

1 **FORMER ADAK NAVAL COMPLEX**  
2 **DECLARATION OF THE RECORD OF DECISION, OPERABLE UNIT B-1**  
3

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4 **SITE NAME AND LOCATION**

5 Operable Unit B-1 CERCLIS ID # AK4170024323  
6 Adak Naval Complex  
7 Adak Island, Alaska  
8  
9

10 **STATEMENT OF BASIS AND PURPOSE**

11  
12 This Record of Decision (ROD) presents the selected remedial actions for Operable Unit B-1 (OU B-1) at  
13 the former Adak Naval Complex (NAF Adak or Adak military reservation) on Adak Island, Alaska.  
14 OU B-1 includes 131 ordnance and explosives (OE) or unexploded ordnance (UXO) areas of concern  
15 (AOCs, or sites). A ROD was prepared for OU A in 1999 and signed in 2000, which covered petroleum  
16 sites and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites. An  
17 additional ROD will be prepared for the areas of concern (AOCs) within OU B-2. The ROD for OU B-2  
18 will be the final ROD for the former Adak Naval Complex on Adak Island, Alaska.  
19

20 Naval Air Facility (NAF) Adak was placed on the National Priorities List (NPL) in 1994. For technical and  
21 administrative purposes, Adak was divided into two operable units (OUs), OU A and OU B in 1998. In  
22 general, OU A encompasses the entire military reservation with respect to chemical contamination, while  
23 OU B encompasses the entire military reservation with respect to ordnance contamination. OU B was  
24 further subdivided into OU B-1 and OU B-2 to facilitate expedited transfer of real estate within OU B-1.  
25

26 This decision document presents the Selected Remedy for OU B-1, which was chosen in accordance with  
27 CERCLA (1980) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA); 42  
28 United States Code (USC) Section 9601 et seq.; and, to the extent practicable, the National Oil and  
29 Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative  
30 Record for sites identified within OU B-1.  
31

32 The State of Alaska concurs with the selected remedy.  
33

34 **ASSESSMENT OF THE SITE**

35  
36 The response actions selected in this Record of Decision are necessary to protect public health, welfare or  
37 the environment from actual or threatened releases of hazardous substances into the environment. Such a  
38 release or threat of release may present an imminent and substantial endangerment to public health,  
39 welfare, or the environment.  
40

41 **DESCRIPTION OF THE SELECTED REMEDIES**

42  
43 OU B-1 addresses all of the OE/UXO sites within the former Adak Naval Complex with the exception of  
44 areas in the vicinity of Mt. Moffett and Andrew Lake. OU B-1 includes 131 sites containing OE/UXO  
45 items. OE/UXO educational awareness programs and incorporation of deed notices in property transfer  
46 documents will be implemented throughout the former Adak Naval Complex that will encompass these 131  
47 sites. No Further Action (NOFA) is selected for 104 of the 131 sites. NOFA, as this term is used in this  
48 ROD, includes the continuation of the Adak OE/UXO Awareness Program and the inclusion of a deed  
49 notice pursuant to CERCLA § 120(h)(3)(A)(i) or other suitable information on OE/UXO in the Bureau of  
50 Land Management permanent file concerning the conveyance. OE/UXO clearance to 4 feet below ground  
51 surface (bgs) will be conducted at three of the 27 sites. Ground surface is defined as the interface between  
52 surface vegetation and underlying mineral soil. The remaining 24 sites will undergo final characterization  
53 and clearance to 4 feet bgs, as needed to support future land use. Disposal sites will be cleared to a depth of  
54 4 feet below the lowest depth that OE/UXO is found or to bedrock, whichever is encountered first. Nine  
55 targets in seven of the 24 sites will have soil sampled for explosives-related chemicals and soil removed,  
56 treated, and disposed of, either on site or offsite, as necessary. The major components of the selected  
57 remedies are summarized in the following section.  
58

1 **NO FURTHER ACTION (NOFA)**

2  
3 NOFA is selected for 104 of the OU B-1 sites, based on initial screening efforts by the Adak OU B Project  
4 Team and on evaluations completed as part of the Remedial Investigation/ Feasibility Study (RI/FS)  
5 process. NOFA, as this term is used in this ROD, includes the continuation of the Adak OE/UXO  
6 Awareness Program and the inclusion of a deed notice pursuant to CERCLA § 120(h)(3)(A)(i) or other  
7 suitable information on OE/UXO in the Bureau of Land Management permanent file concerning the  
8 conveyance.  
9

10 The major components of the NOFA Selected Remedy include:

- 11
- 12 • Continue the Adak OE/UXO awareness program for the foreseeable future and evaluate its  
13 continuation as part of the 5-year CERCLA review process. The program applies to the entire  
14 military reservation at Adak. This program is intended to familiarize island residents and visitors  
15 with the history of ordnance use, storage, handling, and disposal on Adak Island; basic  
16 characteristics of OE/UXO items on Adak; and the procedures that should be followed if a  
17 suspected OE/UXO item is encountered.  
18
  - 19 • Provide copies of this ROD and the Finding of Suitability to Transfer (FOST) to the Bureau of  
20 Land Management (BLM) to be maintained as part of the permanent file of conveyance  
21 documentation. This information will summarize the known nature and extent of OE/UXO on  
22 these sites and the depths of clearance actions taken. Reference to these documents and their  
23 availability in the BLM permanent conveyance file will be included in the interim conveyance  
24 executed by BLM.  
25

26 **UXO CLEARANCE TO 4 FEET BELOW GROUND SURFACE**

27  
28 Based on additional field investigation and documentation through the RI/FS process, 3 of the remaining 27  
29 sites (C3-01A, C6-01A, and ML-01A) were recommended for OE/UXO Clearance to 4 feet bgs.  
30

31 The major components of the selected remedy for the C3-01A, C6-01A, and ML-01A sites include:

- 32
- 33 • Remove all metallic debris from the surface that could interfere with geophysical surveys.
  - 34
  - 35 • Geophysically survey sites to find possible OE/UXO.
  - 36
  - 37 • Identify locations to dig for possible OE/UXO (based upon geophysical data).
  - 38
  - 39 • Re-locate and excavate identified targets to 4 feet bgs
  - 40
  - 41 • Dispose of OE/UXO by detonation in place or removal and treatment at a remote location
  - 42
  - 43 • In addition, disposal sites will be cleared to a depth of 4 ft below the lowest depth that OE/UXO  
44 was found or to bedrock – whichever is encountered first.  
45

46 **SITES SELECTED FOR OBSERVATIONAL APPROACH AND PRESUMPTIVE CLEARANCE**  
47 **(OAPC SITES)**

48  
49 The 24 other sites have been identified for final characterization and clearance to 4 feet bgs, as needed to  
50 support future land use. These sites include the following: Combat Range 3 Sites C3-01B, -01C, -01D,  
51 -01E, and C3-04A; Combat Range 8 Sites C8-01, -03 and -05A; Lake Jean Site LJ-01; Mitt Lake Sites  
52 ML-01B, -02A, and -02B; Lake DeMarie Site DM-06A; Finger Bay Sites FB-01 and -04; Blind Cove Site  
53 BC-01; Husky Pass Training Area (HP-01); the Shagak Bay Gun Emplacement (SH-01); the 20-mm, 40-  
54 mm, and 37-mm gun emplacements (GUN-01, -02, and -03); and the Ammo Pier sites, FBAP-02 and  
55 AP-02, and FB-03 (see Section 13). OE/UXO that has been identified at these areas during past  
56 investigations has been removed.  
57

1 The major components of the selected remedy for 15 of the 24 sites noted above are the same as for the 3  
2 sites previously discussed. For these sites, implementing the remedy will first require gathering final  
3 characterization data on the extent of ordnance contamination as part of an observational approach to  
4 executing clearance at the site. However, at 9 sites (FB-01, FB-04, Husky Pass Training Area, the Shagak  
5 Bay Gun Emplacement, 20-mm, 40-mm, and 37-mm gun emplacements, and the two Ammo Pier sites,  
6 FBAP-02 and AP-02, a reconnaissance survey will be performed in addition to these activities. The  
7 purpose of the reconnaissance survey is to better define the area for characterization through visual  
8 inspections and with hand-held geophysical detectors, as needed.

## 9 10 **SITES SELECTED FOR EXPLOSIVE-RELATED CHEMICAL INVESTIGATIONS**

11  
12 Based on field observations during OE/UXO clearance activities (for 9 targets in 7 sites of the 24 OAPC  
13 sites), there is a potential for the presence of explosives-related chemical contamination in soils. The  
14 selected remedy at these sites includes the following:

- 15  
16 • Sample sites where explosives compounds may pose a risk to human receptors and excavate,  
17 containerize, and treat and/or dispose contaminated soils (either on-site or off-site) that exceed cleanup  
18 levels.

## 19 20 **CHANGES TO THE REMEDY SINCE PUBLICATION OF THE PROPOSED PLAN**

21  
22 As a result of changes in site nomenclature since the publication of the Proposed Plan and Final RI/FS, the  
23 identification of new sites, and the inclusion of former OU B-2 sites within OU B-1 to facilitate property  
24 transfer, remedies in addition to those described in the Proposed Plan and above are described in Section  
25 13.

## 26 **NEW SITE JM-01**

27  
28 JM-01 (a suspected burial and detonation site for twenty 105mm mustard rounds) was recently discovered  
29 southeast of Lake Jean. However, there is insufficient information to draw conclusions about the nature and  
30 extent of potential OE and chemical contamination, much less required remedial actions. This site will be  
31 addressed as part of OU B-2 Record of Decision and will be excluded from the parcel of real estate to be  
32 considered in the FOST.

## 33 34 **INSTITUTIONAL CONTROLS**

35  
36 Due to limitations in current technology and site-specific conditions on Adak, it is not possible to entirely  
37 eliminate the potential for encountering OE/UXO. While the selected remedies for OU B-1 sites will allow  
38 residential land use, the need for maintaining the existing ordnance education and awareness program is  
39 recognized by the Navy as a component of the selected remedy for all OU B sites. This institutional  
40 control will provide residents and visitors with information on the past ordnance use, storage, handling, and  
41 disposal practices on Adak as well as necessary procedures to be followed should they encounter OE/UXO  
42 items.

43  
44 The Navy will also provide copies of this ROD and the Finding of Suitability to Transfer (FOST) to the  
45 Bureau of Land Management (BLM) to be maintained as part of the permanent file of conveyance  
46 documentation. This information will summarize the known nature and extent of OE/UXO on these sites  
47 and the depths of clearance actions taken. Reference to these documents and their availability in the BLM  
48 permanent conveyance file will be included in the interim conveyance executed by BLM.

1 **ROD DATA CERTIFICATION CHECKLIST**

2  
3 The following information is included in the Decision Summary section of this ROD. Additional  
4 information can be found in the Administrative Record for OU B-1.

- 5  
6 ✓ Land and groundwater restrictions, if any (Section 6)  
7  
8 ✓ Cleanup levels established for chemicals of concern and the basis for these levels (Sections 7 and  
9 8)  
10  
11 ✓ How source materials constituting principal threats are addressed (Section 11.2)  
12  
13 ✓ Current and reasonably anticipated future land use assumptions (Section 6)  
14  
15 ✓ Potential land and groundwater that would be available at the site as a result of the selected  
16 remedy (Sections 6 and 11)  
17  
18 ✓ Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate;  
19 and the number of years over which the remedy cost estimates are projected (Section 11.3 and  
20 Tables 11-2 through 11-4)  
21  
22 ✓ Decisive factor(s) that led to the selection of the remedy (Section 11.1).

23  
24 Information concerning explosive compound chemicals of concern (COCs) and their respective  
25 concentrations, baseline risks represented by the COCs, and cleanup levels established for COCs and the  
26 basis for the levels, can be found in Sections 5.8 and 8.3 of this document.

27  
28 **STATUTORY DETERMINATIONS**

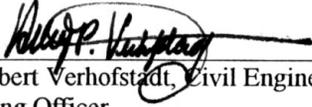
29  
30 The Selected Remedy is protective of human health and the environment and protects the public from  
31 explosive safety hazards, complies with federal and state requirements that are applicable or relevant and  
32 appropriate to the remedial action, is cost-effective, and uses permanent solutions and alternative treatment  
33 technologies to the maximum extent practicable.

34  
35 This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e.,  
36 reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal  
37 element through treatment) by destroying OE/UXO through excavation and detonation. Furthermore, soils  
38 contaminated with explosives-related chemicals will be excavated, treated and disposed of either on-site, or  
39 off-site at a permitted facility. Since there is the potential that OE/UXO contamination may still exist on  
40 Adak Island, the effectiveness of the OE/UXO Educational Awareness Program will be evaluated as part of  
41 the 5-year review process to assure that final remedial actions for OE/UXO on Adak Island remain  
42 protective. In addition, Navy and DoD are responsible for responding to any discovery of ordnance on  
43 Adak and any additional clean up that is required.  
44

1 **RECORD OF DECISION**  
2 **FORMER ADAK NAVAL COMPLEX, ADAK ISLAND, ALASKA**  
3 **OPERABLE UNIT B-1**

4  
5 Signature Sheet for the foregoing Record of Decision for the Operable Unit B-1 final action at Adak Naval  
6 Complex, Adak Island, Alaska, among the United States Navy, the United States Environmental Protection  
7 Agency, and the State of Alaska Department of Environmental Conservation.

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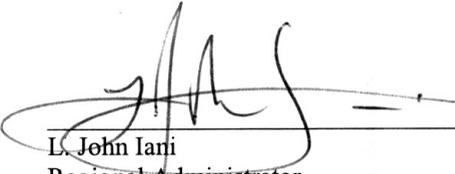
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Captain Albert Verhofstadt, Civil Engineer Corps – USN  
Commanding Officer  
Engineering Field Activity, Northwest

30 NOV 61  
Date

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6 Complex, Adak Island, Alaska, among the United States Navy, the United States Environmental Protection  
7 Agency, and the State of Alaska Department of Environmental Conservation.

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L. John Iani  
Regional Administrator  
Region 10  
U.S. Environmental Protection Agency

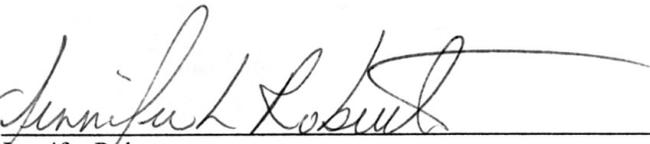
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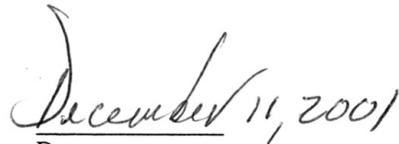
1 **RECORD OF DECISION**  
2 **FORMER ADAK NAVAL COMPLEX, ADAK ISLAND, ALASKA**  
3 **OPERABLE UNIT B-1**

4  
5 The State of Alaska, Department of Environmental Conservation (ADEC) concurs in the selection of the  
6 remedial actions chosen in this Record of Decision.

7  
8 Despite the soundness of the technology choices reflected in this document, ADEC notes that technology  
9 related to ordnance investigation and clearance has advanced rapidly in recent years and may continue to  
10 advance. As new technologies develop, their existence may alter the context in which decisions are made  
11 as to the effectiveness of the remedy to protect human health and the environment. ADEC will expect the  
12 lead agency to take this altered context into account when conducting the reviews required by 42 U.S.C. §  
13 9621(c) and 40 C.F.R. § 300.430(f)(4)(ii). As noted in the letter of Jennifer Roberts to Mark Murphy dated  
14 June 12, 2001, ADEC reserves the right to evaluate technologies available at the time of these reviews to  
15 determine the need for additional work on former ordnance sites if a higher degree of cleanup standard is  
16 warranted. If additional work is determined necessary, that work may include performing additional  
17 investigative activities as well as removal.

18  
19 ADEC concurs with the observation in this document that the State of Alaska presently has no quantitative  
20 legal standards governing cleanup of OE/UXO. This concurrence should not be construed to suggest that  
21 Alaska law does not prohibit the improper release, abandonment, or disposal of OE/UXO. On the contrary,  
22 such OE/UXO is within the statutory definitions of "hazardous waste" and "pollution" in AS 46.03.900,  
23 and must be managed and cleaned up as required for such materials in Title 46 of the Alaska Statutes.  
24  
25  
26  
27  
28  
29

30   
31 Jennifer Roberts  
32 Manager, Contaminated Sites Remediation Program  
33 Division of Spill Prevention and Response  
34 Alaska Department of Environmental Conservation

  
Date

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**ABBREVIATIONS AND ACRONYMS**

1	°F	degrees Fahrenheit
2	A/PIA	Aleutian/Pribilof Islands Association
3	AAC	Alaska Administrative Code
4	ADEC	Alaska Department of Environmental Conservation
5	ADCRA	Alaska Department of Community and Regional Affairs
6	ADNR	Alaska Department of Natural Resources
7	AO	abandoned ordnance
8	AOCs	area of concern
9	AOPC	area of potential concern
10	AP	armor piercing
11	ARAR	applicable or relevant and appropriate requirement
12	ARC	Adak Reuse Corporation
13	ATV	all-terrain vehicle
14	bgs	below ground surface
15	BLM	Bureau of Land Management
16	BRAC	Base Realignment and Closure
17	BTAG	Biological Technical Assistance Group
18	CAD	cartridge actuated device
19	CD	compact disc
20	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
21	CFR	Code of Federal Regulations
22	COC	chemicals of concern
23	Corps	U.S. Army Corps of Engineers
24	CRP	Community Relations Plan
25	CSM	Conceptual Site Model
26	CSO	Caretaker Support Office
27	CWS	Chemical Warfare Service
28	DDESB	Department of Defense Explosives Safety Board
29	DERP-FUDS	Defense Environmental Reuse Program-Formerly Utilized Defense Sites
30	DGPS	differential global positioning system
31	DoD	Department of Defense
32	DQO	data quality objective
33	EBS	environmental baseline survey
34	ECC	Environmental Chemical Corporation, Inc.
35	EFA Northwest	Engineering Field Activity, Northwest
36	EHS	environmental, health, and safety
37	EM	electromagnetic
38	EOD	explosive ordnance disposal
39	EPA	U.S. Environmental Protection Agency
40	ESHA	Explosive Safety Hazard Assessment
41	FFA	Federal Facilities Agreement
42	FFCA	Federal Facilities Compliance Act
43	FOSL	Finding of Suitability to Lease
44	FOST	Finding of Suitability to Transfer
45	FS	Feasibility Study
46	FUDS	Formerly Used Defense Site

**ABBREVIATIONS AND ACRONYMS**

1	FWENC	Foster Wheeler Environmental Corporation
2	GPS	global positioning system
3	GRA	General Response Action
4	HE	high explosive
5	IAS	Initial Assessment Study
6	IR	installation restoration
7	IR <sup>3</sup> M	Interim Range Rule Risk Methodology
8	LRA	Local Reuse Authority
9	m	meter
10	NACIP	Navy Assessment and Control of Installation Pollutants
11	NAF Adak	Naval Air Facility Adak
12	NAS	Naval Air Station
13	National Register	National Register of Historic Places
14	NAVFAC	Naval facility
15	NAVSEA	Naval Sea Systems Command
16	Navy	U.S. Navy
17	NCDC	National Climatic Data Center
18	NCP	National Contingency Plan
19	NEESA	Naval Energy and Environmental Support Activity
20	NEHC	Navy Environmental Health Center
21	NOAA	National Oceanic and Atmospheric Administration
22	NOFA	no further action
23	NPL	National Priorities List
24	NSGA	Naval Security Group Activity
25	O&M	operation and maintenance
26	OAPC	observational approach and presumptive clearance
27	OB/OD	open burn/open detonation
28	OE	ordnance and explosives
29	OSHA	Occupational Safety and Health Administration
30	OU A	Operable Unit A
31	OU B	Operable Unit B
32	OU B-1	Operable Unit B-1
33	OU B-2	Operable Unit B-2
34	OUs	Operable Units
35	PA	preliminary assessment
36	PD	point detonating
37	PPE	personal protective equipment
38	PRG	preliminary remedial goal
39	Proj	projectile (or Projo)
40	PSE	preliminary source evaluation
41	PT	project team
42	QC	quality control
43	QCP	Quality Control Plan
44	RAB	Restoration Advisory Board
45	RAO	remedial action objective
46	RBSC	risk-based screening concentration

**ABBREVIATIONS AND ACRONYMS**

1	RCRA	Resource Conservation and Recovery Act
2	RD/RA	remedial design/remedial action
3	RDX	Cyclonite or Cyclotrimethylenetrinitramine
4	RI	remedial investigation
5	RI/FS	remedial investigation/feasibility study
6	ROD	Record of Decision
7	SA	source area
8	SAERA	State Adak Environmental Restoration Agreement
9	SHPO	State Historic Preservation Officer
10	SI	site investigation
11	SOP	standard operating procedure
12	SSPORTS	Superintendent of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia
13	SWMU	solid waste management unit
14	TAC	The Aleut Corporation
15	TAPP	Technical Assistance Public Participation
16	TBC	To Be Considered
17	TBD	To Be Determined
18	Tetryl	Trinitrophenylmethylnitramine
19	TNT	Trinitrotoluene
20	TSI	TAC Services Incorporated
21	USATCES	United States Army Technical Center for Explosives Safety
22	USC	United States Code
23	USFWS	U.S. Fish and Wildlife Service
24	USGS	U.S. Geological Survey
25	U/W	underwater
26	UXO	unexploded ordnance
27	VDS	Validation of Detection Systems
28	WWII	World War II
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**RECORD OF DECISION  
DECISION SUMMARY**

**FORMER ADAK NAVAL COMPLEX  
OPERABLE UNIT B-1**

**1.0 SITE NAME, LOCATION, AND DESCRIPTION**

Adak Island is located approximately 1,200 air miles southwest of Anchorage, Alaska, in the Aleutian Island chain (Figure 1-1, figures and tables follow the section in which they are cited). Its geographic position is 176°45' W longitude and 51°45'N latitude. With an area of 280 square miles, it is the largest of the Andreanof group of the Aleutian Islands.

