13-103. January 1986.

Quest Environmental (Quest). 1993. *Project Report: Tank #10573 Removal at NSGA, Adak NAS, Alaska (N62474C-3711).* Prepared for Asbestos General, Inc. Anchorage, Alaska.

Science Applications International Corporation (SAIC). 1991. *RCRA Facility Assessment PR/VSI Report, U.S. Naval Complex Adak, Adak Island, Alaska.* Prepared for U.S. EPA Region 10 by SAIC. Bothell, Washington. March 1991.

Shannon & Wilson (S&W). 1994a. *Tank V149A Closure Assessment, Adak Naval Air Station, Adak, Alaska.* Anchorage, Alaska.

———. 1994b. *Tank V149C Closure Assessment, Adak Naval Air Station, Adak, Alaska.* Anchorage, Alaska.

———. 1993. *Tank T27044 Closure Assessment, Adak Naval Air Station, Adak, Alaska.* Anchorage, Alaska. October 1993.

Tetra Tech, Inc. (Tetra Tech). 2006. *Final Closure Report Interim Action Free-Product Recovery, South of Runway 18-36 Area, NMCB Expanded Area, Tanker Shed Area, NORPAC Hill Seep Area, and Yakutat Hangar, Former Naval Air Facility Adak, Adak Island, Alaska*. Prepared for Naval Facilities Engineering Command Northwest under Contract No. N44255-01-D-2000, Poulsbo, Washington. January 2006.

———. 1989. *Draft Site Inspection Report, Naval Air Station Adak, Adak Island, Alaska, Vol. 1, Field Reports.* TC-3603-02. January 1989.

Tryck Nyman Hayes Inc. 1996. *Adak Reuse Plan.* Project ASPS #96-0121. Anchorage, Alaska. August 1996.

URS Greiner, Inc. 1999b. *Draft Free-Product Recovery Closure Report for SWMU 62, New Housing Fuel Leak, Adak Naval Complex, Adak Island, Alaska.* Prepared for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Seattle, Washington. October 19, 1999.

U.S. Environmental Protection Agency (USEPA). 2004a. Drinking Water Standards and Health Advisories. EPA 822-R-04-005. Office of Water. Winter 2004.

———. 2004b. National Recommended Water Quality Criteria. Office of Water. Office of Science and Technology.

———. 2001. *Comprehensive Five-Year Review Guidance.* Office of Emergency and Remedial Response. EPA 540-R-01-007. OSWER No. 9355.7-03B-P. June 2001.

———. 1990. *Federal Facilities Compliance Agreement, In the Matter of: United States Department of the Navy, Naval Air Station Adak.* Docket Number 1090-02-05-6001. Signed by EPA on November 20, 1990. Published as an enclosure to a letter from Charles Findley, USEPA to Captain James Dulin, U.S. Navy.

U.S. Fish and Wildlife Service (USFWS). 1995. *Survey of the Fishery Resources on Adak Island, Alaska Maritime National Wildlife Refuge, 1993 and 1994.* Alaska Fisheries Technical Report No. 29. USFWS, Region 7. January 1995.

U.S. Geological Survey (USGS). 2005. *Monitoring the Natural Attenuation of Petroleum in Ground Water at the Former Naval Complex, Operable Unit A, Adak Island, Alaska, May and June 2003*. Scientific Investigations Report 2005-5002.

U.S. Navy (Navy). 2006a. *Final Annual Groundwater Monitoring Report, September 2005*. Prepared by URS Group, Inc., under Naval Facilities Engineering Command Engineering Field Activity, Northwest Contract No. N44255-02-D-5100, Delivery Order 0008. May 2006.

______. 2006b. *Final Annual Landfill Monitoring Report, September 2005*. Prepared by URS Group, Inc., under Naval Facilities Engineering Command Engineering Field Activity, Northwest Contract No. N44255-02-D-5100, Delivery Order 0008. May 2006.

———. 2005a. *Draft Final Partial Closeout Report.* Prepared by URS Group, Inc., for Naval Facilities Engineering Command Northwest. Poulsbo, Washington. September 2005.

———. 2005b. *Cleanup Report, 19 Sites.* Prepared by URS Group, Inc., for Naval Facilities Engineering Command Northwest. Poulsbo, Washington. September 2005.