The former U.S. Naval Complex occupied 76,800 acres on the northern portion of the island and closed operationally on March 31, 1997. The U.S. Fish and Wildlife Service (USFWS) manages the southern portion (117,265 acres) of the island, which is a designated wilderness area within the Alaska Maritime National Wildlife Refuge system.

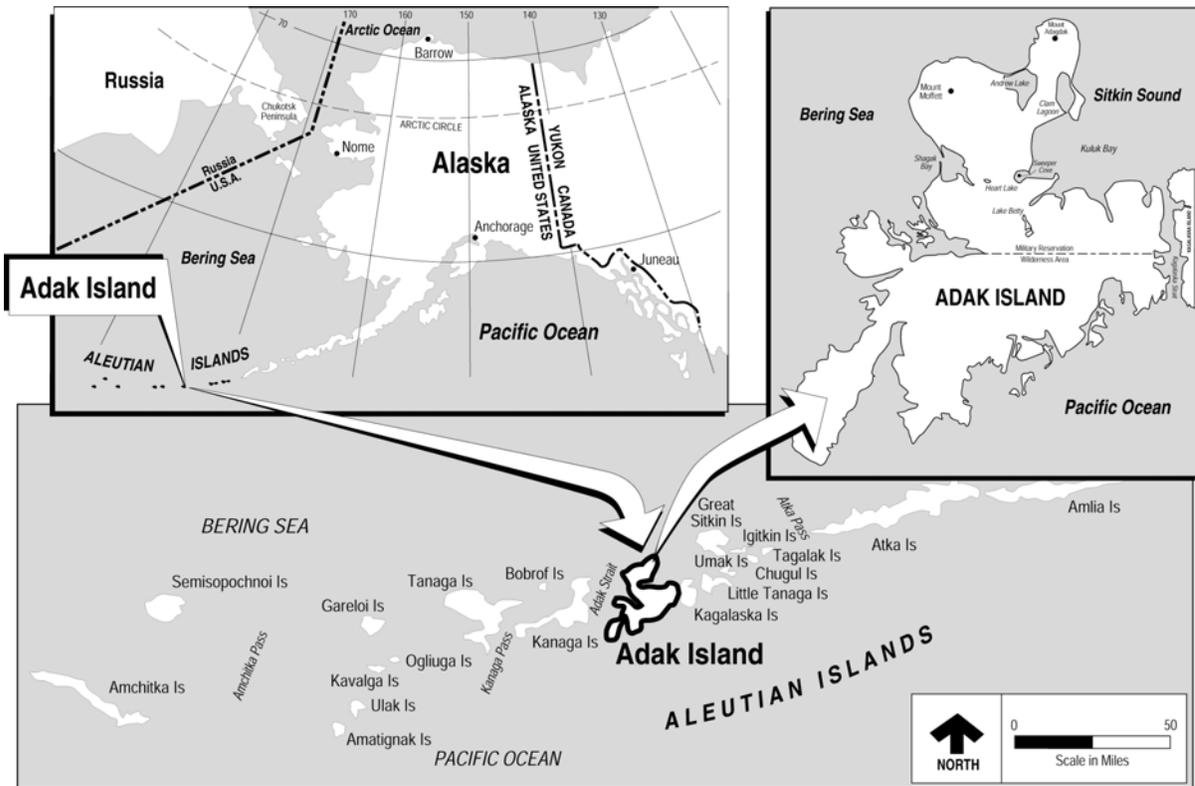
The development of Adak is limited to the northern portion of the island. The Adak Naval Complex had two main developed areas: Naval Air Facility (NAF) Adak and Naval Security Group Activity (NSGA). Land uses at NAF Adak, located in the developed “downtown” area, include the airfield; port facilities; and light industrial, administrative, commercial/recreational, and residential areas. NSGA is located approximately 5 miles north of NAF Adak, at the northwestern corner of Clam Lagoon. NSGA ceased all operations in 1995. The structures and road system remain, but the area is not inhabited.

Three steep, highly weathered volcanic peaks dominate the topography of Adak Island. These peaks are cut with deep valleys resulting from erosion by streams that also provide runoff to the coastal areas. Deltaic and tidal lagoon areas are found near the coastline in some portions of the island; however, steep rocky slopes or cliffs characterize most of the coastline. The terrain surrounding the former naval facility at Adak Island includes steep ridges, deep ravines, rolling hills, and some flatlands.

The tundra vegetation on Adak consists of grasses, lichens, mosses, and other species adapted to the wet, cold, and windy polar climate. Tundra tussocks referred to as “haystacks” are one of the most predominant features and are often interspersed with hollows or holes in the ground under the vegetation. Low-growing tundra is often thick and spongy, making access difficult, even on level terrain.

Adak Island has a polar maritime climate characterized by persistent overcast skies, high winds, frequent and often violent storms, and a narrow range of temperature fluctuation throughout the year. The mean annual temperature is 40° F, the average annual rainfall is 47 inches, and the average annual snowfall is 71 inches. The average wind speed is 15 mph. Weather on the island can be varied and localized with fog, low ceilings, precipitation, and clear weather experienced at the same time, separated by a distance of only a few miles.

1 **Figure 1-1 Location Map, Adak Island, Alaska**  
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1                                   **2.0     SITE HISTORY AND ENFORCEMENT ACTIVITIES**

2   **2.1     SITE HISTORY**

3   In recorded history, indigenous people known as the Aleuts (Alaska Natives having a common heritage and  
4   sharing common interests) frequented Adak Island. The site of the NAS was actually an active seasonal  
5   hunting/fishing camp used by Aleuts from other villages. The first recorded visit by non-natives to Adak  
6   Island was September 9, 1741, by Captain Alexi Chirof aboard the Russian vessel St. Paul. It was  
7   estimated that over 20,000 Aleuts once lived in hundreds of small villages scattered throughout the  
8   Aleutian Islands.

9   In 1913, President Taft, by Executive Order, designated Adak Island as part of the Aleutian Islands  
10  National Wildlife Refuge (renamed the Alaska Maritime National Wildlife Refuge in 1980). It is currently  
11  included within the Alaska Maritime National Wildlife Refuge managed by the USFWS. The island was  
12  unoccupied in 1942 when the U.S. Army established a military presence on the island to take offensive  
13  action against Japanese forces occupying Attu and Kiska Islands. The World War II (WWII) military  
14  forces at Adak (both on island and in support ships) numbered approximately 100,000 troops. After WWII,  
15  the military installation was transferred to the U.S. Air Force and in 1950 became a naval complex. On  
16  August 19, 1959, Public Land Order No. 1949 withdrew the northern portion of Adak Island  
17  (approximately 76,800 acres) for use by the Navy for military purposes. By the early 1990s, the military  
18  facility at Adak Island included approximately 6,000 military personnel, civilian federal employees, and  
19  civilian support contractors.

20  The military reservation uses included airfields, port facilities, warehouses, housing areas, schools, chapels,  
21  dining facilities, medical clinics, recreational facilities, landfills, vehicle and aircraft maintenance and  
22  repair sites, fuel facilities, military and non-military firing ranges, and ammunition and ordnance storage  
23  and disposal sites.

24  Naval Air Facility, Adak, was placed on the 1995 base closure list under the Base Realignment and Closure  
25  Act (BRAC). The BRAC recommendation became final when Congress did not disapprove the list. The  
26  active Navy mission ceased and the base operationally closed on March 31, 1997. From April 1997  
27  through September 2000, the Navy continued to operate critical facilities such as the power plant, airfield,  
28  and other utilities and services in support of environmental cleanup activities through a caretaker contract.  
29  In June 1998, the Navy entered into a lease with the Adak Reuse Corporation (ARC), which is the  
30  designated local redevelopment authority, which authorized ARC to use or sublease property in the  
31  developed core of the military reservation for commercial reuse purposes. In October 2000, ARC  
32  commenced operation of community facilities, such as the airfield and utility systems. A land transfer  
33  agreement among the Navy, Department of Interior, and The Aleut Corporation (TAC) was signed in  
34  September 2000. This agreement sets forth terms and conditions for an eventual land exchange under  
35  which TAC will obtain title to approximately 47,000 acres of the former military reservation, including all  
36  of the downtown area, housing units, and industrial facilities. Special legislation by Congress is needed to  
37  execute this exchange. Congress is expected to introduce and enact this legislation in 2001. Based on the  
38  latest reuse plan for Adak (ASCG, 2000), the anticipated future land uses are expected to be generally  
39  similar to current land uses.

40   **2.2     HISTORY OF SITE INVESTIGATIONS, REMOVALS, AND REMEDIAL ACTIONS**  
41   **CONDUCTED UNDER CERCLA OR OTHER AUTHORITIES**

42  Navy investigation of environmental problems associated with past military practices began in 1986 with  
43  oversight from EPA Region 10 (EPA) and the State of Alaska Department of Environmental Conservation  
44  (ADEC) (NEESA 1986). During years of active military activity at Adak, numerous OE/UXO items were  
45  discovered during normal activity, and were removed and disposed of in accordance with military  
46  requirements at the time. It is estimated, based on Explosive Ordnance Disposal (EOD) Detachment

1 records that over 75,000 individual OE/UXO items were recovered between 1942 and 1996, the majority of  
2 them small arms ammunition.

3 Based on these records and historical archive information, the Navy began an OE/UXO investigation,  
4 removal and disposal program in 1996 to meet the requirements of the Department of Defense Explosives  
5 Safety Board (DDESB), the EPA, and ADEC to take all necessary actions to protect human health and the  
6 environment and make the real estate suitable for transfer to TAC for the reasonably expected future land  
7 use. A complete listing of OE/UXO investigations is presented in the Remedial Investigation/Feasibility  
8 Study (RI/FS) Report for OU B (ECC, 2001).

9 In July 1999, under the provisions of the existing Federal Facilities Agreement (FFA) for the cleanup of the  
10 former Navy base at Adak Island and in order to address issues of concern, the Navy, EPA, and the State of  
11 Alaska formed an OU B Project Team. The OU B Project Team, which also includes membership by  
12 USFWS, TAC, the Aleutian/Pribilof Islands Association (A/PIA) and Adak community members was  
13 tasked with developing a plan for investigating sites with potential UXO contamination that addressed the  
14 concerns of regulatory agencies as well as community members and TAC, the future landowner. This plan  
15 is formally referred to as the RI/FS Work Plan for OU B. Since its formation in July of 1999, the OU B  
16 Project Team worked closely to resolve complex technical issues related to completing the RI/FS Work  
17 Plan. The project team generally met on a monthly basis with regular teleconferences and e-mail  
18 communication among members of the team.

### 19 **2.3 HISTORY OF ENFORCEMENT ACTIONS**

20 In October 1992, NAF Adak was proposed for addition to the National Priorities List under CERCLA and  
21 as finalized on the list in May 1994. In September 1993, the Navy, EPA, and ADEC signed the Adak FFA  
22 to conduct RI/FS and remedial design/remedial action (RD/RA) activities for chemical and petroleum sites.  
23 These sites are addressed as OU A. In early 1998, the FFA was amended to include ordnance sites and  
24 OU B was created. In June 1999, EPA and ADEC initiated formal dispute proceedings with the Navy over  
25 proposed methods for the investigation and evaluation of OE/UXO sites on Adak. That dispute was  
26 resolved through the efforts of the OU B Project Team and the approval of the OU B RI/FS Work Plan in  
27 December 2000. To expedite the property transfer under the BRAC program, the Navy recommended  
28 dividing OU B into OU B-1 and OU B-2. OU B-1 is the portion of the military reservation that contains  
29 the core of the proposed reuse area.



1 In the spring of 1999, the RAB received a grant from the Navy and was able to obtain a technical advisor  
 2 (Dr. Ron Scrudato) under a Technical Assistance Public Participation (TAPP) grant to review documents  
 3 and provide technical support. This grant was renewed in the summer of 2001.

4 Since the OU B Project Team was formed, RAB meetings have been held on the following dates:  
 5

1999	2000	2001
January 13	January 26	February 21 (Informal)
March 10	March 8	March 21
May 12	April 15	April 23 (Informal)
June 9	June 28	May 30
July 14	August 23	July 18 (Informal)
August 18	September 27	August 22
September 15	November 15	October 17
October 20		
November 17		

6 **3.4 OU B PROJECT TEAM ACTIVITIES**

7 Starting in July 1999, the OU B Project Team began to develop a process to characterize and prioritize  
 8 cleanup of ordnance materials on Adak. The Project Team is composed of representatives from:  
 9

- 10 • The U.S. Navy
- 11 • U.S. Environmental Protection Agency (EPA)
- 12 • Alaska Department of Environmental Conservation (ADEC)
- 13 • U.S. Fish and Wildlife Service (USFWS)
- 14 • The Aleut Corporation (TAC)
- 15 • Aleutian/Pribilof Islands Association (A/PIA)
- 16 • Observing member of the Community of Adak

17 The entire Project Team met formally on a monthly basis and as subcommittees (on an as-needed basis).  
 18 Meetings were held from inception of the Project Team through 2001 :  
 19

1999	2000	2001
August 11-12	January 24-26	March 21
August 18-19	March 1-2	May 31
September 13-16	May 1	June 18-19
October 14-15	May 17-19	August 22
November 18-19	June 1-2	October 29-30
December 21-22	June 26-29	
	July 26-27	
	August 21-24	
	November 14-15	
	December 19	

20 **3.5 MAILING LIST**

21 The Navy maintains and regularly updates two mailing lists: a RAB-members' list and a general mailing  
 22 list. Approximately 40 names are on the RAB-members list. More than 225 names are on the general  
 23 mailing list, which includes individuals, environmental organizations, businesses, and agencies. Both lists  
 24 are published in the current CRP. The list is updated regularly as additional individuals request information  
 25 and/or involvement.

1     **3.6     FACT SHEETS AND NEWSLETTERS**

2     Since September 1999, 11 newsletters have been distributed. Since September 1999, a joint Navy, EPA,  
3     ADEC newsletter (called Adak Update), or a fact sheet from the Navy has been published (U.S. Navy, et. al  
4     1999-2001). The newsletter is distributed to the individuals and groups on the general mailing list, as  
5     outlined in the revised CRP. Additional copies of the newsletter and fact sheets are sent to the information  
6     repository on Adak and to the Adakupdate.com web-site.

7     **3.7     OPEN HOUSES**

8     In addition to formal community briefings and RAB meetings, a series of open houses have been held on  
9     Adak and in Anchorage. These open houses allow for project managers and project team members from  
10    the Navy, EPA, and ADEC to be available on a one-on-one basis to answer questions from the public and  
11    to address concerns. These open houses first started in July 1993 and have been held in May 1994;  
12    February 1998; September 1999; and January, April, and June 2000. A meeting with the community was  
13    held by the RAB in late September 1999. In addition, an open house was held in conjunction with the  
14    November 1999 RAB meeting in Anchorage.

15    **3.8     HOT LINES**

16    To support the local reuse authority and the RAB, the Navy established a toll-free hot line in December  
17    1995. RAB members and citizens interested in reuse or environmental restoration of Adak are encouraged  
18    to call 1-800-360-1561 and to leave a message regarding their questions or concerns. Messages are  
19    retrieved daily and responded to as soon as possible, generally within 3 days.

20    **3.9     PUBLIC COMMENT**

21    Public comments regarding OU B-1 also are solicited through informal avenues such as hot lines, open  
22    houses, and RAB meetings, via the Internet, through formal public comment periods, and at public  
23    meetings held for the OU B-1 Proposed Plan.

24    The Navy, EPA, and ADEC respond to public comment in a variety of ways. During a RAB meeting in  
25    August of 2000, RAB members and public participants participated in the development of existing and  
26    future land use areas by reviewing existing land use maps and making recommendations. The reuse maps  
27    were revised in September 2000 to reflect the input of the stakeholders, RAB members, and the public.  
28    These maps are included in the OU B-1 RI/FS Report (ECC, 2001).

29    Ordnance materials constitute a primary concern for many community members. In response to these  
30    concerns, the Navy conducted ordnance materials surveys and extensive intrusive sampling in the  
31    downtown area. The Navy completed clearance of the Solid Waste Management Unit (SWMU) 2  
32    minefield in the fall of 1998. The updated community relations and stakeholder involvement plan was  
33    specifically designed to address community concerns relative to ordnance issues under OU B.

34    The Proposed Plan for OU B-1 was distributed to the public on May 14, 2001 with a one-month public  
35    comment period (U.S. Navy, 2001). Comments from public meetings held on Adak Island on May 29,  
36    2001 and in Anchorage on May 31, 2001, are summarized in the attached Responsiveness Summary  
37    (Appendix A).

38    **3.10    STAKEHOLDER RELATIONS**

39    As part of the updated CRP, a comprehensive stakeholder relations program has been implemented. A  
40    “stakeholder” is defined as anyone with an economic, social, political, or personal interest in an issue. A  
41    wide range of stakeholders are involved and interested in the clean up effort and transfer of Naval Air  
42    Facility Adak including government agencies, the community of Adak, Native groups, residents of the

1 greater Aleutian Islands, the Alaska State Legislature, and citizens throughout the state. The goal of the  
2 CRP is to create a forum that allows the voice of interested individuals to be considered in decision-  
3 making. The stakeholder communications agenda identifies the ideas, concerns, values, principles,  
4 motivations, and plans of all interest groups involved. The stakeholder relations program currently in place  
5 serves to identify and reconcile conflicting information, and perceptions of stakeholders. It further seeks to  
6 assist the public in understanding the selected technical solutions under development by providing the  
7 public additional opportunities for input and an avenue for responding to proposed solutions. Numerous  
8 one-on-one stakeholder meetings were conducted both in person and via telephone since August 1999. In  
9 addition, the Navy stakeholders relations' specialist conducted on-island visits in November 1999, April  
10 2000, July 2000, and May 2001 to solicit community input, suggestions, and concerns.

11 In addition, the stakeholder relation program provides an opportunity for stakeholders to identify concerns  
12 related to proposed environmental investigation and cleanup approaches on Adak. These concerns are  
13 considered by the Navy and regulatory agencies as they develop and finalize decisions on required  
14 environmental cleanup.

### 15 **3.10.1 Stakeholder Identification**

16 The following is a partial list of stakeholders involved or interested in the clean up and transfers of Naval  
17 Air Facility Adak.

#### 18 **Federal Agencies**

- 19 • U.S. Department of the Navy
- 20 • U.S. Army Corps of Engineers, Alaska District (Corps)
- 21 • U.S. Department of the Interior, U.S. Fish and Wildlife Service
- 22 • Department of Transportation, U.S. Coast Guard
- 23 • U.S. Environmental Protection Agency
- 24 • Department of Defense Explosives Safety Board
- 25 • United States Geological Survey

#### 26 **State Agencies**

- 27 • Alaska State Legislature
- 28 • Department of Environmental Conservation
- 29 • Department of Natural Resources
- 30 • Office of Governor
- 31 • Division of Governmental Coordination
- 32 • Department of Community and Economic Development
- 33 • Department of Public Safety

#### 34 **Local Government Agencies**

- 35 • City of Adak
- 36 • Attu Community Council, School District Superintendent
- 37 • City of Dutch Harbor
- 38 • City of Atka
- 39 • Aleutian Region School District

#### 40 **Organizations and Individuals**

- 41 • Adak Reuse Corporation (ARC)
- 42 • Aleutian/Pribilof Islands Association (A/PIA)
- 43 • United Aleut Nation
- 44 • Alaska Federation of Natives
- 45 • Aleutian Village Corporations
- 46 • Glen Reed, Fishery Industry representative

- 1 • Environmental Groups
- 2 • Adak Restoration Advisory Board
- 3

4 **Business Entities**

- 5 • Aleut Enterprise Corporation
- 6 • Peninsula Airways (PenAir)
- 7 • TAC Services Incorporated (TSI)
- 8 • Evergreen International Airlines, Inc.
- 9 • The Aleut Corporation (TAC)
- 10 • Construction Companies
- 11 • Norquest Fisheries
- 12 • Adak Seafoods
- 13

14 **Media**

- 15 • Alaskan media outlets

16 Although the list is not inclusive, it identifies many of the participants from whom information and  
17 involvement is being sought and to which follow-up stakeholder visits/telephone calls are being conducted.  
18 In addition, these stakeholders are part of the ongoing efforts to keep the general public informed about  
19 Adak issues.

20 **3.11 WEB SITE**

21 A project web site [www.adakupdate.com](http://www.adakupdate.com) is currently on line. The site is easily accessible through common  
22 Internet search engines. Information is added and updated on a regular basis.

23 The site contains all project newsletters, all presentation materials prepared for the RAB, fact sheets and  
24 news releases. Links to appropriate technical documents are provided. Information on RAB meetings,  
25 public meetings and open houses, and links to state and federal agency sites are also provided. The web  
26 site also provides an interactive opportunity by enabling stakeholders and the public to e-mail their  
27 questions and comments.

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#### 4.0 SCOPE AND ROLE OF OPERABLE UNIT B-1

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Adak consists of two operable units: OU A and OU B. OU A includes CERCLA and petroleum sites. OU B deals exclusively with OE/UXO sites. The Navy signed the Record of Decision for OU A in October 1999, the EPA in March 2000, and the State of Alaska in April 2000. Copies of the OU A ROD are available at the Adak Administrative Record and Information Repository locations listed in Section 3.3 of this document.

7

Under the terms of a land transfer agreement finalized in September 2000, Navy will relinquish approximately 47,000 acres to Department of Interior, which will convey these lands to TAC for private sector reuse in exchange for other lands in the Aleutian Islands that will be managed by USFWS (U.S. Navy, et. al, 2000). To identify lands that are environmentally suitable for transfer as quickly as possible, the Navy recommended that OU B be divided into OU B-1 and OU B-2 (see Figure 4-1).

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The OU B Project Team identified a group of 131 sites that includes all identified areas of concern (AOCs) within the military reservation, lying outside of the Mt. Moffett/Andrew Lake area (Table 4-1), where the RI work was completed during the 2000 field season. This group of 131 sites is collectively known as OU B-1.

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This group of sites also includes many potential AOCs that met the criteria for NOFA during the preliminary assessment conducted in 1999 and several land areas that were never associated in the historical record with any ordnance-related activities. The results of the RI/FS at OU B-1 sites are presented in this ROD. Sites not included in this group (OU B-2 sites) will undergo remaining RI/FS work. The results of investigation in those areas will be reported in a separate RI/FS Report for OU B-2.

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#### 4.1 PLANNED SEQUENCE OF ACTIVITY

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Upon completion of the OU B-1 ROD, clearance actions will be taken for all sites recommended for remediation. Remedial actions selected in this ROD will be implemented by the Navy, as the lead agency, with oversight and verification by EPA Region 10 and ADEC. Specific language will be incorporated into the property conveyance documents to help maintain an active OE/UXO education program for future residents and visitors to Adak Island. This will also include information on the nature and extent of OE/UXO on Adak and depth of clearance activities. Five-year review and follow-on inspection and maintenance will be performed as required. The remainder of OU B will be addressed in a separate ROD covering OU B-2.

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To enable the conveyance of property to TAC as set forth in the land exchange agreement, the Department of the Navy will complete a finding of suitability to transfer (FOST). The FOST documents compliance with CERCLA 120(h)(3) concerning environmental suitability of federal property for conveyance to a non-federal party, and sets forth any land use restrictions. In addition, when addressing OE/UXO sites, the site-specific guidelines of Department of Defense (DoD) Instruction 6055.9-STD promulgated by the DDESB must be met with regards to clearance depths for future land uses and land transfer requirements. DDESB/NOSSA concurrence will be obtained for the ordnance safety aspects of the FOST.

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#### 4.2 SCOPE OF OE/UXO PROBLEMS AND APPROACH

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Throughout Adak's history as a military facility, ordnance or munitions were present for various purposes related to the military's mission on island, such as for use, storage, transloading, or disposal at the military reservation. One of the first priorities for evaluation of OE/UXO issues on Adak was obtaining reliable historical information that could focus investigation efforts in areas known or suspected to contain OE/UXO. This information was obtained through an archive search of military records for the island in combination with a review of ordnance-related records remaining at the site. The sites identified by this archive search process were called Areas of Potential Concern (AOPCs). A total of 192 sites (131 in OU

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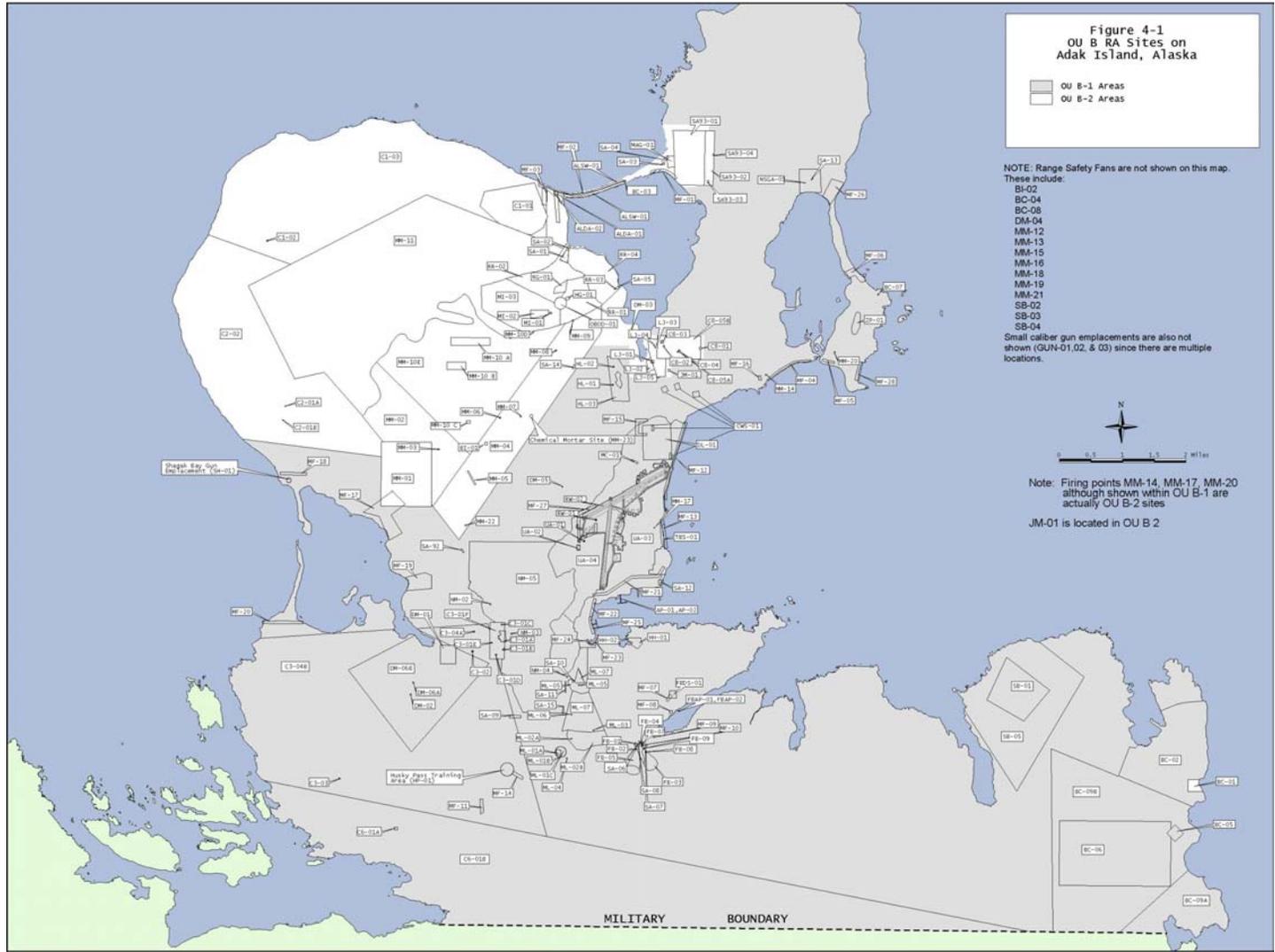
1 B-1 and 61 in OU B-2) were identified (Figure 4-2). These include four new sites (Husky Pass Training  
2 Area, Shagak Bay Gun Emplacement, and the Chemical Mortar Site within MM-04) which were not  
3 included in the RI/FS. Six other sites south of the military reservation are to be addressed by the Defense  
4 Environmental Restoration Program (DERP)/Formerly Used Defense Sites (FUDS) administered by the  
5 Corps. These six sites will not be evaluated in OU B, nor will the RODs for OU B dictate actions at these  
6 sites.

7 An initial screening was developed as part of an overall hazard assessment methodology developed for  
8 OU B to eliminate sites that had little or no likelihood of OE/UXO concerns. This hazard assessment  
9 methodology is an Adak-specific process developed as part of an overall framework for assessing and  
10 managing potential threats to human health and the environment. These potential threats include explosive  
11 safety hazards due to the presence of unexploded ordnance and the potential release of hazardous chemical  
12 substances related to that ordnance. Risks associated with releases from ordnance-related chemical  
13 substances are addressed through the chemical sampling and risk analysis methods developed under OU A  
14 (URS 1995ab) and updated for current toxicity screening values for explosives-related chemicals.

15 Sites identified during the preliminary assessment screening as having little or no likelihood of OE/UXO  
16 concern were recommended for the Adak NOFA (No Further Action/Institutional Controls) alternative.  
17 Sixty sites were referred to the RI/FS. During the RI/FS, site information was assessed for explosive  
18 hazard through a CERCLA-like risk evaluation process. This Adak-specific Explosives Safety Hazards  
19 Analysis (ESHA) model was developed by the OU B Project Team to evaluate explosive safety hazards to  
20 human health based on RI data. Of the 44 sites evaluated under the ESHA process, 41 of the sites were  
21 recommended for the Adak NOFA Alternative, and three were evaluated through the CERCLA FS process  
22 and recommended for clearance action to a depth of four feet bgs. One of the "A" sites (BC-01) was  
23 subsequently removed from ESHA.  
24

1  
2

**Figure 4-1** OU B RA Sites on Adak Island, Alaska

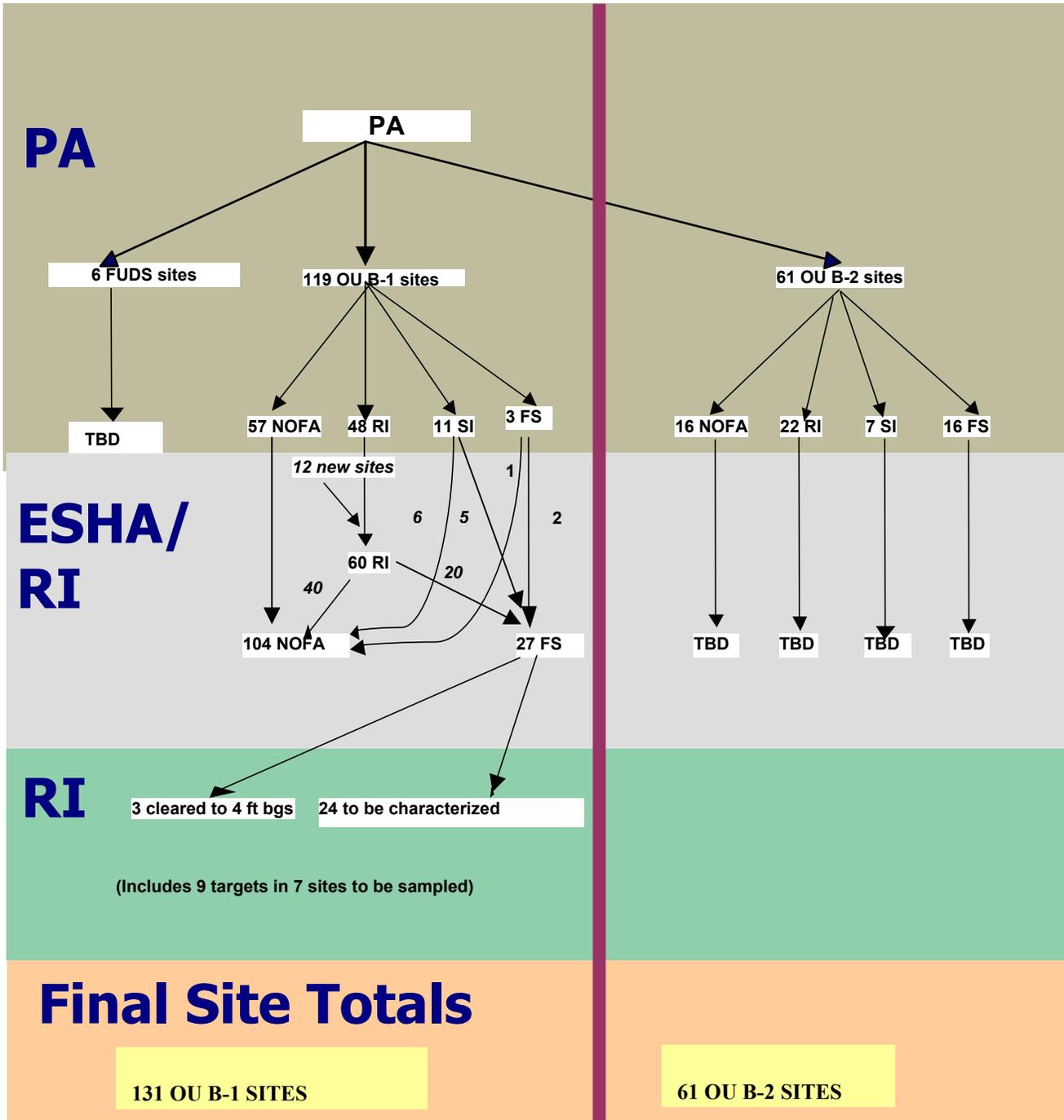


3

1 **Figure 4-2 Summary of OU B-1 and OU B-2 Site Evaluations**

2

3



**Table 4-1  
Adak OE/UXO Sites in OU B-1**

1

Candidate Site Name	Site Identifier/Name	Preliminary Assessment		
		NOFA	RI/ Inspect	FS
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 #3	C3-01 (C3-01A, C3-01B, C3-01C, C3-01D, C3-01E), C3-04 (C3-04A)		(see note)	
	C3-01 (C3-01F), C3-02, C3-03, C3-04 (C3-04B)		√	
Combat Range #6	C6-01 (C6-01A)		(see note)	
	C6-01B		√	
Combat Range #8	C8-01, C8-02, C8-03, C8-04, C8-05 (C8-05B)		√	
	C8-05 (C8-05A)		(see note)	
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 (see note), FB-06, FB-07, FB-08, FB-09		√	
Gun Emplacements	GUN-01, GUN-02, GUN-03		√	
Gun Emplacement	Shagak Bay			√
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)	
Lake Jean Ammunition Complex	LJ-01, LJ-02, LJ-03, LJ-04		√	
	LJ-05	√		
MAUW Complex	MC-01	√		
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)			√
Husky Pass	a.k.a. Husky Pass Training			√
Mitt Lake Impact Area	ML-01 (ML-01A, ML-01B), ML-02 (ML-02A)		(see note)	
	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)	√		
Urban Area	UA-01, UA-02		√	
	UA-03, UA-04	√		
WWII Ammunition Pier (Sweeper Cove)	AP-01	√		
	AP-02		√	

**Table 4-1 (continued)  
Adak OE/UXO Sites in OU B-1**

Candidate Site Name	Site Identifier/Name	Preliminary Assessment		
		NOFA	RI/ Inspect	FS
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		√	

1

2 Notes:

3 Twelve sites [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  
4 (DM-06A); ML-01 (ML-01A, ML-01B); and ML-02 (ML-02A)] did not undergo Preliminary Assessment but were evaluated in the  
5 RI.

6

7 FB-03 was transferred from NOFA to Final Characterization based on the discovery of additional archival information following  
8 completion of the Proposed Plan (See Section 13).



- 1 • The Adak World War II Cultural Landscape Historic District (eligible for the National Register but not  
2 formally listed).

### 3 **5.1.3.2 Cold War-Era Resources**

4 The White Alice Site, a Cold War-era communications site, was listed in the National Register as part of  
5 the White Alice System; however, all antennas and structures have since been removed. The State Historic  
6 Preservation Office (SHPO) has determined that the site is not individually significant and no additional  
7 consultation is necessary.

### 8 **5.1.3.3 Archaeological Resources**

9 Previous surveys have identified 37 prehistoric archaeological sites and locations of potential sites within  
10 the boundaries of the Adak military reservation. The sites are mainly house foundations and middens  
11 containing shell, sea urchin, bone, and artificial detritus. Some of these sites were damaged by various  
12 military actions on the island. Nine sites were formally assessed for a determination of eligibility for the  
13 National Register, and eight of those nine were determined to meet eligibility criteria. As a resource  
14 protection measure, the exact location of these sites will not be publicized, but will be kept by the Alaska  
15 Department of Natural Resources (ADNR) Division of Parks and Recreation. A burial was found at one  
16 site, and others might contain them. There may also be some burials on islands off the west shore.

## 17 **5.2 ARCHIVE INFORMATION**

18 Throughout Adak's military history, ordnance items were managed and handled as part of the active duty  
19 military requirements of the stationed organizations and frequently discovered in areas throughout the  
20 island. Historical archive records regarding ordnance activities on Adak are the primary source for initial  
21 identification and delineation of areas potentially contaminated with ordnance. These documents—which  
22 include defense plans for the island, firing orders for weapons training, munitions inventories, photographs,  
23 maps, and other training and operations documents—provided valuable data regarding the types of  
24 ordnance activities that may have taken place on Adak Island, the areas where these activities most likely  
25 took place, and the types of ordnance that may be present in the various areas. These data were reviewed  
26 and interpreted to delineate candidate sites for the OU B RI/FS process.

27 Historical archive research and investigation was performed by several consulting firms in support of site  
28 characterization and remediation activities on Adak, including URS, Clearwater Engineering, and Foster  
29 Wheeler Environmental Corporation (Foster Wheeler Environmental). Research also was conducted by a  
30 number of government organizations, including the Corps; the Navy Environmental Health Center  
31 (NEHC); and Superintendent of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia (SSPORTS)  
32 Environmental Detachment, Vallejo, California; and U.S. Army Technical Center for Explosives Safety  
33 (USATCES). The results of some of the major research efforts are provided in detail in the Archive Search  
34 Report (FWENC, 1998) and are summarized in Table 5-1.

## 35 **5.3 PRELIMINARY INVESTIGATIONS**

36 Numerous environmental studies have taken place on Adak Island over the past 10 years, including several  
37 preliminary source evaluations (PSEs) (URS 1995ab) and an RI/FS for OU A (URS 1997), which  
38 encompasses the military reservation with respect to chemical contamination. OU B, which encompasses  
39 the northern portion of the entire island with respect to ordnance (explosives) contamination, was studied  
40 less extensively as part of these previous investigations; however, a number of important investigations  
41 were completed, which influenced the design of the OU B RI/FS program. These previous studies and their  
42 relevance to the current work are summarized below. Additional details are available in numerous  
43 documents contained within the administrative record.