———. 2005c. *Comprehensive Monitoring Plan, Revision 2, Operable Unit A, Former Adak Naval Complex, Adak, Alaska*. Prepared by URS Group, Inc., under Naval Facilities Engineering Command Northwest, Contract No. N44255-02-D-2008, Delivery Order 0055. Poulsbo, Washington. July 2005.

———. 2005d. *Annual Landfill Monitoring Report, September 2004*. Prepared by URS Group under Naval Facilities Engineering Command Engineering Field Activity, Northwest Contract No. N44255-02-D-2008, Delivery Order 0048. Poulsbo, Washington. May 16, 2005.

———. 2005e. *Final Institutional Controls Primary Site Inspection Report, Adak Island, Alaska*. Prepared for Engineering Field Activity, Northwest, by Integrated Concepts Research Corporation under Contract No. N44255-00-D-2538, Delivery Order No. 019. Poulsbo, Washington. February 2005.

———. 2005f. *Internal Draft Institutional Controls Primary Site Inspection Report, Adak Island, Alaska*. Prepared for Engineering Field Activity, Northwest by Integrated Concepts Research Corporation under Contract No. N44255-00-D-2538, Delivery Order No. 021. Poulsbo, Washington. October 2005.

———. 2005g. *Final Closure Report Landfill Restoration, White Alice and Roberts Landfills, Adak Island, Alaska Former Naval Air Complex Adak, Alaska*. Prepared for Naval Facilities Engineering Command Northwest by Sealaska Environmental Services and Tetra Tech EC, Inc., under Remedial Action Contract No. N68711-04-D-1104 (FRAC), Task Order 5. Poulsbo, Washington. September 2005.

———. 2005h. *Final Focused Feasibility Study Report, NMCB Building T-1416 Expanded Area, Former Adak Naval Complex, Adak, Alaska.* Prepared by URS Group for Naval Facilities Engineering Command Northwest under Contract No. N44255-02-D-2008, Delivery Order 0037. Poulsbo, Washington. February 2005.

———. 2005i. *Draft Closure Report Interim Action Free-Product Recovery, South of Runway 18-36 Area, NMCB Expanded Area, Tanker Shed Area, NORPAC Hill Seep Area, and Yakutat Hangar, Former Naval Air Facility Adak, Adak Island, Alaska.* Prepared by Tetra Tech EC, Inc., for Naval Facilities Engineering Command Northwest, under RAC Contract No. N44255-01-D-2000. Poulsbo, Washington. November 2005.

———. 2005j. *Draft After Action Report, 2004 Field Season for OU B-1 Sites, Former Naval Air Facility, Adak Island, Adak Alaska*. Prepared by Environmental Chemical Corporation and Foster Wheeler Environmental Corporation for Engineering Field Activity, Northwest. Poulsbo, Washington. January 2005.

———. 2004a. *Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Statutory Five-Year Reviews*. November 2001 (Revised May 2004).

———. 2004b. *Completion Report Shoreline Restoration and Partial Cap Installation, Metals Landfill*. Naval Air Facility Adak Island, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under Contract N44255-98-D-9951/DO #0023. October 2004.

———. 2004c. *Final Institutional Controls Primary Site Inspection Report, Adak Island, Alaska*. Prepared for Engineering Field Activity, Northwest, by Integrated Concepts Research Corporation under Contract No. N44255-00-D-2538, Delivery Order No. 015. Poulsbo, Washington. April 2004.

———. 2004d. *Comprehensive Monitoring Plan, Revision 1, Operable Unit A, Former Adak Naval Complex, Adak, Alaska*. Prepared by URS Group, Inc., under Engineering Field Activity, Northwest Contract No. N44255-02-D-2008, Delivery Order No. 008. Poulsbo, Washington. March 2004

———. 2004e. *Final Annual Groundwater Monitoring Report, October 2003, Operable Unit A, Former Adak Naval Complex, Adak, Alaska.* Prepared by URS Group, Inc., for Engineering Field Activity, Northwest, under Contract No. N44255-02-D-2008, Delivery Order No. 0030. Poulsbo, Washington. August 2004.