### 1 **5.3.1 NAS Whidbey EOD Survey**

2 In 1996, the EOD Mobile Unit 11 Detachment Whidbey Island stationed at NAS Whidbey, Washington,  
3 conducted an ordnance survey in the known range areas of Adak (U.S. Navy 1996b). This survey  
4 suggested that significant effort would be required to remove OE/UXO from certain sites. These sites  
5 include the downtown area within OU B-1 and SWMUs 1, 2, 8, and Source Area 93 in OU B-2.

### 6 **5.3.2 SWMU 2 Investigation and Clearance**

7 In 1996, following the EOD survey, SSPORTS performed an investigation of SWMU 2 (SSPORTS, 1999).  
8 SSPORTS began clearance operations in mid-1998. The SWMU 2 clearance (to a depth of one foot  
9 because there was no evidence of deeper ordnance) was completed in fall of 1998. The majority of mines  
10 located at the site were inert training mines. However, a small number of live service mines were also  
11 removed during clearance activities. Also found were remnants of Bangalore torpedoes that were typically  
12 used during minefield clearance activities.

### 13 **5.3.3 Intrusive Investigation of UXO in the Downtown Areas**

14 Throughout 55 years of military history on Adak, a number of ordnance items have been recovered. Most  
15 of the items were considered souvenirs or abandoned ordnance that originated from other sources and were  
16 brought to the "downtown area" by hikers. In 1996, the Navy initiated an ordnance investigation of the  
17 downtown area in order to facilitate leasing of the primary reuse area of the island (FWENC 1997). The  
18 investigation of the Downtown Areas included review of historical records and archives, surface clearance  
19 with a metal detector, a geophysical investigation using electro-magnetic equipment, and excavation of  
20 selected geophysical anomalies to a depth of 4 feet bgs. Intrusive investigations and clearance activities  
21 were completed in the Downtown Area in 1998. Within the approximately 2200 acres that were  
22 investigated, 7116 geophysical anomalies were excavated. Only three UXO items were found from the  
23 surface clearance and three OE/UXO items were found during subsurface investigations. These included a  
24 50-millimeter (mm) mortar, a 37-mm anti-aircraft cartridge case, a 20-mm high-explosive point-detonating  
25 (HEPD) projectile with cartridge case, an abandoned incendiary bomblet, a smoke grenade without a fuze,  
26 and a thermite grenade.

### 27 **5.3.4 Investigation of Potential Minefields**

28 In April 1998, ongoing archival research on historical ordnance-related activities on Adak resulted in the  
29 discovery of World War II era defensive plans for the island (May 1945). These plans contained proposed  
30 locations for defensive works, including 27 potential minefield locations with instructions to emplace up to  
31 22,000 mines in the event of an imminent invasion by Japanese troops. The archival and physical  
32 investigation has revealed no evidence that defensive minefields were installed on Adak. Historical EOD  
33 incident reports do not list any contact with mines or mine-related wastes in the vicinity of proposed  
34 minefields, and no mine-related injuries have occurred on Adak, in spite of heavy use of many of the  
35 potential minefield locations for military and recreational purposes. Furthermore, the date of the defensive  
36 plans calling for the installation of the potential minefields indicates that the conditions that would have  
37 mandated the installation of such minefields (i.e. threat of enemy invasion of Adak) never occurred  
38 subsequent to the date of the defensive plans. In fact, WWII ended 3 months later in August 1945.

39 Twenty-three of the potential minefield locations on Adak have been investigated either intrusively (14),  
40 using geophysical and surface clearing data from previous UXO investigations (8), or by visual inspection  
41 (1). The SWMU 2 minefield was cleared in 1998. The three others in the Andrew Lake area were not  
42 investigated and remain part of OU B-2 within the Navy exclusion zone. The visual inspection site (Shagak  
43 Bay) was also the location for removal of Rommel Stakes. This included preliminary investigations of the  
44 areas near the Rommel Stakes with hand-held geophysical equipment. Mines were found only at one  
45 location (SWMU 2) and are believed to have been placed there for training and not as part of the defensive  
46 plan. Live mines and training mines (inert and live) were found and removed from this site during 1998.

### 1 5.3.5 1999 and 2000 Physical and Intrusive Investigations

2 The 1999 and 2000 investigation was focused on the remote areas north of the Military Reservation  
3 Boundary outside of the downtown area, which was investigated previously. The areas that were  
4 investigated in 1999 for ordnance contamination used the following methods:

- 5  
6 • **Sector Selection**—Areas potentially contaminated with OE/UXO based on evidence suggesting  
7 past use, storage, handling, or disposal of OE/UXO were designated as sectors. Historical archive  
8 records and documents were reviewed by UXO personnel and aided in identifying the 26 distinct  
9 sectors that were investigated during the field seasons.
- 10  
11 • **Terrain Analysis**—Each sector was analyzed to identify the terrain that was inaccessible to  
12 geophysical technicians performing subsurface investigations of OE/UXO items. Areas steeper  
13 than 30 degrees (from the horizontal) were excluded from the investigation area. This criterion  
14 was established to address access limitation on steep terrain for recreational hikers.
- 15  
16 • **Demarcation of the Investigation Areas**—Each sector was evaluated to determine the sampling  
17 area required to characterize the sector. Waypoint maps were developed to identify investigation  
18 paths within the sectors. These idealized pathways were adjusted in the field as necessary to  
19 accommodate site-specific terrain and vegetation or other physical features that may have limited  
20 access or posed a danger to field personnel.
- 21  
22 • **Geophysical Survey and Target Selection**—Subsurface anomaly data were collected over the  
23 selected areas using a time-domain electromagnetic instrument (Geonics EM-61) and processed to  
24 develop geophysical anomaly maps and target anomaly lists.
- 25  
26 • **Anomaly Selection**—Digital geophysical data were recorded, post-processed, and analyzed to  
27 identify with an associated signal indicative of metallic wastes that may be ordnance related. Post-  
28 processing refers to the analysis of geophysical data collected from the field to determine which  
29 anomalies are to be selected for intrusive investigation. Based on the data obtained from this  
30 geophysical investigation, target anomalies were chosen for intrusive investigation (excavation).
- 31  
32 • **Intrusive Investigation**—All selected target anomalies were excavated to identify and record  
33 findings of geophysical targets within 4 feet of the ground surface. Ground surface at Adak for  
34 these investigations is defined as the top of the mineral soil zone. In tundra areas on Adak, this can  
35 be between 6 inches and 36 inches below the walking surface.
- 36  
37 • **Data Validation**—The Adak OU B Project Team established data validation protocols during the  
38 2000 field season as summarized in the Validation of Detection Systems (VDS) Report (ECC,  
39 2000). This protocol determined the applicability of the 1999 data to the decision-making process  
40 for sites within OU B.

41 Ordnance-related findings for the 1999 and 2000 field seasons are summarized in Table 5-2.

### 42 5.4 SAMPLING STRATEGY

43 Adak OE/UXO AOPCs identified through the archive records search and preliminary investigations were  
44 evaluated through a screening program (preliminary assessment) to identify which sites would require  
45 physical inspection or remedial investigation. The details of this screening process and results are  
46 presented in the Preliminary Assessment Report (FWENC, 2000b).

47 Those AOPCs determined to require additional investigation or evaluation were designated as AOCs and  
48 forwarded to the next level in the risk evaluation process. This process of evaluation that was carried out as  
49 part of the RI/FS, is based on application of the Explosive Safety Hazard Assessment (ESHA)

1 Methodology specifically developed for OU B on Adak. The ESHA methodology and its application at  
2 Adak is discussed in Section 7 of this ROD. One of the steps necessary to support use of the ESHA  
3 Methodology is the acquisition of quantitative field data to further assess the presence or absence of  
4 ordnance within each of the AOCs that were identified by the preliminary assessment screen. This process  
5 includes three basic investigation elements:

- 6
- 7 • Site assessment/reconnaissance
- 8 • Site inspection
- 9 • Site characterization

10 Prior investigations, such as in the downtown area, as well as the during 1999 field season, were  
11 accomplished prior to the development of the Preliminary Assessment and RI/FS hazard evaluation  
12 approach by the OU B Project Team. The OU B Project Team carefully reviewed the data gathered during  
13 these previous investigations to ensure data quality objectives were met.

14 In preparation for the 2000 field season, the Navy performed a VDS test on Adak to validate the equipment  
15 to be used for further investigations and the statistical sampling methodology to be used. The Geonics  
16 EM-61, which had been used for all geophysical data collection on Adak, was tested and found to exceed  
17 the data quality objectives (DQOs) established by the OU B Project Team. These DQOs included a  
18 probability of detection of 0.85 with a confidence interval of 90%. The probability of detection is defined  
19 as the number of ordnance items detected with geophysical survey equipment relative to the total number  
20 of ordnance items actually present. The confidence interval is the range on either side of the probability of  
21 detection, and is a function of the selected statistical power, the standard deviation and the number of  
22 ordnance items. Details on the VDS program are provided in the VDS Report (ECC, 2000). Detailed  
23 explanations and applications of the preliminary assessment and RI/FS evaluations are identified in Section  
24 7 of this document.

## 25 **5.5 OU B-1 AOPCS AND AOCs**

26 The initial AOPC screening was a qualitative assessment of potential ordnance contamination in AOPCs.  
27 Those AOPCs that require additional investigation or evaluation were designated as AOCs and forwarded  
28 to gain additional information through the RI/FS process.

## 29 **5.6 NATURE AND EXTENT OF OE/UXO CONTAMINATION**

30 The approach and rationale for the investigations performed at all sites investigated during the 2000 RI/FS  
31 work on Adak Island are described in detail in the Final Preliminary Assessment (FWENC, 2000b) and the  
32 Final RI/FS Work Plan (FWENC, 2000a). Results of the remedial investigation are provided in detail in  
33 the RI/FS Report (ECC, 2001). The following sections provide a summary of the results.

### 34 **5.6.1 Remedial Investigation Sampling Methodology**

35 The OU B RI Sampling Methodology includes three basic investigation elements: reconnaissance, site  
36 inspection, and site characterization. A reconnaissance was used to determine whether a site had potential  
37 impacts that would warrant further investigation through site inspection or site characterization.  
38 Reconnaissance for numerous firing points was accomplished by walking the approved transect spacing  
39 within the known boundaries of the area. Using archive data to establish the best location for firing points,  
40 UXO teams reacquired those points by using GPS instruments. UXO teams searched within a radius of  
41 300 feet around each GPS point (firing point) looking for any evidence of a gun emplacement at that  
42 location.

43 Site inspection mode (also called “site inspection/search” mode) is a systematic search for ordnance  
44 contamination by locating areas to be investigated in more detail through a site characterization. The site

1 inspection was performed based on historical information and other factors at sites that were either impact  
2 or discharge areas and where significant densities of ordnance were suspected.

3 Site characterization (also called bound and characterized mode) is a systematic search for ordnance  
4 contamination that includes bounding and characterizing contaminated areas. Site inspection and site  
5 characterization are similar in that both stages acquire geophysical and positional data, analysis of  
6 subsurface anomaly data, intrusive investigation of anomalies, and Conceptual Site Model-based sampling  
7 requirements (transect spacing). Bound and characterize methodology was performed on areas known to  
8 contain ordnance and was used to identify the nature and extent of the contaminants in a more thorough  
9 manner. At sites that contained single or multiple OE/UXO items, the investigation consisted of 100  
10 percent geophysical and intrusive investigation within a specified distance of the OE/UXO find.

### 11 **5.6.2 Geophysical Survey Approach**

12 Geophysical data acquisition was performed in each AOC sector through one or more of the following  
13 methods by walking parallel transects whose spacing was developed based on the known or suspected  
14 weapons system(s) fired in the AOC by walking a star [an "X" superimposed on a "T," or X/T] patterns,  
15 grid patterns, or by completing a 100 percent geophysical survey. The transect spacings were calculated  
16 based on known fragmentation patterns around a target and were established at a 90% confidence interval  
17 of detecting a target area within an AOC. The specific methods used in each AOC are listed in Table 5-3.  
18 Transect surveying required the team to carry the geophysical survey instruments and Differential Global  
19 Positioning System (DGPS) instruments across the AOC from waypoint to waypoint. Subsurface anomaly  
20 data were collected over the investigated areas using a time-domain electromagnetic instrument (Geonics  
21 EM-61) and processed to develop geophysical anomaly maps and target anomaly lists for excavation.

22 Geophysical data were downloaded from recording units at the end of each day. Data were backed-up on  
23 removable media and stored in a fire-resistant container for additional data security. Data from the DGPS  
24 base station were also downloaded to the data management computer and backed-up on electronic media.

25 Target anomalies were chosen for intrusive investigation using signal selection and interpretation protocols  
26 for investigated areas. Digital geophysical data were recorded, post-processed, and analyzed to identify  
27 associated signals indicative of metallic wastes, which may be ordnance-related. Post-processing refers to  
28 the analysis of geophysical data collected from the field to determine the location of potential OE/UXO  
29 anomalies to be selected for intrusive investigation.

### 30 **5.6.3 Intrusive Investigation**

31 Intrusive sampling of all valid target anomalies was performed to identify OE/UXO present from the  
32 ground surface to a depth of 4 feet bgs. Based on post-processing of subsurface geophysical data, each  
33 team received a dig package that contained all necessary information and maps to perform the assigned  
34 work. Electronic files containing target reacquisition coordinates were uploaded onto each team's DGPS.  
35 UXO teams proceeded to the coordinates for each target and set up an exclusion zone to protect non-  
36 essential personnel from potential OE/UXO in the immediate area.

37 Exclusion zones were expanded if an OE/UXO item was encountered. The DGPS was used to locate the  
38 target area and a Vallon metal detector was used to pin point the target anomaly. All anomalies located  
39 within a 5-foot radius were intrusively investigated to ensure that the target area had been correctly located.  
40 OE/UXO debris and scrap (i.e., frag, fins, and expended munitions) were inspected for signs of hazardous  
41 waste residue and disposed of properly. One criterion used in determining the proper characterization  
42 category included whether or not the item was fired, and if the item contained or ever contained energetic  
43 material.

44 If OE/UXO was intact upon discovery (i.e., no exposed HE or filler), it was noted. If the ordnance item  
45 was safe to transport, it was transported to the explosives storage magazine. If the item was unsafe to move

1 it was left in place for disposal by Navy EOD personnel. Because most of the sectors investigated were in  
2 remote areas of the island, the position of the OE/UXO was marked, photo-documented, and electronically  
3 recorded. The OE/UXO remained at the location for later disposal. All metal debris, OE/UXO scrap, and  
4 OE/UXO were documented and disposed or destroyed in accordance with Navy and DDESB requirements  
5 (in accordance with OPNAVINST 8027.1G from U.S. Navy, 1992). Under this directive, final disposal  
6 procedures may include demolition, burning in place, or other authorized means. Inert OE/UXO scrap  
7 (containing no OE residue) from Adak ordnance operations was disposed of in Roberts Landfill.

## 8 **5.7 RESULTS OF THE INTRUSIVE INVESTIGATION**

9 The basis for the RI evaluations for the OU B-1 sites included all previous investigative work performed  
10 throughout the military reservation of Adak. Additional investigations will be conducted in the 2001 field  
11 season for selected sites. The evaluations of sites within OU B-1 are provided in the RI/FS Report for OU  
12 B-1 (ECC, 2001). Table 5-3 contains a summary of the ordnance findings for the OU B-1 sites examined  
13 in the RI/FS Report. A summary of the RI is presented below for the three sites found to pose a potential  
14 explosive safety hazard.

### 15 **5.7.1 Combat Range 3 (C3)**

#### 16 **5.7.1.1 Physical Characteristics**

17 C3 is a trapezoidal area southwest of downtown Adak adjacent to Combat Range 6 (C6) on the north  
18 (Figure 5-2). The area stretches between Mt. Reed and Shagak Bay and encompasses the Lake De Marie  
19 Impact Area. The Lake De Marie Impact Area was investigated separately. C3 is approximately 6,124  
20 acres and has a variety of terrain and vegetation, including some of the most rugged terrain found on Adak.  
21 This area is divided north to southeast by the Mt. Reed mountain range. There are steep, rocky cliffs along  
22 the western shoreline to sloping plateaus and rolling hills descending from the Mt. Reed range.

#### 23 **5.7.1.2 Results of Investigation**

24 During the 2000 RI, four AOCs were investigated within C3: C3-01, C3-02, C3-03, and C3-04. The  
25 geophysical investigation and the intrusive investigation were completed in July, August, and September  
26 2000. AOC C3-01 contained several pieces of UXO and AO, along with multiple pieces of OE scrap.  
27 There is an area within this AOC C3-01, which clearly appears to have been extensively used for ordnance  
28 disposal (C3-01A). Single UXO items within C3-01 indicate that some portions of the area may have been  
29 used for maneuvers or training. Table 5-3 summarizes the results of the SI and the RI for this area (C3).

### 30 **5.7.2 Combat Range 6 (C6) (Portion North of Military Boundary)**

#### 31 **5.7.2.1 Physical Characteristics**

32 C6 is a triangular area that stretches across the entire width of Adak (east to west) near the military  
33 reservation boundary (Figure 5-3). The orientation is such that a portion of the combat range is within the  
34 military reservation and a portion of the range is located outside the military reservation in the wilderness  
35 area of the wildlife refuge. (The portions of C6 within the wilderness area of the wildlife refuge are the  
36 responsibility of the Corps under the DERP-FUDS program). Only that portion of the combat range within  
37 the military reservation was included in the current ordnance investigation. This portion of the sector is  
38 approximately 6,820 acres and has a variety of terrain and vegetation. The area surrounding the entire  
39 south half of Lake Betty is a high, steep, bowl-shaped ridge of exposed rock. This range of mountains is  
40 divided by two high saddles known as Gannet Pass and Hiker's Pass. This mountain ridge is located in the  
41 center of the sector, and divides the sector from west to east. The majority of topographic formations noted  
42 in C6 consist of high mountains separated by large wide valleys.

1 Access was limited because of the division by mountain ranges throughout the area. The western side of  
2 the sector was surveyed from a staging area at Beverley Cove within the Bay of Islands during boating  
3 operations. Due to the high valley separation, travel in this area was difficult and only limited ATV routes  
4 were available. The eastern side of the sector proved to be one of the most difficult areas on Adak to  
5 access because of its remote location. Survey data were collected in the eastern portion of the sector by  
6 helicopter transportation that provided quick access to this remote site during periods of good weather.

### 7 **5.7.2.2 Results of Investigation**

8 During the 2000 RI, one sector (C6-01) was investigated in C6. This included all portions of the combat  
9 range north of the military reservation boundary. Several pieces of UXO were found in C6-01, along with  
10 multiple pieces of OE scrap. UXO detected included a single rifle grenade found along the trail over  
11 Husky Pass and several 60-mm mortars found in the western portion of the C6-01. Table 5-3 summarizes  
12 the results of the RI and SI for C6.

## 13 **5.7.3 Mitt Lake Impact Area (ML)**

### 14 **5.7.3.1 Physical Characteristics**

15 The Mitt Lake Impact Area is located southwest of downtown Adak adjacent to the Naval Magazine sector.  
16 (Figure 5-4) This sector is approximately 482 acres, with a variety of terrain and vegetation. Lowlands,  
17 cut deep by meandering streambeds, dominate the northern end of the sector. There is also a large lake,  
18 surrounded by a marshy area, and the lowlands rise to rolling hills (mid-sector) and finally to a tall peak  
19 near the southern boundary.

20 Vegetation in the Mitt Lake sector is varied; tall grasses dominate the slopes; and short grasses, mosses,  
21 and wetland species occupy the lowland areas. Some of the ridgetops in this sector have bare patches with  
22 rocky outcrops.

### 23 **5.7.3.2 Results of Investigation**

24 During the 2000 RI, five AOCs were investigated within the Mitt Lake Impact Area: ML-01, ML-02,  
25 ML-03, ML-04, and ML-05. The geophysical and intrusive investigations were completed in July and  
26 August 2000. Two of the AOCs, ML-03 and ML-04, did not contain any OE/UXO or related scrap. The  
27 remaining AOCs contained ordnance related items. AOC ML-01 contained several pieces of UXO (60-mm  
28 mortars), along with multiple pieces of OE scrap. Table 5-3 summarizes the results of the RI and SI in the  
29 Mitt Lake Impact Area.

## 30 **5.7.4 Additional Sites For Final Characterization and Clearance**

31 Twenty-four sites were identified during the review of the RI/FS for final characterization and clearance.  
32 These sites have identified data gaps where OE/UXO may be present. All previously identified OE/UXO  
33 was removed during earlier investigations. These include Combat Range 3 Sites C3-01B, -01C, -01D, -  
34 01E and C3-04A; Combat Range 8 Sites C8-01, -03 and -05A; Lake Jean Site LJ-01; Mitt Lake Sites ML-  
35 01B, -02A, and -02B; Lake DeMarie Site DM-06A; Finger Bay Sites FB-01, FB-03 (see Section 13.0), and  
36 -04; Blind Cove Site BC-01; Husky Pass Training Area (HP-01); the Shagak Bay Gun Emplacement (SH-  
37 01); the 20-mm, 40-mm, and 37-mm gun emplacements (GUN-01, -02, and -03); and the Ammo Pier sites,  
38 FBAP-02 and AP-02. These are relatively small sites that include ordnance disposal sites, impact areas,  
39 ammunition storage areas, firing points, training areas, or gun emplacements.

## 40 **5.8 OE/UXO CONTAMINATION INFORMATION**

41 During the course of various OE/UXO investigations and cleanup activities, a wide variety of ordnance  
42 items, from small arms ammunition (.22 through .50 caliber), anti-aircraft munitions (20-mm, 37-mm, 40-

1 mm), grenades (both hand and rifle-fired), mortars (60-mm, 87-mm), large caliber artillery rounds (105-  
2 mm, 155-mm), torpedoes, and bombs (incendiary, practice, and HE) were discovered, removed, and  
3 disposed of by the Navy and its contractors. While most, if not all, of these items were stored and managed  
4 on the island during and after WWII, use of live ordnance on Adak was primarily limited to training ranges  
5 and their subsequent impact areas. The sites within OU B-1 do not include the ordnance training and  
6 disposal areas located around Andrew Lake and Andrew Lake Seawall.

7 Based on available archival records regarding past ordnance use, storage, handling, and disposal on Adak  
8 Island, and extensive subsurface geophysical investigations conducted to date, it is believed that throughout  
9 most of Adak OE/UXO contamination at depths greater than 4 feet bgs is unlikely. This is because many  
10 of the weapons systems used were not capable of greater soil penetration and those that were (105-mm and  
11 155-mm projectiles, for example) were fired into areas on Mt. Moffett that have bedrock shallower than 4  
12 feet. This effectively prevented deeper penetration. Figure 5-5 shows the bedrock outcrop areas on Adak  
13 that were mapped by the USGS in 1995. OE/UXO contamination for most of the sites investigated was  
14 found to be within 2 feet of the ground surface. Approximately 98% (1425 of 1449) of OE/UXO to date  
15 were found in this depth interval.

16 The 2001 intrusive work at C3-01A indicates it is a probable OE/UXO burial/disposal site and that  
17 associated OE/UXO items may exist at depths greater than 4 ft bgs. This and other such disposal sites that  
18 are discovered will be cleared to a depth of 4 ft below the lowest depth that OE/UXO was found or to  
19 bedrock – whichever is encountered first.

#### 20 **5.8.1 Current/Potential Pathways for Exposure**

21 Current and future pathways for exposure to OE/UXO consist of direct contact with items within an  
22 impacted area. Potential for exposure to OE/UXO is derived from the current and future land uses of the  
23 AOCs. Land use issues are discussed in Section 6 of this ROD.

#### 24 **5.8.2 Likelihood for Migration of OE/UXO from Current Locations or to Other Media**

25 Vertical migration of OE/UXO items within the soil may result from frost heave or displacement of  
26 OE/UXO items by animals or humans. The weapons systems used on all three sites recommended for  
27 clearance are not capable of deep soil penetration. This is substantiated by the fact that no OE/UXO were  
28 found on the sites deeper than 2 feet, while the proven detection capability was 4 ft bgs. Clearance to 4 feet  
29 at these sites is expected to remove all OE/UXO present.

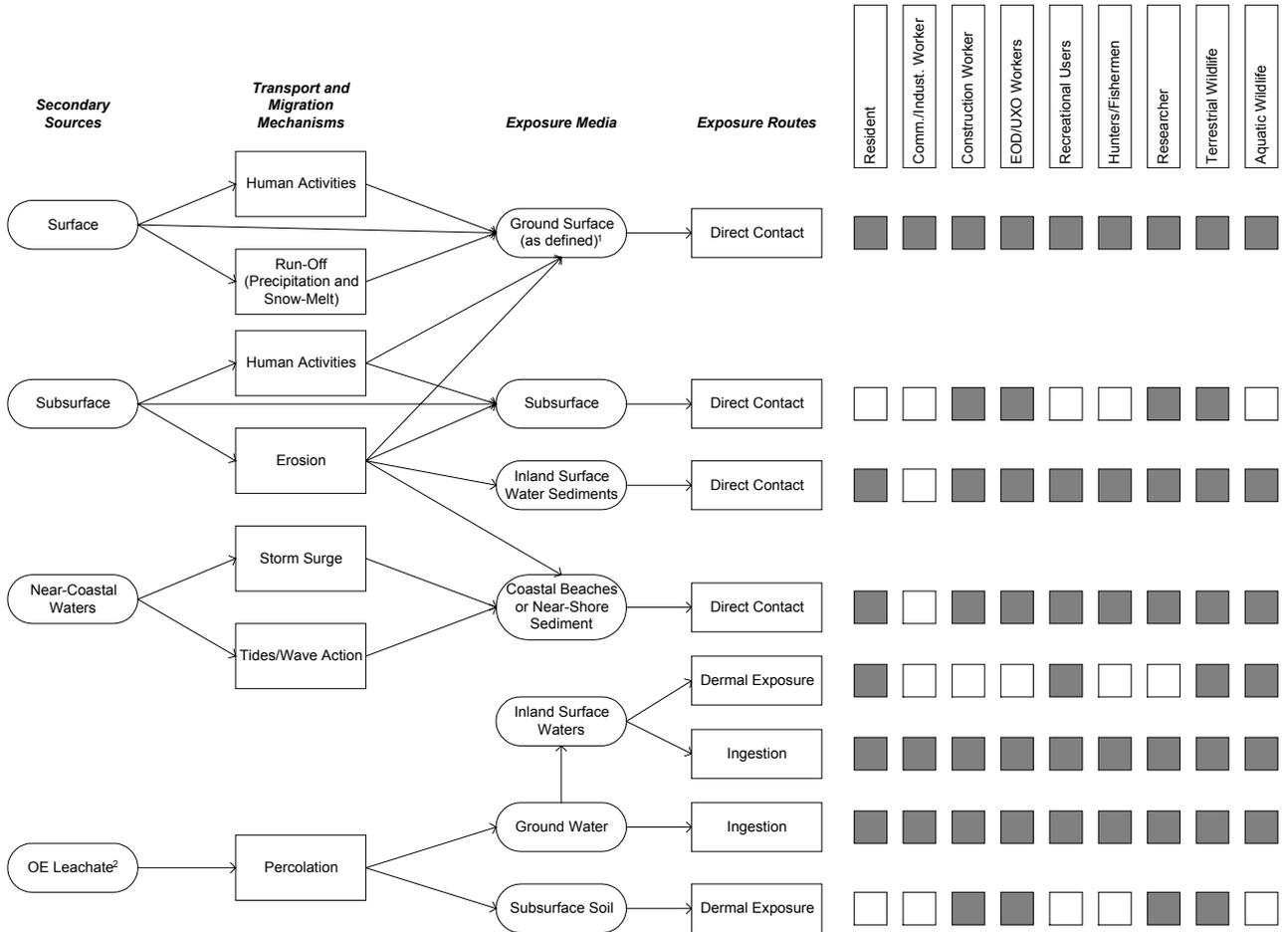
### 30 **5.9 EXPLOSIVES-RELATED CHEMICAL CONTAMINATION**

31 Based on RI/FS investigations to date, nine targets within seven sites in OU B-1, have been identified with  
32 the potential for explosives-related chemical contamination. The field conditions associated with these sites  
33 and the reason to suspect there may be chemical contamination at each location is provided in Table 5-4.  
34 These include soil staining, observation of broken open rounds with filler material on the ground, and  
35 odors. In addition, there are two sites that are in close proximity to surface water bodies. These include  
36 C3-01A and C3-04A. Potential marine environment ecological impacts are also being investigated at the  
37 following two sites through reconnaissance dives: FBAP-02 and AP-02.

### 38 **5.10 SITE ACCESS LIMITATIONS**

39 One major factor in assessing OE/UXO presence or absence is physical site access and terrain. In many  
40 cases, an advanced reconnaissance of the investigation sites was conducted to identify inaccessible areas  
41 due to terrain, slope, or other conditions that made the area impassable by foot. The OU B Project Team  
42 determined that an area whose slope exceeded 30 degrees was inaccessible to reasonably motivated hikers.  
43 ADEC and EPA Project Team members reviewed the inaccessibility determinations and assisted in  
44 screening many areas in the field. Inaccessible areas for each site are identified in the RI/FS Report (ECC,

- 1 2001) and are recommended for NOFA because the terrain prevents most human contact (e.g. recreational
- 2 hiker) to surface and subsurface OE/UXO. Areas within these sites that are not cleared will be documented
- 3 with survey information contained in clearance reports (ECC, 2001) and will be included in the Adak
- 4 OE/UXO Educational Awareness Plan.
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**Figure 5-1 Conceptual Site Model**

Notes:

<sup>1</sup>Ground surface (as defined): For some users “Ground Surface” may include incidental subsurface intrusion (e.g., placing tent stakes).

<sup>2</sup>OE Residue on the surface may give an exposure pathway to inland surface waters through erosion and run-off.

Shaded squares represent potentially complete pathways.

Figure 5-2 Map of Combat Range 3 (C3) Sites

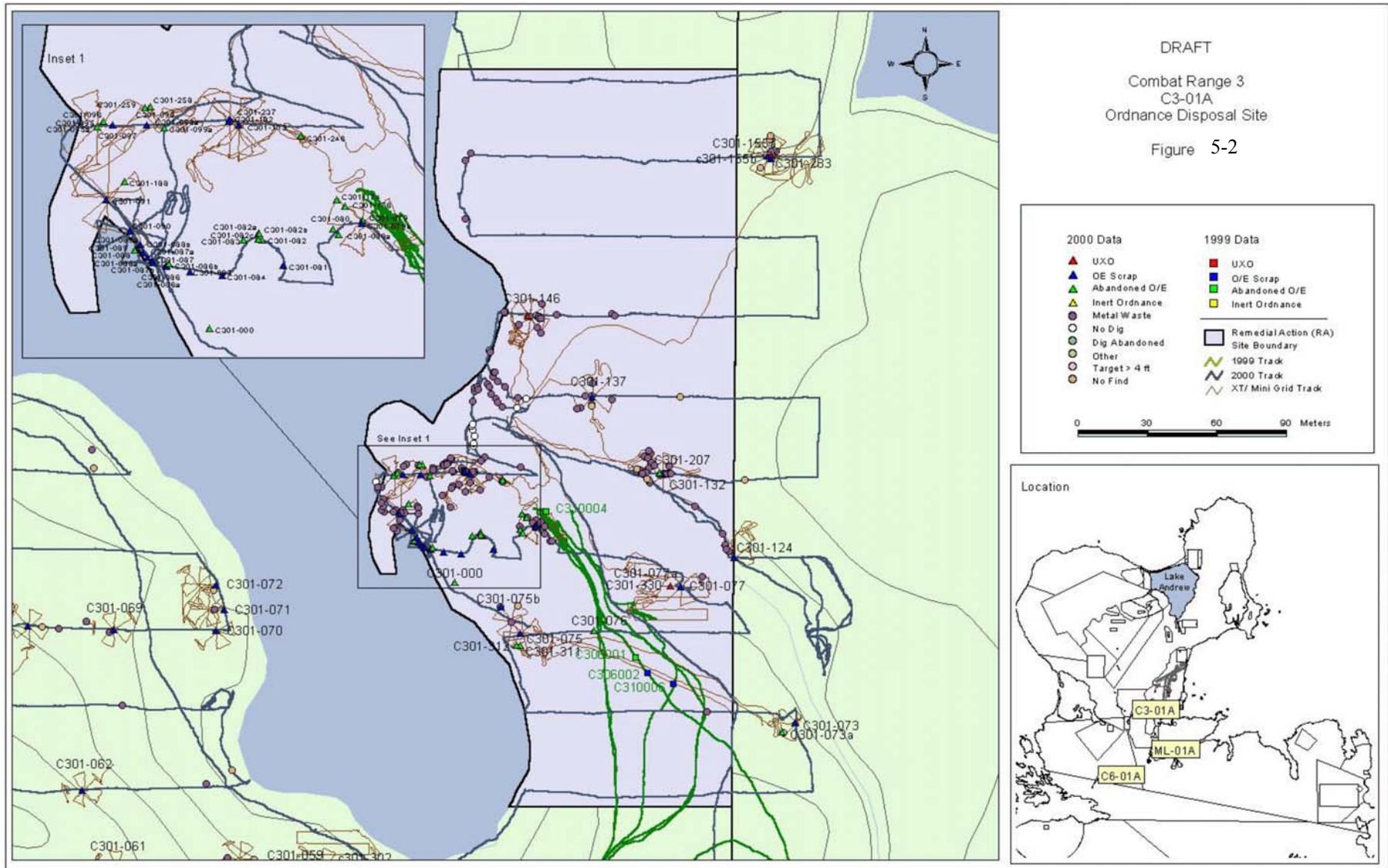


Figure 5-3 Map of Combat Range 6 (C6) Sites

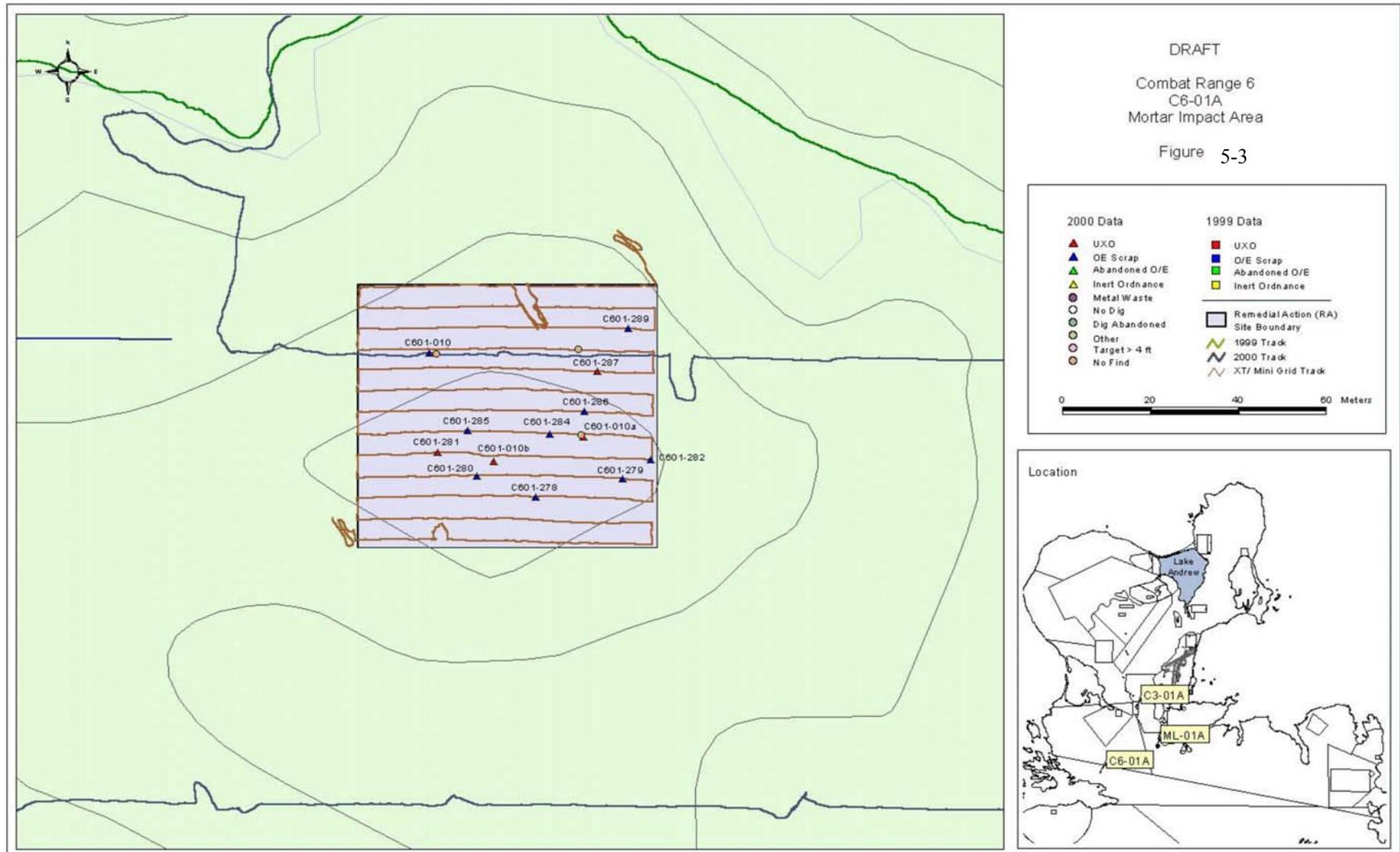
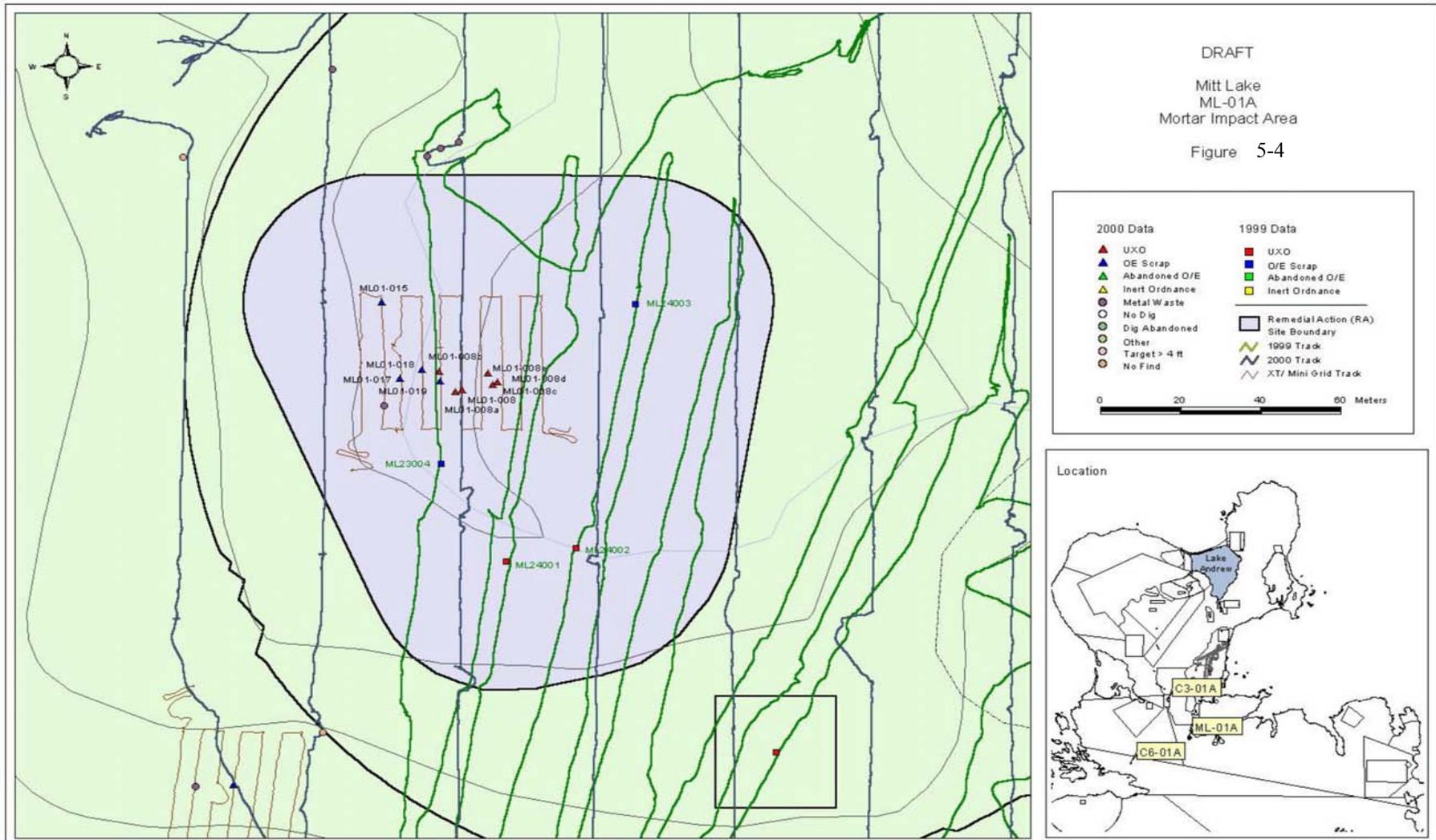
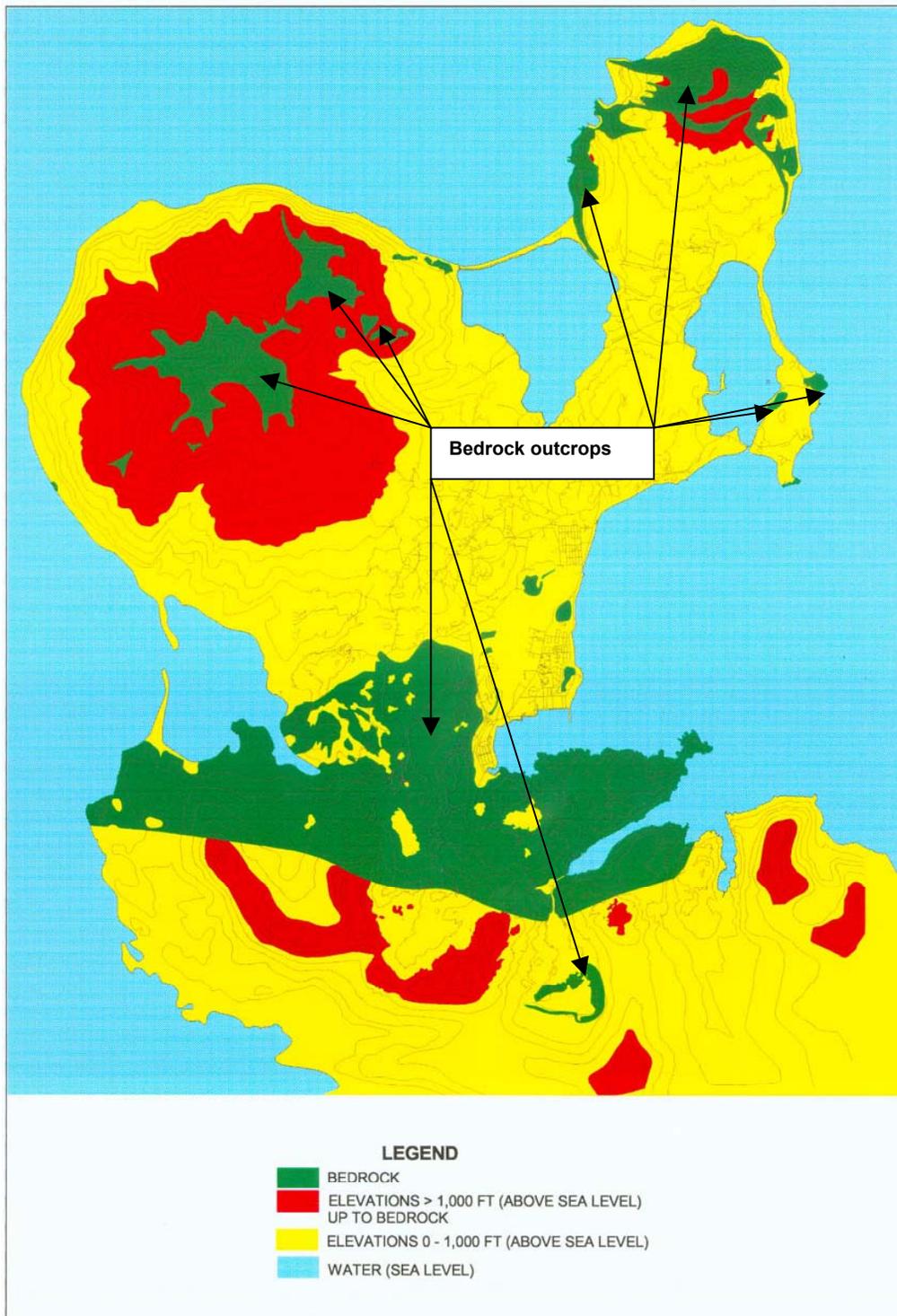