———. 2004f. *Final Site Characterization Report, Part 1, Free-Product Recovery Petroleum Sites with Risks Below Target Health Goals, Former Adak Naval Complex, Adak Island Alaska.* Prepared by URS Group, Inc. for Engineering Field Activity, Northwest, under Contract No. N44255-02-D-2008. Poulsbo, Washington. September 2004.

———. 2004g. *Closure Report, South Sweeper Creek*. Naval Facility Adak, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under contract N44255-98-D-9951/DO #0017. Poulsbo, Washington. October 2004.

———. 2004h. *Draft Final Remedial Investigation/Feasibility Study Report for OU B-2 Sites, Former Naval Air Facility, Adak, Alaska.* Prepared by TetraTech FW, Inc. for Engineering Field Activity Northwest under Contract No. N44255-01-D-2000, Task Order 7. Poulsbo, Washington. June 2004.

———. 2003a. *Final Institutional Controls Primary Site Inspection Report, Adak Island, Alaska.* Prepared for Engineering Field Activity, Northwest, by Integrated Concepts Research Corporation under Contract No. N44255-00-D-2538, Delivery Order No. 009. Poulsbo, Washington. March 2003.

———. 2003b. *Remedial Investigation/Feasibility Study Report for OU B-2 Sites*. Prepared by Foster Wheeler Environmental Corporation for Engineering Field Activity Northwest, under Contract No. N44255-01-D-2000, Task Order 7. Poulsbo, Washington. November 2003.

———. 2003c. *Closure Report Cleaning and Closure of Fuel Pipelines, Adak, Alaska.* Prepared by GeoEngineers for Engineering Field Activity, Northwest, under Contract No. N68711-02-D-8306, CTO 0006. Poulsbo, Washington. October 2003.

———. 2003d. *Completion Report, Power Plant 3 Interim Remedial Action*. Naval Air Facility Adak Island, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under Contract N44255-00-D-2475/0021. Poulsbo, Washington. February 2003.

———. 2003e. *Completion Report, Cabin Demolition and Roberts Landfill Closure*. Naval Air Facility Adak Island, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under Contract N44255-00-D-2475/0013 Mod 3. Poulsbo, Washington. January 2003.

———. 2003f. *Final Closure Report, Drum Removal at Finger Bay (FB-03), Remedial Action, Adak, Alaska*. Prepared by Foster Wheeler Corporation for Engineering Field Activity, Northwest, under Contract N44255-01-D-2000/TO 7. Poulsbo, Washington. July 2003.

———. 2003g. *Final Completion Report, Free Product Recovery and Post Recovery Monitoring Activities, May 2002 – November 2002, Adak Island, Alaska.* Prepared by Integrated Concepts and Research Corporation for Engineering Field Activity, Northwest, under Contract No. N44255-00-D-2538. Poulsbo, Washington. May 2003.

———. 2003h. *Final After Action Report, 2002 Field Season for OU B-1 Sites, Former Naval Air Facility, Adak Island, Adak Alaska*. Prepared by Foster Wheeler Environmental Corporation for Engineering Field Activity, Northwest. Poulsbo, Washington. May 2003.

———. 2002a. *Completion Report Final Cap Installation for Roberts Landfill*. Naval Air Facility Adak Island, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under Contract N44255-00-D-2475/DO 0007. Poulsbo, Washington. February 2002.

———. 2002b. *Final After Action Report, 2001 Field Season, Former Naval Air Facility, Adak Island, Adak Alaska*. Prepared by Environmental Chemical Corporation and Foster Wheeler Environmental Corporation for Engineering Field Activity, Northwest. Poulsbo, Washington. March 2002.

———. 2001a. *Draft Annual Groundwater Monitoring Report for Petroleum Release Sites, August 1999 – July 2000, Former Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Greiner, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. April 2001.

———. 2001b. *Final Five-Year Review Report, Former Adak Naval Complex, Adak, Alaska*. Prepared by URS Corporation for Engineering Field Activity, Northwest, under Contract Number N44255-00-D-2476, Delivery Order 0011. Poulsbo, Washington. Signed December 14, 2001.

———. 2001c. *Completion Report Building Demolition, Revision 1, Naval Air Facility, Adak Island, Alaska.* Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest. Poulsbo, Washington. November 2001.