Figure 5-4 Map of Mitt Lake (ML) Sites



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**Figure 5-5 Bedrock Areas on Adak Island (In color shown in green)**



**Table 5-1**  
**Summary of Significant Records**

<b>Type of Record</b>	<b>Data Obtained</b>
Firing Orders (1943 & 1944)	Specific location (coordinates) of 10 target impact areas for test firing of large caliber weapons; information on the types of weapons fired into each area; and, in some cases, the location of the firing point and the range fan (1 area only).
Field Order #1 – Adak Defense Plan (May 1945)	The general location (sketches) of planned defensive works for Adak including anti-tank barriers, proposed minefields, and existing gun emplacements. Directives for when and how minefields will be laid.
Training Memorandum #12 – Orientation Lecture (Oct. 1944)	Defense Plan for Adak confirming the proposed minefield locations in Field Order #1 and showing additional proposed minefield locations.
Training Memorandum #12 – Practice Firing (July 1943)	Sketch of newly designated combat ranges for use in troop training maneuvers and test firing of weapons. Specification that written requests to test fire large caliber weapons and written permission will be required (see firing orders).
Training Memorandum Number 38 (Sept. 1944)	Sketch of the location of 16 designated post-firing ranges (pistol, rifle, machine gun, rifle grenade, hand grenade, anti-tank grenade, etc.); no coordinates supplied.
Unexploded Ordnance Survey 1996	Map showing the configuration of several of the practice ranges and the Open Burn/Open Detonation ordnance disposal range at Andrew Lake (formerly called Parcel 4). Summary of ordnance survey, including recommendations for future investigation of selected areas. Anecdotal information regarding the potential for mines/ordnance in SWMU 2 at Clam Lagoon.
EOD Incident Reports 1945 – 1995	Information regarding all reported contact with ordnance items discovered during the period 1945-95. Most reports contain the type and number of items found and the general area of the contact.
Photographs	Photographs from 1945 showing a firepower demonstration at the Finger Bay Small Arms Range Complex. The demonstration was conducted using mortars fired from the range area toward the west/southwest.
War Diaries/Unit Journals	History of units/groups including limited information on test firing exercises conducted by various groups.
Ordnance Inventories from Archival Search Report	Information on the types and amounts of ordnance delivered to Adak; limited information on the amounts of ordnance allotted for training/testing purposes. This effort (FWENC, 1998) consisted of historical document reviews in government archives and personnel interviews with people who served on Adak during and after World War II. This information, including 1500 ordnance-related documents, was evaluated to aid in the location and evaluation of ordnance related activities.

Source: FWENC, 1998

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**Table 5-2  
Ordnance-Related Target Anomaly Item Summary For 1999 and 2000 Field Seasons**

Year	Sectors	Transect Miles	Ribbon-Walk Acreage	Target Anomalies Detected	Anomalies Investigated	Ordnance-Related Items <sup>1/</sup>	UXO	Abandoned OE	OE Scrap
1999	26	594	236	7,243	4,991	906	66	48	790
2000	72	696 <sup>2/</sup>	277	5,957	4,407	1,433	67	143	1,174

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Notes

<sup>1/</sup> Includes total of UXO, abandoned OE, OE/UXO scrap, and inert ordnance.

The differences between the values in columns five and six of this table are due to the presence of non-ordnance related metallic items such as nails, cans, etc., or false positive target identification stemming from conservative interpretation of raw geographical data.

<sup>2/</sup> Includes mileage from investigations within OU B-1 and OU B-2.

**Table 5-3  
Investigation Approach, Geophysical Investigation and Ordnance-related Finds in OU B-1 Area Sectors During Intrusive Investigations**

1

Sector Site	Survey Method	Total Accessible Acreage	Acreage No Access	Targets Investigated 2000	AO/OE Scrap/UXO Items 2000	AO/OE Scrap/UXO Items 1999	Comments
<b>Combat Range 3 (C3)</b>							
C3-01	34.5 m Spacing	64.03	21.20	402	29/61/3	3/4/3	OE/UXO and scrap found in 1999 indicating likely disposal area; additional items found in 2000 providing data to more clearly define actual disposal area. Potentially single UXO items indicate that some portions of the area may have been used for maneuvers or training.
C3-02	X/T	0.22	0	1	0/1/0	0/0/1	A single piece of UXO in 1999; no OE/UXO in 2000.
C3-03	X/T	0.22	0	0	0/0/0	0/1/0	A single piece of mortar frag in 1999; no OE/UXO or frag in 2000.
C3-04	105 m Spacing	3531.53	2573.48	192	0/45/2	0/2/0	No OE/ UXO found in 1999; three single pieces of UXO found in 2000 along with additional frag.
<b>Combat Range 6 (C6)</b>							
C6-01	105 m Spacing	3176.47	3644.30	292	0/11/5	0/4/0	No OE/UXO found in 1999; mortars and mortar frag found in 2000 along with a single rifle grenade. The rifle grenade is a single find within the overall AOC.
<b>Mitt Lake (ML) Sector</b>							
ML-01	34.5 m Spacing	14.30	0.38	24	0/5/6	0/3/3	Mortars and related scrap found in 1999 and 2000; sufficient data obtained in 2000 to refine impact area boundary.
ML-02	20 m Spacing	71.04	26.04	83	1/17/7	--	Area not investigated in 1999 due to steep slopes; numerous 20-mm related OE/UXO items found in 2000. Many finds in this AOC were considered as single finds ("onesies"). There was also a single 20-mm found but not investigated.
ML-03	30m x 30m Grid	0.22	0	11	0/0/0	0/0/1	No OE/UXO or related scrap found in 2000.
ML-04	X/T	0.22	0	0	0/0/0	0/0/1	A single 20-mm found in 1999; no OE/UXO found in 2000. The 1999 item very likely did not originate from the Mitt Lake firing point since an overshoot from that point would have continued for up to two or three miles. This single item may be a flier from a remote, unidentified firing point.

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**Table 5-3 (continued)**  
**Investigation Approach, Geophysical Investigation and Ordnance-Related Finds in OU B-1 Area Sectors During Intrusive Investigations**

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Sector Site	Survey Method	Total Accessible Acreage	Acreage No Access	Targets Investigated 2000	AO/OE Scrap/UXO Items 2000	AO/OE Scrap/UXO Items 1999	Comments
ML-05	Recon Grid	0.22	0	46	1/2/0	0/0/1	This area consists of a 30 x 30 grid placed around an AO item found in 1999. Some small arms ammunition was found in the grid in 2000; a single piece of OE scrap was found in the remainder with nothing found in the mini-grid follow-up search.
<b>Blind Cove/Campers Cove Impact Area (BC)</b>							
BC-01	115 m Spacing	13.31	2.44	5	0/5/0	0/0/0	No OE/UXO related items found 1999; cluster of frag found on the southern boundary for this AOC in 2000.
BC-05	115 m Spacing	21.84	0.53	0	0/0/0	0/0/0	No OE/UXO related items found in the AOC based upon the approved RI methodology.
BC-06	115 m Spacing	477.53	666.11	21	0/1/0	0/0/0	No OE/UXO found 1999 or 2000; frag on eastern boundary of the AOC in 2000.
BC-07	100% Survey	0.22	0	5	0/0/0	0/0/0	Construction and domestic waste; wire.
BC-09A	34.5 m Spacing	505.77	66.84	34	0/2/0	0/0/0	No OE/UXO related items found in 1999; four pieces of frag found at three locations in 2000.
BC-09B	105 m Spacing	822.18	970.13	57	0/9/0	0/0/0	The frag in the NW corner of BC-09B may actually be associated with BC-01 and BC-05 since it is distributed along a general line between these two identified target points. BC-09B is thought to be a maneuver area for troop training, not a target area for projectiles.
<b>Combat Range 8 (C8)</b>							
C8-01	30m x 30m Grid	0.22	0	21	4/0/0	2/0/0	Three AO items found in 1999; two additional AO items found in 2000. Area appears to be adequately bounded based upon the investigation data. 100 percent investigation in 2000 qualifies area for Adak NOFA.
C8-02	30m x 30m Grid	0.22	0	0	1/0/1	1/0/0	A single AO find in 1999 (37-mm projectile); no OE/UXO related finds in 2000. 100 percent investigation in 2000.

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**Table 5-3 (continued)**  
**Investigation Approach, Geophysical Investigation and Ordnance-Related Finds in OU B-1 Area Sectors During Intrusive Investigations**

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Sector Site	Survey Method	Total Accessible Acreage	Acreage No Access	Targets Investigated 2000	AO/OE Scrap/UXO Items 2000	AO/OE Scrap/UXO Items 1999	Comments
C8-03	47m x 47m Grid	0.54	0	41	22/10/1	1/1/0	AO found in 1999 (Three 20-mm projectiles w/o casings, one with separated casing and a crushed 40-mm). Multiple OE/UXO items found in 2000: 20-mm, hand grenade, 3-inch anti-aircraft projectile/high explosive, 40-mm, 60-mm fuze and small arms. There are OE/UXO related items located at the current boundaries of the AOC.
C8-04	30m x 30m Grid	0.22	0	11	1/0/0	1/0/0	A cache of small arms ammunition found in 1999; single .45 caliber bullet found in 2000; missed in 1999; 100 percent investigation in 2000.
C8-05	105 m Spacing	151.26	5.37	312	3/1/0	0/2/0	Numerous abandoned items found in 1999 at four separate locations (C8-01, C8-02, C8-03, and C8-04); additional AO found in 2000 at two of the 1999 locations. Three pieces of AO and two pieces of inert ordnance also found in 2000 in C8-05.
<b>Finger Bay Impact Area (FB)</b>							
FB-03	34.5 m Spacing	21.33	9.42	95	0/71/0	0/9/0	There is a small area within the AOC that appears to have been a small arms target; however, small arms scrap represents the same level of hazard as OE scrap found in the remainder of the AOC. No OE/UXO found in either 1999 or 2000.
FB-06	20m Spacing	8.58	7.43	9	0/4/0	0/0/0	No investigation in 1999 due to steep terrain; scrap only in 2000 based upon the approved RI methodology.
FB-07	30mx 30m Grid	0.22	0	31	0/0/0	3/0/0	Three AO items found at a single location on the surface in 1999 (mortar, small arms); no OE/UXO in 2000.
FB-08	30m x 30m Grid	0.20	0.02	31	0/29/0	1/0/0	Multiple pieces of flare scrap found in both 1999 and 2000; single piece of UXO (Flare) found in 1999.
FB-09	30m x 30m Grid	0.22	0	1	0/0/0	1/0/0	Single rifle grenade in 1999; no OE/UXO in 2000.
<b>Haven Lake Sector (HL)</b>							
HL-01	30m x 30m Grid	0.22	0	3	0/0/0	1/0/0	A single OE/UXO item found in 1999; no OE/UXO found in 2000. 100 percent investigation in 2000.
HL-02	30m x 30m Grid	0.22	0	29	0/0/0	1/0/0	

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**Table 5-3 (continued)**  
**Investigation Approach, Geophysical Investigation and Ordnance-Related Finds in OU B-1 Area Sectors During Intrusive Investigations**

Sector Site	Survey Method	Total Accessible Acreage	Acreage No Access	Targets Investigated 2000	AO/OE Scrap/UXO Items 2000	AO/OE Scrap/UXO Items 1999	Comments
<b>Lake De Marie (DM)</b>							
DM-01	58 m Spacing	45.45	0.31	103	0/48/0	0/16/0	No OE/UXO found 1999 or 2000. This area encompasses several clusters of mixed scrap from both projectiles and mortars. This may be indicative of firing exercises using mortars to create smoke plumes simulating enemy gun batteries and providing targets for the 90-mm guns at the firing point for this AOC.
DM-02	30m x 30m Grid	0.22	0	0	0/0/0	1/0/0	A single piece of scrap (37-mm) found in 1999; no OE/UXO related items in 2000. 100 percent investigation in 2000.
DM-03	Recon Grid	0.22	0	366	1/2/0	--	Not discussed within RI text
DM-05	Recon	0	0	0	0/0/0	--	No items found.
DM-06	50 m Spacing	1024.77	244.96	134	1/29/0	0/0/0	Frag found in 1999; a single abandoned mortar and projectile frag found in 2000.
<b>Lake Jean Sector (LJ)</b>							
LJ-01	58m x 58m Grid	0.84	0	207	76/24/21	6/0/1	OE/UXO items found in 1999; OE/UXO items and related scrap found in 2000. This area contained numerous OE/UXO items. UXO was mainly MK2 hand grenades. These may be considered UXO due to corrosion of pins. OE items included small arms ammunition, a practice hand grenade, rockets, PD fuzes, flares, a 60-mm HE, 37-mm projectiles, and 50-mm mortars.
LJ-02	Recon Grid	11.51	0	0	0/0/0	--	No investigation in 1999; no OE/UXO related items found in 2000 based upon the approved RI methodology (reconnaissance).
LJ-03	30m x 30m Grid	0.22	0	7	0/1/0	0/1/0	Single grenade fuze found 1999; second grenade fuze found 2000.
LJ-04	30m x 30m Grid	0.22	0	0	0/0/0	0/1/0	Single piece of frag found 1999; no OE/UXO related items found 2000.
<b>Naval Magazine Section (NM)</b>							
NM-02	30m x 30m Grid	0.22	0	8	3/1/0	2/0/0	A small group of CADs found in 1999; two additional CADs found in 2000.
NM-03	30m x 30m Grid	0.22	0	1	0/0/1	1/0/0	A single potential CAD found in 1999; a 75 -mm AP (UXO) found in 2000.

**Table 5-3 (continued)**  
**Investigation Approach, Geophysical Investigation and Ordnance-Related Finds in OU B-1 Area Sectors During Intrusive Investigations**

Sector Site	Survey Method	Total Accessible Acreage	Acreage No Access	Targets Investigated 2000	AO/OE Scrap/UXO Items 2000	AO/OE Scrap/UXO Items 1999	Comments
NM-04	30m x 30m Grid	0.22	0	60	0/0/0	0/0/1	A single armed grenade found in 1999; no OE/ UXO related items found in 2000.
<b>Scabbard Bay (SB)</b>							
SB-01	58 m Spacing	24.94	307.25	0	0/0/0	0/0/0	Nothing found in 1999 or 2000.
<b>Urban Area (UA)</b>							
UA-01	30m x 30m Grid	0.22	0	26	0/1/0	1/0/0	A single piece of AO in 1999; a single piece of OE scrap in 2000. Trash pit; numerous pieces of scrap metal including electrical parts. 100 percent investigation in 2000.
UA-02	78m x 122m Grid	2.32	0	368	3/95/0	1/1/0	One abandoned incendiary bomblet found in 1999 and numerous pieces of related, burned scrap indicating potential disposal; AO found in 2000 including a smoke grenade without fuze and one thermite grenade; OE scrap found including fire bomb weights, M50 thermite bomb noses, a 3-lb. Practice bomb, and a lead practice bomb. Trash pit; a very large number of pieces of metal waste found including steel pipes, wire, machine parts, cans, steel. An energized cable ran through the dig site. 100 percent investigation in 2000.
<b>Runway Sector (RW)</b>							
RW-01	30m x 30m Grid	0.22	0	4	0/4/0	1/0/0	A single piece of AO found in 1999 (practice bomb); nothing found in 2000.
<b>Zeto Point (ZP)</b>							
ZP-01	65 m Spacing	21.5	0	6	0/0/0	--	Suspected practice bombing range. Nothing found in 1999 or 2000. EOD reports of small practice bombs disposed of in Lake Shirley.

- 1 AO – abandoned ordnance
- 2 AOC – area of concern
- 3 AP – armor piercing
- 4 CAD – cartridge actuated device
- 5 EOD - explosive ordnance disposal
- 6 ESHA - Explosive Safety Hazard Assessment
- 7 Frag - fragment (or fragmentation)
- 8 FS - feasibility study

**Table 5-3 (continued)**

**Investigation Approach, Geophysical Investigation and Ordnance-Related Finds in OU B-1 Area Sectors During Intrusive Investigations**

- 1 HE – high explosive
- 2 NOFA - no further action
- 3 OE – ordnance and explosives
- 4 PD - point detonating
- 5 X/T - star-shaped geophysical transect consisting of 15- or 30-m segments centered over OE/UXO objects and oriented at 45-degree intervals.

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**Table 5-4  
Summary of Sites Identified For Chemical Sampling<sup>1</sup>**

Site	Target ID	Type of Filler	Description	Chemical Constituents of Filler
C3-01A	C301-086	Explosive	Frag w/HE	TNT, RDX
C3-04A	C304-035	Explosive	Booster cup with HE	RDX, Tetryl, TNT
C6-01A	C601-287	Explosive	2.36" rocket motor w/frag	TNT
C8-01	C801-006	Explosive	37-mm M51	Tetryl, TNT
C8-05A	C805-050	Explosive	3inch projectile	TNT, RDX
LJ-01	LJ01-033	Propellant	~400 .30 caliber ammo	Nitroglycerin, Nitroguanidine
	LJ01-053	Explosive	37-mm HE	Tetryl, TNT
	LJ01-119	Propellant	~100 .30 caliber ammo	Nitroglycerin, Nitroguanidine
ML-02B	ML02-053	Explosive	20-mm; fired; no fuze	Tetryl, TNT

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- HE – high explosive
- OE – ordnance explosives
- RDX – Cyclonite or Cyclotrimethylenetrinitramine
- Tetryl - Trinitrophenylmethylnitramine
- TNT - Trinitrotoluene (includes DNT isomers and mixtures)

<sup>1</sup> Nine targets will be chemically sampled within seven sites

1                   **6.0       CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES**

2   In 1995, the State of Alaska, through the Alaska Department of Community and Regional Affairs  
3   (ADCRA), established a Local Reuse Authority (LRA) consisting of stakeholders with potential reuse  
4   interest in Adak. The first conceptual reuse plan, prepared for the LRA in 1996 by Tryck Nyman Hayes,  
5   Inc., presented three reuse scenarios—low use, middle use, and high use (Tryck Nyman Hayes, Inc. 1996).  
6   This plan concluded that reuse was not likely to be economically viable.

7   Some of the participants in the reuse planning process took issue with that conclusion and sought state  
8   recognition of a new LRA to proceed with further reuse planning. Accordingly, the Adak Reuse  
9   Corporation (ARC) was established to take the role of the LRA. A “revised final” plan was prepared for  
10   ARC by ASCG Consultants and released in August 1998 (ASCG 1998). This plan was further refined  
11   (ASCG, 2000) and is the land use plan used in preparation of the ROD.

12   The Navy, U.S. Department of the Interior, and TAC signed the Adak Land Transfer Agreement in  
13   September of 2000 (U.S. Navy, et. al., 2000). The future land uses established for Adak for the purposes of  
14   this ROD are described in the Existing and Future Uses Map, Figure 6-1. Current and project land uses  
15   include: residential housing and school facilities; industrial and port facilities, including fishing fleet  
16   support, seafood processing, wastewater treatment, power plant operation, domestic landfill operations;  
17   ongoing environmental cleanup; administration of USFWS facilities; and recreational activities, including  
18   fishing, hunting, hiking, and eco-tours.

19   Current and future land use was considered in the development of the conceptual site models for OU B-1  
20   sites. It was also a factor in the ESHA evaluations made for OU B-1 sites. These are discussed in more  
21   detail in Section 7 of this ROD. The land uses identified for each site are included in Table 6-1.

22                   **6.1       CURRENT ON-SITE LAND, GROUNDWATER, AND SURFACE WATER USES**

23   The Navy operationally closed the former Naval Air Facility Adak on March 31, 1997. A caretaker  
24   contract was awarded by the Navy and on April 1, 1997, that contractor began to maintain base facilities  
25   and continue providing services to support environmental cleanup, including billeting, food, water and  
26   wastewater, fuel, power, heating, and airport operations. From April 1997 through September 2000,  
27   critical facilities such as the power plant, airfield, and environmental cleanup systems were operated by the  
28   Navy through that caretaker contract. Since that time, The ARC has been operating and maintaining Adak  
29   facilities pursuant to a lease with the Navy. Drinking water continues to be supplied from the surface water  
30   reservoir at Lake Bonnie Rose. Throughout the history of the development of Adak, surface water has been  
31   used for potable water due to the high quality and abundance of available supply. Groundwater has never  
32   been used for potable or industrial purposes. The restriction on installation of groundwater wells in the  
33   downtown area under the Adak OU A ROD remains in effect as an institutional control. OU B-1 areas that  
34   are subject to ongoing OE/UXO intrusive investigations and clearance activities are designated as exclusion  
35   zones during such activities. At the successful conclusion of these activities, access restrictions and  
36   warning signs will be removed.



**Table 6-1  
Current and Projected Future Land Uses**

1

<b>AOC Name and Identifier</b>	<b>ESHA Area Number</b>	<b>Current Land Use<sup>1</sup></b>	<b>Projected Future Land Use<sup>2</sup></b>
<b><i>Blind Cove</i></b>			
BC-01	BC-01	Recreation and Wildlife Management	Return To Refuge Status
BC-05	BC-05		
BC-06	BC-06		
BC-07	BC-07		Recreation, Subsistence, Wildlife Management
BC-09A	BC-09A		Return To Refuge Status
<b><i>Combat Range #3</i></b>			
C3-01	C3-01A	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
	C3-01B		
	C3-01C		
	C3-01D		
	C3-01E	Recreation and Wildlife Management	
C3-02	C3-02	Recreation and Wildlife Management	
C3-03	C3-03		Mt. Reed Exclusion Area
C3-04	C3-04A	Recreation, Wildlife Management, and Mt. Reed Exclusion Area	Recreation, Subsistence, Wildlife Management
	C3-04B		
<b><i>Combat Range #6</i></b>			
C6-01	C6-01A	Recreation and Wildlife Management	Commercial, Marine, Industrial
	C6-01B	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
<b><i>Combat Range #8</i></b>			
C8-01	C8-01	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
C8-02	C8-02		
C8-03	C8-03		
C8-04	C8-04		
C8-05	C8-05A		
	C8-05B		
<b><i>Finger Bay Impact</i></b>			
FB-03	FB-03	Recreation and Wildlife Management	Commercial, Marine, Industrial
FB-06	FB-06		
FB-07	FB-07		
FB-08	FB-08		
FB-09	FB-09		
<b><i>Haven Lake Ordnance Area</i></b>			
HL-01	HL-01	Recreation and Wildlife Management	Residential
HL-02	HL-02		
<b><i>Lake De Marie Impact</i></b>			
DM-01	DM-01	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
DM-02	DM-02		Mt. Reed Exclusion Area
DM-06	DM-06A		
	DM-06B		

2

**Table 6-1  
Current and Projected Future Land Uses**

1

<b>AOC Name and Identifier</b>	<b>ESHA Area Number</b>	<b>Current Land Use<sup>1</sup></b>	<b>Projected Future Land Use<sup>2</sup></b>
<b><i>Lake Jean Ammunition Complex</i></b>			
LJ-01	LJ-01	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
LJ-02	LJ-02		
LJ-03	LJ-03		
LJ-04	LJ-04		
<b><i>Mitt Lake Impact Area</i></b>			
ML-01	ML-01A	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
	ML-01B		
	ML-01C		
ML-02	ML-02A		
	ML-02B		
ML-03	ML-03		
ML-04	ML-04		
ML-05	ML-05		
<b><i>NAF Adak Magazine</i></b>			
NM-02	NM-02	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management
NM-03	NM-03		
NM-04	NM-04	Recreation and Wildlife Management	Commercial, Marine, Industrial
<b><i>Scabbard Bay Impact</i></b>			
SB-01	SB-01	Recreation and Wildlife Management	Return To Refuge Status
<b><i>Urban Area</i></b>			
UA-01	UA-01	Commercial/Marine	Residential
UA-02	UA-02		
<b><i>WWII Runway</i></b>			
RW-01	RW-01	Commercial/Marine	Aviation/Commercial/Marine Industrial/Public Facilities
<b><i>Zeto Point</i></b>			
ZP-01	ZP-01	Recreation and Wildlife Management	Recreation, Subsistence, Wildlife Management

2

3

4

5

6

<sup>1</sup>Recreation uses include caribou hunting, ptarmigan hunting, duck hunting, fishing, berry picking, hiking, and camping

<sup>2</sup>Although projected future land uses include a range of activities, these areas have been cleared to support residential use



1 little or no qualitative hazard to future residents of Adak. This group of AOPCs includes 27 potential  
2 defensive minefield locations on Adak (24 within OU B-1), which evidence indicates were never installed.  
3 This group of AOPCs also includes 15 small arms ranges (11 in OU B-1), which all evidence indicates  
4 were used only for firing small caliber non-explosive weapons. Eleven AOPCs were referred for Site  
5 Inspection due to a lack of evidence with which to assess potential hazard. These sites include firing points  
6 and bivouac areas, as well as the known gun emplacements on Adak. Sixty of the OU B-1 AOPCs  
7 screened were referred for RI either because the available field data did not support the documented  
8 historical land use or because the site requires further physical investigation or remediation. These AOPCs  
9 include the majority of the impact areas on Adak, as well as most of the sites where ordnance was found  
10 during the 1999 field investigation.

11 The results of the PA are summarized in Table 4-1. It also contains comments that reflect adjustments to  
12 the outcome that were agreed to during the OU B Project Team discussions and meetings. For example,  
13 the combat ranges were referred for additional investigation even though these areas emerged from the PA  
14 process as NOFA sites. The Navy also determined that a small number of sites identified for inspection  
15 should move directly to RI in order to facilitate complete and efficient collection of data needed for FS (i.e.,  
16 collect all data with fewer site visits to optimize use of investigation time and funding). Six AOPCs were  
17 not carried forward in the RI process under the BRAC program (not included in the numeric totals cited  
18 above), because they encompass areas outside the military reservation. The sites will be addressed by the  
19 Corps under the DERP-FUDS program. The adjustments to AOPC status made following the preliminary  
20 assessment screen are summarized in Table 2-6 of the RI/FS, which includes the rationale for each change.

## 21 **7.2 EXPLOSIVE SAFETY HAZARD ASSESSMENT (ESHA)**

### 22 **7.2.1 Adak Island OU B Explosive Safety Hazard Assessment Methodology (ESHA)**

23 Prior to conducting the FS for ordnance-contaminated areas on Adak in OU B-1, it was necessary to  
24 identify appropriate areas for the study (i.e., those areas that represent a potential explosive safety hazard to  
25 the current and future residents of Adak). These areas were identified using a hazard assessment to analyze  
26 the results of the RI and to determine the potential magnitude of risk and hazards associated with any  
27 ordnance-related contamination on Adak. The findings of the hazard assessment focus the subsequent  
28 development, evaluation, and selection of appropriate response action alternatives for areas where the  
29 projected level of risk and hazard is judged to be unacceptable.

30 CERCLA has no specific provisions for dealing with ordnance-related explosive hazards, and the processes  
31 developed for assessing health risks associated with chemical substances do not lend themselves directly to  
32 the evaluation of explosive hazards. In addition, the hazard assessment methodology developed for Adak is  
33 a site-specific process. This process was developed as part of an overall framework for assessing and  
34 managing potential threats to human health and the environment on Adak due to the presence of  
35 unexploded ordnance (hazard assessment) and the potential release of hazardous chemical substances  
36 related to that ordnance (risk assessment).

37 The ESHA developed for Adak is a site-specific hazard assessment process for explosive dangers that  
38 addresses the unique character of the island, as allowed by DDESB 6055.9-STD C12.3.4.3. The  
39 methodology is qualitative in nature, but makes use of both qualitative and quantitative inputs in a  
40 framework that results in recommendations for proper site management of OE/UXO. For example, sites  
41 scored as an "A" or "B" were recommended for NOFA; those with a "C" or "D" were recommended for  
42 further investigation or remediation.

43 The Adak ESHA is based on four primary factors:

- 44
- 45 • Ordnance Search/Removal Status (areas where OE/UXO are known or indicated to be present  
46 have higher potential for explosive hazards than areas where OE/UXO have been searched for and  
47 not found or where all known ordnance items have been removed)
- 48

- 1 • Ordnance Characteristics (different types of ordnance have different potentials for detonation  
2 when disturbed, and if detonated, can produce a range of potential consequences)
- 3
- 4 • Ordnance Accessibility (the potential for explosive hazards is higher if energetic ordnance items  
5 are located at a depth where they would likely be disturbed by current or future land use activities)
- 6
- 7 • Public Exposure (a greater potential for explosive hazards occurs when people interact with the  
8 land more intensively or more frequently)

9 Each of the four primary factors is subdivided into subfactors. These subfactors are weighted in the  
10 calculation of the primary factor to reflect the relative importance of each element. For example, public  
11 exposure is influenced by the ease of public access (Are roads or trails present in the area? What is the  
12 planned future use for the land?), the intensity of public activity (How much energy will be imparted to the  
13 ground?), and the portability of ordnance items present in the area (How easily can the items be transported  
14 by a child). All three subfactors influence public exposure hazard; however, the ease with which people  
15 may reach and use an area, and the purpose for which they will use that area, are considered more  
16 important in the overall evaluation of public exposure than the other two subfactors. Existing and future  
17 land uses, which influence these subfactors, are described in Section 6.0.

18 The primary hazard factors are not only made up of weighted sub-factors but are also weighted themselves  
19 in the final calculation of explosive hazard to ensure that factors which have more influence in creating risk  
20 are more significant in the calculation. The presence or absence of ordnance and the relative hazard of that  
21 ordnance are far more important in assessing the overall risk to future residents of Adak. If there is no  
22 ordnance present, based on the results of an approved RI approach, then there is little risk no matter how  
23 intensively an area is used.

24 The primary factors and subfactors for the Adak ESHA are outlined on the ESHA Scoring Sheet presented  
25 in the RI/FS Report (ECC, 2001). A more detailed description of the development and application of the  
26 ESHA is presented in the ADAK OU B ESHA Methodology, Version 11 (FWENC, 2000a) which is  
27 incorporated in the RI/FS work plan for OU B. Table 7-1 includes the inputs to ESHA used to arrive at a  
28 letter score.

29 **7.2.2 Results of ESHA Analysis**

30 The ESHA process was conducted initially on 44 individual sites located within 41 OU B-1 AOCs. The  
31 majority of the sites screened in the ESHA received either an A score (38 sites) or a B score (3 sites), which  
32 results in a recommendation for NOFA. One of the “A” sites (BC-01) was subsequently removed from  
33 ESHA (leaving a total of 43 sites), and it was forwarded to the FS for additional data needs. For Adak, the  
34 NOFA recommendation includes an ordnance awareness and education program (a.k.a. Blue Card training)  
35 for island residents and visitors. This program is intended to familiarize residents and visitors with the  
36 history of ordnance use, storage, handling, and disposal on Adak, and to inform them of the proper  
37 procedures to follow in the event they encounter a suspected ordnance item. This program applies to all  
38 areas of the military reservation on Adak, including NOFA sites, and is necessary to address the potential  
39 for encountering ordnance, even in areas that have no known ordnance hazard. Three sites received scores  
40 of C (2 sites) or D (1 site) in the ESHA, thereby indicating that further remedial action is needed to reduce  
41 potential explosive safety hazards at these sites. These are sites C3-01A, C6-01A, and ML-01A. None of  
42 the 43 sites screened received an E score, which represents the greatest level of relative explosive hazard.  
43 Table 7-2 presents a summary of the ESHA scoring results for the 43 sites.

44 **7.3 RISKS FROM EXPLOSIVES-RELATED CHEMICALS**

45 Chemical contamination from ordnance on Adak was first evaluated during the SWMU 1 investigation  
46 performed under OU A. As SWMU 1 is the most heavily contaminated OE/UXO site identified on Adak,  
47 samples taken from within the site and downgradient were considered a worst-case scenario for  
48 contamination by OE/UXO. Based on the sampling performed at SWMU 1, contaminant migration of  
49 explosives-related compounds was not considered a risk to human health or the environment. Additional

1 details on the chemical contamination evaluation of OE/UXO can be found in the OU A RI/FS Report  
2 (URS, 1997). Post-removal action sampling was performed at SWMU 2 subsequent to the clearance of  
3 OE/UXO from the site. No ordnance-related compounds were detected during this sampling.

4 A complete baseline risk assessment for sites in OU B-1 where ordnance-related chemicals may be present  
5 was not undertaken. This is due to several reasons. First, the areas noted in the field notes in Table 5-4 as  
6 having potential releases of ordnance chemicals are single items or multiple small arms rounds. Therefore,  
7 the potential for release is very limited in terms of quantity and areal extent. The NCP 300.430 (e)  
8 indicates that the extent of the evaluation of risks and alternatives should be commensurate with the nature  
9 of the release. In this case, given the limited nature of any potential releases, the OU B Team developed a  
10 combined soil screening and cleanup approach based on risk based soil screening levels for an assumed  
11 residential exposure scenario. Finally, baseline risks for other OE/UXO sites was undertaken under OU A  
12 activities at sites with greater impacts and no unacceptable risks were found. Metals were not considered to  
13 pose a potential for adverse human health or ecological risk due to the nature of the sites, including those  
14 with single or limited rounds where filler release was noted or where soil staining was observed. These  
15 observations would not indicate the presence of metals in sufficient quantity to pose potential adverse risks.  
16 In a similar manner, filler material was not evaluated for potential adverse ecological risks due to the  
17 limited area of release. Several OE/UXO sites with much greater areal extent investigated during the OU A  
18 RI/FS were determined not to pose significant adverse ecological risk, given the small number of OE  
19 constituents detected and the very low RBSCs (below detection limits) for some OE constituents. For these  
20 reasons, it was determined that human health risk-based screening criteria associated with the filler  
21 materials would be relied upon for soil remediation decisions.