———. 2001d. *Final Remedial Investigation/Feasibility Study Report for OU B-1 Sites, Former Naval Air Facility, Adak Island, Alaska*. Prepared by Environmental Chemical Corporation and Foster Wheeler Environmental Corporation for Engineering Field Activity, Northwest, under Contract No. N62742-99-D-1800/CTO #0002. Poulsbo, Washington. July 2001.

———. 2000a. *Completion Report, Remove Petroleum Contaminated Soil.* Prepared by Bristol Environmental and Engineering Services Corporation for Engineering Field Activity, Northwest, under Small Business Administration Contract No. 1084988079800. Poulsbo, Washington. October 2000.

———. 2000b. *Draft Free-Product Recovery Closure Report, Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Greiner, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. August 2000.

———. 2000c. *Quarterly Free-Product Status Report for October through December 1999, Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Greiner, Inc. for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. April 2000.

———. 2000d. *Completion Report Remedial Action at SWMU 17 (Waste Oil Pond Retention Pond).* Naval Air Facility Adak Island, Alaska. Prepared by Bristol Environmental & Engineering Services Corporation for Engineering Field Activity, Northwest, under Contract N44255-98-D-9551/DO #0017. Poulsbo, Washington. January 2000.

———. 2000e. *Draft Final Preliminary Assessment Report Volume I—Report Text, Selected Areas of Concern in Operable Unit B, Former Naval Air Facility, Adak Island, Adak Alaska, Delivery Order No. 0083*. Prepared by Foster Wheeler Environmental Corporation for Engineering Field Activity, Northwest. Poulsbo, Washington. December 2000.

———. 1999. *Final Site Summary Report for Free-Product Petroleum Sites, Volumes 1 and 2, Adak Naval Complex, Adak, Alaska*. Prepared by URS Consultants for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. March 1999.

———. 1998a. *Final Focused Feasibility Study for Petroleum Sites.* Prepared by URS Greiner, Inc., for U.S. Navy under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. January 1998.

———. 1998b. *Final Closure Report, Petroleum Aesthetic Corrective Action, East Airport Ditch USGA Heating Plant #6, South Runway Area, Naval Facility Adak, Alaska.* Prepared by Bristol Environmental and Engineering Services Corporation for U.S. Navy under Contract N44255-98-D-9951/DO #0004. Poulsbo, Washington. October 1998.

———. 1997a. *Final Remedial Investigation/Feasibility Study Report, Operable Unit A, Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Greiner, Inc. for U.S. Navy CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. September 1997.

———. 1997b. *Draft Kuluk Bay Human Health and Ecological Risk Assessment Report, Operable Unit A, Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Greiner, Inc. for U.S. Navy CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. April 1997.

———. 1997c. *Final Revised Action Memorandum, Site 16A (Soil Stockpile Area Within SWMU 16) and SWMU 67 (White Alice PCB Spill Site)*. Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. March 1997.

———. 1996a. *Final Preliminary Source Evaluation (PSE-2) Guidance Document, Operable Unit A, Naval Air Facility (NAF) Adak, Adak Island, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. July 1996.

———. 1996b. *Final Preliminary Source Evaluation 2 (PSE-2) Report for Batch 2 Sites, Operable Unit A, Adak Naval Complex, Adak Island, Alaska.* 8 vols. Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. July 12, 1996.

———. 1995b. *Final RCRA Certification of Closure Report: RCRA Closure of the Hazardous Waste Storage Facility, Small Drum Storage Area, Metals Landfill Waste Pile, Naval Air Facility Adak, Adak, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. October 1995.

———. 1995a. *Master Shore Station Development Plan, General Development Plan for Adak Island, Conditions as of 30 Jun3 1955.* U.S. Naval Station Adak, Alaska. Department of the Navy, Bureau of Yards and Docks. Y & D Drawing No. 589009. August 15, 1955.

———. 1995c. *Site Assessment Report: Underground Storage Tank GCI 1, GCI Compound, Naval Air Facility Adak, Adak, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. October 1995.

———. 1995d. *Site Assessment Report: Underground Storage Tank (UST) 27089, Steam Plant #4, Naval Air Facility, Adak, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. May 1995.

———. 1995e. *Site Assessment Report: Aboveground Storage Tank (AST) 10333, Naval Air Facility, Adak, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. May 1995.

———. 1995f. *Final Preliminary Source Evaluation 2 (PSE-2) Report for Batch 1 Sites, Operable Unit A, Adak Naval Complex, Adak Island, Alaska.* 3 vols. Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. June 1995.

———. 1995g. *Final Preliminary Source Evaluation (PSE-1) Batch 2 Report, Operable Unit A, Naval Air Facility (NAF) Adak, Adak Island, Alaska.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. November 1995.

———. 1994. *Final Release Investigation Report: Tank Farm B, Tank Farm D, Main Road Pipeline, and Steam Plant 4 USTs, Naval Air Station Adak, Adak Island, Alaska, CTO 81.* Prepared by URS Consultants, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. February 1994.

———. 1992. *Site Inspection, Sites 13, 37, 38, and 39, Naval Air Station (NAS) Adak, Alaska.* Prepared by URS Corporation, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract N62474-89-D-9295. Poulsbo, Washington. February 18, 1992.

———. 1991. *Supplement to Reconnaissance Investigation Report for Naval Air Station Adak, Island, Alaska.* Prepared by URS Consultants for Naval Facilities Engineering Command Under Contract No. N62474-89-C-7074. Poulsbo, Washington. November 1991.

U.S. Navy and Alaska Department of Environmental Conservation (Alaska DEC). 2006. *Final Decision Document NMCB Building Area T-1416 Expanded Area, Former Adak Naval Complex, Adak Island, Alaska.* Prepared by URS Group, Inc., for Naval Facilities Command Northwest under Contract No. N44255-05-D-5100, Delivery Order 0003, March 22, 2006.

———. 2005a. *Final Decision Document for Petroleum Sites with No Unacceptable Risk.* Prepared by URS Group, Inc., for Engineering Field Activity, Northwest, under Contract No. N4255-02-D-2008, Delivery Order 0037. Poulsbo, Washington. May 20, 2005.

———. 2005b. *Final Proposed Plan for South of Runway 18-36 Area, Former Adak Naval Complex, Adak Island, AK.* Prepared by URS Group, Inc., for Engineering Field Activity, Northwest under Contract No. N44255-05-D-5100, Delivery Order 0003. Poulsbo, Washington. December 2005.

———. 2005c. *Final Proposed Plan for SWMU 62, New Housing Fuel Leak Site, Former Adak Naval Complex, Adak Island, AK.* Prepared by URS Group Inc. for Engineering Field Activity, Northwest under Contract No. N44255-05-D-5100, Delivery Order 0003. Poulsbo, Washington. December 2005.

U.S. Navy, U.S. Environmental Protection Agency (USEPA), and Alaska Department of Environmental Conservation (Alaska DEC). 2003. *Adak Naval Air Station, Adak, Alaska, (AK 4170024323) Operable Unit A Record of Decision Amendment No. 1*. Prepared by Naval Facilities Engineering Command, Engineering Field Activity, Northwest. Poulsbo, Washington. Signed October 10, 2003.

———. 2002. Amendment Number 3 to Adak Federal Facility Agreement (FFA). Letter to Elim Yoon of Alaska DEC and Kevin Oates, USEPA from Mark Murphy, U.S. Navy, dated and signed by all parties March 1, 2002. Including as an attachment: Amendment Number 0001 to State-Adak Environmental Restoration Agreement Between United States Navy and Alaska Department of Environmental Conservation.

———. 2001. *Final Record of Decision for Operable Unit B-1, Former Adak Naval Complex, Adak Island, Alaska*. Prepared by Foster Wheeler for Engineering Field Activity, Northwest. Poulsbo, Washington. October 2001.

———. 2000. *Draft Final Record of Decision for Operable Unit A, Former Adak Naval Complex, Adak Island, Alaska*. Prepared by URS Greiner, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. Accepted as final April 2000.

———. 1995. *Record of Decision, Naval Air Facility Adak, Site 11 (Palisades Landfill) and Site 13 (Metals Landfill), Adak Island, Alaska.* Prepared by URS Greiner, Inc., for Engineering Field Activity, Northwest, under CLEAN Contract No. N62474-89-D-9295. Poulsbo, Washington. March 31, 1995.