22 All of the sites listed in Table 5-4 for chemical sampling are in locations designated for recreational or  
23 wildlife management in the current and future land use plans. The use of residential soil screening criteria  
24 will provide for an added level of conservatism. The numeric values for screening that will also be used for  
25 cleanup are the lowest default values from the USEPA Region 9 residential soil screening criteria for  
26 ordnance related compounds that may be encountered at these sites (U.S. EPA 1999). The numeric criteria  
27 are presented in Section 8 of this ROD. These criteria are equivalent to a  $1 \times 10^{-6}$  risk in a residential  
28 exposure scenario.  
29

1  
2

**Table 7-1  
Explosives Safety Hazard Weighting Factors and Scoring Rules**

Ordnance Presence/Absence - High Weighting Ordnance Characteristics - High Weighting		PUBLIC EXPOSURE									
		A Least Potential Exposure		B		C		D		E Most Potential Exposure	
		Ordnance Search/ Removal Status		Ordnance Search/ Removal Status		Ordnance Search/ Removal Status		Ordnance Search/ Removal Status		Ordnance Search/ Removal Status	
Ordnance Characteristics ↓	Ordnance Accessibility ↓	A Not Found or Detected and Removed	B Known or Indicated to be Present	A Not Found or Detected and Removed	B Known or Indicated to be Present	A Not Found or Detected and Removed	B Known or Indicated to be Present	A Not Found or Detected and Removed	B Known or Indicated to be Present	A Not Found or Detected	B Known or Indicated to be Present
	A Least Potential	All cases where the Ordnance Characteristics Score is "A" will result in an Overall Hazard Score of "A"									
	B										
A Least Hazard	C										
	D										
	E Most Potential										
	A Least Potential	All cases where the Ordnance Characteristics Score is "B" will result in an Overall Hazard Score of "B"									
	B										
B	C										
	D										
	E Most Potential										
	A Least Potential	B	C	B	C	B	C	B	C	B	C
	B	B	C	B	C	B	C	B	C	B	C
C	C	B	C	B	C	B	C	B	C	B	D
	D	B	C	B	C	B	C	B	D	B	D
	E Most Potential	B	C	B	C	B	D	B	D	B	E
	A Least Potential	B	C	B	C	B	C	B	C	B	C
	B	B	C	B	C	B	C	B	D	B	D
D	C	B	C	B	C	B	C	B	D	B	D
	D	B	C	B	C	B	D	B	E	B	E
	E Most Potential	B	C	B	D	B	D	B	E	B	E
	A Least Potential	B	C	B	C	B	C	B	C	B	C
	B	B	D	B	D	B	D	B	D	B	D
E Most Hazard	C	B	D	B	D	B	D	B	D	B	D
	D	B	D	B	D	B	E	B	E	B	E
	E Most Potential	B	D	B	D	B	E	B	E	B	E
NOTE: Shaded scores are the "A"s and "B"s, which would result in the AOC not being sent on to the Feasibility Study for further evaluation using the matrix below. Unshaded scores are the "C"s, "D"s and "E"s, which would result in the AOC being sent to the Feasibility Study for further evaluation. The Feasibility Study evaluation process will be the same regardless of whether an AOC has received an Explosives Safety Hazard Score of "C", "D", or "E". The three category levels are included to provide a rough qualitative scale for judging the degree to which the various candidate response alternatives reduce the level of explosives hazard.											
Hazard Category		General Management Response Option (Actual responses to be identified through AOC-specific evaluation in the Feasibility Study)									
A (Lowest Hazard Level)											
B											
C											
D											
E (Highest Hazard Level)											

3

**Table 7-2  
ESHA Scoring Results and Disposition of OU B-1 Sites**

1

Candidate Site Name	Site Identifier/Name	ESHA Score	Disposition After ESHA Scoring			
			NOFA	Clearance to 4 ft bgs	Final Characterization	Chemical Sampling
Bay of Islands Impact Area	BI-02	N/A	√			
Blind Cove/ Campers Cove Impact Area	BC-01	A			√	
	BC-05, BC-06, BC-07, BC-09A, BC-09B	A	√			
	BC-02, BC-04, BC-08	N/A	√			
Chemical Warfare Materials Warehouses	CWS-01	N/A	√			
Combat Range #3	C3-01 (C3-01A)	D		√		√
	C3-01 (C3-01B, C3-01C, C3-01D, C3-01E)	N/A			√	
	C3-01F, C3-04 (C3-04B)	A	√			
	C3-02	B	√			
	C3-03	A	√			
	C3-04 (C3-04A)	N/A			√	√
Combat Range #6	C6-01 (C6-01A)	C		√		√
	C6-01B	A	√			
Combat Range #8	C8-01	A				√
	C8-03	N/A			√	
	C8-02	A	√			
	C8-04, C8-05 (C8-05B)	B	√			
	C8-05 (C8-05A)	N/A			√	√
Davis Lake Ordnance Warehouses	DL-01	N/A	√			
Finger Bay Ammunition Pier	FBAP-01	N/A	√			
	FBAP-02	N/A			√	
Finger Bay Dynamite Storage	FBDS-01	N/A	√			
Finger Bay Impact Area	FB-01, FB-04	N/A			√	
	FB-02, FB-05	N/A	√			
	FB-03 (see note), FB-06, FB-07, FB-08, FB-09	A	√			
Gun Emplacements	GUN-01, GUN-02, GUN-03	N/A			√	
Gun Emplacement	Shagak Bay	N/A			√	
Hammer Head Cover Impact Area	HH-01, HH-02	N/A	√			
Haven Lake Ordnance Area	HL-01, HL-02	A	√			
	HL-03	N/A	√			
Lake DeMarie Impact Area	DM-01, DM-02, DM-06B	A	√			
	DM-06 (DM-06A)	N/A			√	
	DM-03, DM-04, DM-05	N/A	√			
Lake Jean Ammunition Complex	LJ-01	N/A			√	√
	LJ-02, LJ-03, LJ-04	A	√			
	LJ-05	N/A	√			
MAUW Complex	MC-01	N/A	√			
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)	N/A	√			
	SWMU 2 Clam Lagoon (MF-21) (see below)	N/A	√			
Husky Pass	a.k.a. Husky Pass Training	N/A			√	

2

**Table 7-2  
ESHA Scoring Results and Disposition of OU B-1 Sites**

1

Candidate Site Name	Site Identifier/Name	ESHA Score	Disposition After ESHA Scoring			
			NOFA	Clearance to 4 ft bgs	Final Characterization	Chemical Sampling
Mitt Lake Impact Area	ML-01 (ML-01A)	C		√		
	ML-01 (ML-01B), ML-02 (ML-02A)	N/A			√	
	ML-01 (ML-01C), ML-03, ML-04, ML-05	A	√			
	ML-02 (ML-02B)	A				√
	ML-06, ML-07	N/A	√			
NAF Adak/Lake DeMarie Ammunition Complex	NM-02, NM-03, NM-04	A	√			
	NM-05	N/A	√			
NSGA Magazine Complex	NSGA-01	N/A	√			
Scabard Bay Impact Area	SB-01	A	√			
	SB-02, SB-03, SB-04, SB-05	N/A	√			
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)	N/A	√			
Urban Area	UA-01, UA-02	A	√			
	UA-03, UA-04	N/A	√			
WWII Ammunition Pier (Sweeper Cove)	AP-01	N/A	√			
	AP-02	N/A			√	
WWII (Near Runways)	RW-01	A	√			
	RW-02	N/A	√			
WWII Temp Bomb Storage (Kuluk Beach)	TBS-01	N/A	√			
Finn Field Bomb Burn Pile	SA92-01	N/A	√			
Zeto Point Impact Area	ZP-01	A	√			

2

3 Notes:

4 N/A – Not scored using ESHA due to change in site status or insufficient information at time of ESHA  
5 scoring.

6 FB-03 was switched from NOFA to Final Characterization based on the discovery of additional archival  
7 information following completion of the Proposed Plan (See Section 13).

8 SWMU 2 underwent clearance in 1998 (Section 5.3.2) and no further action is necessary.

9

1 **8.0 REMEDIAL ACTION OBJECTIVES**

2 **8.1 BACKGROUND**

3 The goal of the OU B investigation and remediation activities on Adak Island is to take steps to effectively  
4 reduce and manage potential explosive hazards and potential chemical risks posed by OE/UXO in order to  
5 protect human health and the environment for the current and reasonably expected future land use.  
6 Remedial action criteria are established to define the performance goals for the cleanup. Remedial action  
7 criteria typically include Remedial Action Objectives (RAOs), Cleanup Levels, and General Response  
8 Actions (GRAs). Because of the limited number of technologies available for addressing OE/UXO, GRAs  
9 were not developed in the FS.

10 **8.2 REMEDIAL ACTION OBJECTIVES TO CONTROL EXPLOSIVE HAZARDS**

11 The RAOs and cleanup levels were considered within the overall framework of the Adak Island OU B  
12 ESHA Methodology as described in the RI/FS Work Plan (FWENC, 2000a). This ESHA considers a broad  
13 range of factors that influence potential explosive hazards relative to possible exposures at a given site on  
14 Adak. These include:

- 15
- 16 • The indicated presence or absence of OE/UXO and the strength of evidence of sampling results
- 17
- 18 • Type, size, and detonation sensitivity of the ordnance items found
- 19
- 20 • The relationship between the depth at which OE/UXO was found (or may migrate to) and the
- 21 depth at which people may intrude into the soil during the performance of current or projected
- 22 future activities
- 23
- 24 • Frequency of public access to OE/UXO as measured by the ease with which the public can gain
- 25 access and the nature of the land use (current and/or future), or the ease with which the OE/UXO
- 26 may be transported out of the area to result in exposures elsewhere

27 The RAOs pertaining to the explosive safety aspect of the ordnance are directly related to the relationship  
28 among these risk factors in order to eliminate or reduce the potential for exposure to explosive ordnance in  
29 an area. The ESHA Methodology was applied to qualitatively evaluate the baseline (i.e., Adak NOFA)  
30 level of explosive hazard projected for the public, given the specified future use and set of associated  
31 activities. The ESHA was also used to qualitatively project the change in explosive hazard level and the  
32 residual explosive hazard associated with the implementation of a particular remedial alternative. This  
33 results in an RAO to reduce remaining potential explosive safety hazards throughout OU B-1 through the  
34 application of the ESHA process and subsequent clearance of OE/UXO, as necessary, to support current  
35 and reasonably expected future land use.

36 Cleanup levels are typically numeric expressions of RAOs. For explosive hazards, the cleanup level would  
37 entail removing all known OE/UXO that can be located with the methods developed for Adak.

38 While there are no current applicable, or relevant and appropriate (ARARs) promulgated federal or state  
39 standards to address potential explosive safety hazards, the Department of Defense has issued policies that  
40 have been identified as “to be considered” (TBC) for OU B-1. These include DDESB MIL-STD 6055.9,  
41 and the DoD policy concerning responsibilities for OE/UXO response actions post-transfer of property  
42 (DoD policy memorandum from Under Secretary of Defense, “Responsibility for Additional  
43 Environmental Cleanup After Transfer of Real Property,” dated July 25, 1997).

44

1    **8.3       REMEDIAL ACTION OBJECTIVES TO CONTROL CHEMICAL RISKS**

2    As discussed in Section 7 of this ROD, a combined soil screening and cleanup level approach was  
3    developed for the sites listed in Table 5-4. The current and projected future uses of these sites is  
4    recreational and wildlife management. The RAO for potential ordnance-related chemical risks at these  
5    sites is to prevent future residents and recreational users from being exposed to explosives-related  
6    contamination in soil above the cleanup levels. These cleanup levels are based on USEPA Region 9 default  
7    residential soil screening levels. The assumptions used to develop these criteria are more conservative than  
8    those used in the development of Adak baseline risk assessments for OU A recreational exposure scenarios.  
9    The soil cleanup levels for explosives-related chemicals are shown in Table 8-1. Achievement of these  
10   cleanup levels will result in an estimated residential risk of  $1 \times 10^{-6}$  or lower, and a potential recreational risk  
11   that is also lower.

12   The State of Alaska 18 AAC 75 requires a cumulative risk of no more than  $1 \times 10^{-5}$ . Compliance with this  
13   state ARAR should be met by achieving the cleanup levels in Table 8-1. For on-site treatment 18 AAC  
14   75.365 Offsite or Portable Treatment would be an ARAR. In the event that off-site treatment and disposal  
15   is required for soils containing ordnance related chemicals, 40 CFR Part 264 would be an ARAR.

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**Table 8-1**  
**Cleanup Levels for Soil Chemicals of Concern**

**Media:** Soil

**Site Area:** OU B-1

**Available Use:** Varies: Uses Include Residential and Recreational (See Table 6-1)

Chemical of Concern	Cleanup Level (ppm or mg/kg)	Basis for Cleanup Level	Risk at Cleanup Level
Dinitrotoluene (mixture)	0.72	EPA Region 9 Residential RBSC	10 <sup>-6</sup>
2,4,6-Trinitrotoluene	18	EPA Region 9 Residential RBSC	10 <sup>-6</sup>
Nitroglycerin	35	EPA Region 9 Residential RBSC	10 <sup>-6</sup>
Nitroguanidine	6100	EPA Region 9 Residential RBSC	10 <sup>-6</sup>
Tetryl (Trinitrophenylmethylnitramine)	610	EPA Region 9 Residential RBSC	10 <sup>-6</sup>
RDX (Cyclonite)	4	EPA Region 9 Residential RBSC	10 <sup>-6</sup>

9

RBSC – Risk Based Screening Concentration

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Notes:

Dinitrotoluene (mixture) represents a mixture of 2,4-dinitrotoluene and 2,6-dinitrotoluene.

16

1 **9.0 DESCRIPTION OF ALTERNATIVES**

2 This section presents the remedial alternatives that were developed and evaluated in the OU B-1 RI/FS.

3 **9.1 ALTERNATIVE 1- NOFA (NO FURTHER ACTION/FACILITY-WIDE ORDNANCE**  
4 **AWARENESS PROGRAM)**

5 Alternative 1 (Adak NOFA) provides a baseline for comparing the other alternatives. Alternative 1 is  
6 evaluated assuming the projected land use for each site given its present state with no additional site-  
7 specific activities aimed at locating, removing, or disposing of any potential OE/UXO. Alternative 1  
8 includes the OE/UXO awareness program that is currently required for Adak residents and visitors. This  
9 program applies to the entire military reservation at Adak, including sites that are not part of OU B-1, and  
10 therefore is not an AOC-specific institutional control. This program is intended to familiarize on-island  
11 residents and visitors with the history of ordnance use, storage, handling and disposal on Adak Island; basic  
12 characteristics of OE/UXO items on Adak; and the procedures that should be followed if a suspected  
13 OE/UXO item is encountered. In addition to maintaining this program, deed notices or other legal  
14 instruments will also be used to inform future users of information related to past investigations for  
15 OE/UXO.

16 Navy will provide a copy of this OU B-1 ROD and the FOST to BLM to be maintained as part of the  
17 permanent file of conveyance documentation. The FOST will contain a full legal description of the  
18 properties, associated Institutional Controls, and a legal description of covenants, as appropriate based on  
19 decisions in place for the specific OU reference to these documents and their availability in the BLM  
20 permanent conveyance file will be included in the interim conveyance executed by BLM. This BLM  
21 permanent file of interim conveyance documents will be available to current and future owners of the real  
22 estate seeking information about past land uses, including the potential for OE/UXO items. This measure  
23 will provide the current and future landowners with a source for information about OE/UXO and the type  
24 of remedial actions that have been taken. Otherwise, no AOC-specific actions are provided under the Adak  
25 NOFA, and no land use restrictions are identified for the NOFA sites.

26 **9.2 ALTERNATIVE 2-SURFACE CLEARANCE (REMOVAL OF SURFACE OE/UXO)**

27 Surface clearance involves identifying and removing OE/UXO at the surface (top of the mineral soil level)  
28 by conducting a surface sweep and a subsequent removal and disposal operation. This surface clearance  
29 action would be applied to all accessible portions of the site, removing and disposing of all metal scrap,  
30 OE/UXO debris, and OE/UXO found on the surface. Hand-held metal detectors would be used to assist in  
31 locating these items. Digging for OE/UXO is not included with this alternative. Sites subject to this  
32 alternative would also be covered by the educational awareness programs.

33 **9.3 ALTERNATIVE 3-SURFACE AND SUBSURFACE CLEARANCE TO 4 FEET**

34 Alternative 3 includes all the work performed as part of the Surface Clearance alternative with an  
35 additional subsurface investigation and clearance to four feet bgs. In addition to reducing risk at a site,  
36 subsurface clearance to the maximum depth that OE/UXO were found will further meet the site-specific  
37 requirements outlined in DoD 6055.9-STD Chapter 12 for cleanup and transfer of property potentially  
38 contaminated by OE/UXO. All accessible portions of a site will be geophysically surveyed, with  
39 subsequent removal of detected subsurface OE/UXO and ordnance debris. While a clearance depth of two  
40 feet bgs is the minimum required clearance to support the current and reasonably likely future land use for  
41 recreational and wildlife areas on Adak, a 4-foot depth was chosen by the OU B Project Team based upon  
42 site conditions, ordnance management history, technology to be used for clearance, and the depth intervals  
43 at which nearly all OE/UXO has been found on Adak. Achieving a 4-foot clearance depth on these sites

1 will allow residential land use for these sites. Sites subject to this alternative would also be covered by the  
2 educational awareness programs.

3 Discovery during the 2001 field season of probable WWII OE/UXO burial/disposal site at C3-01A and  
4 subsequent initial investigations and clearance activities indicate that OE/UXO at this location exists below  
5 4 feet bgs. This disposal site, and any others where similar conditions are encountered, will be cleared to a  
6 depth of 4 feet below the lowest depth that OE/UXO was found or to bedrock – whichever is encountered  
7 first.

8 **9.4 ALTERNATIVE 4-SAMPLING FOR ORDNANCE COMPOUNDS AND REMOVAL AND**  
9 **DISPOSAL OF EXPLOSIVES-CONTAMINATED SOILS**

10 Alternative 4 is an observational approach that addresses 9 targets within 7 sites that were identified  
11 through year 2000 field notes. Sampling will be performed where field observations indicate that breached  
12 ordnance or staining may have contaminated the soil with chemicals from OE/UXO. Field screening  
13 methods will be used to identify soils that are contaminated above cleanup levels in Table 8-1. All such  
14 soils at the sites listed in Table 5-4 will be excavated and containerized at the site. Confirmatory sampling  
15 to verify that cleanup levels have been achieved will be done through fixed lab analyses. Based on  
16 considerations such as the final volume, chemical composition of contaminated soils from the sites, and  
17 costs, the soils will either undergo final treatment and disposal on-site, or off-site at a permitted facility.  
18 This alternative also assumes excavation and shipment for ultimate treatment and/or disposal of a nominal  
19 volume of soil (less than 1 cubic meter per site) contaminated above the cleanup levels from each of these  
20 sites.

## 10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

CERCLA requires that the ROD address and support the specific statutory requirements, emphasize long-term effectiveness, and encourage evaluation of innovative technologies. Nine evaluation criteria contained in the NCP provide the basis for determining which alternative provides the “best balance” among the alternatives to meet the nine criteria. The nine criteria are grouped into three categories, based upon the role of each during remedy selection.

- Threshold criteria:
  - Overall protection of human health and the environment
  - Compliance with ARARs/TBCs
- Balancing criteria:
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, and volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost of implementation
- Modifying criteria
  - State acceptance
  - Community acceptance

This section presents the evaluation of the four identified remedial alternatives based on the nine selection criteria. A description of each criterion is presented along with the evaluation of each alternative in the following sections.

The comparative analysis evaluates the relative performance of each alternative in relation to each specific evaluation criterion. The advantages and the disadvantages of each alternative are identified and discussed so that key tradeoffs can be identified for the decision-makers.

### 10.1 COMPARATIVE ANALYSIS FOR C3-01A, C6-01A, ML-01A, AND THE 24 AOPC SITES. AND THE 7 POTENTIAL CHEMICAL RELEASE SITES.

This section presents the results of the nine NCP criteria evaluation for the C3-01A Ordnance Disposal Site, C6-01A Mortar Impact Area, the ML-01A Mortar Impact Area, the 24 AOPC sites, and the 7 sites (nine targets) where potential ordnance-related chemicals may be released into the environment. Table 10-1 provides a summary of these evaluations.

#### 10.1.1 Overall Protection of Human Health and the Environment

This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls. The overall protection of human health and the environment reflects the level of relative residual hazard remaining after the alternative has been implemented, compliance with ARARs/TBCs, and long-term and short-term effectiveness.

Alternative 3 (OE/UXO Surface and Subsurface Clearance to 4 feet bgs) is highly protective of human health and the environment with respect to explosives safety. Removal of OE/UXO will be protective of human health and the environment. Alternative 2 (Surface Clearance) is considered slightly protective of human health and the environment, but a moderate level of relative residual hazard remains. This alternative does not meet the threshold of being compliant with the site-specific DDESB TBC (DoD

1 Instruction 6055.9-STD), and the long-term effectiveness is not reduced because some of the OE/UXO  
2 remain.

3 Alternative 1 is the baseline alternative providing no remedial action. The results show the Adak  
4 NOFA/Baseline Institutional Controls Alternative has the lowest level of relative protectiveness.

5 Alternative 4 (Sampling, Removal, Treatment and Disposal of Explosives-Contaminated Soils) involves  
6 clean up of soils that contain ordnance-related compounds through treatment and disposal that will be  
7 protective of human health and the environment.

### 8 **10.1.2 Compliance with ARARs/TBCs**

9 This criterion evaluates whether a remedial action meets state and federal environmental laws and  
10 regulations that pertain to the site. For explosive safety concerns, the primary TBC is the site-specific  
11 DDESB DoD Instruction 6055.9-STD guidelines (DoD, 1999) for clearance for property transfer. These  
12 standards establish policies and procedures necessary to provide protection to personnel as a result of DoD  
13 ammunition, explosives, or chemical agents and contamination of real property currently or formerly  
14 owned, leased, or used by DoD. These include default clearance depths for projected land uses, absent site-  
15 specific clearance requirements.

16 Alternative 3 (OE/UXO Surface and Subsurface Clearance) complies with the site-specific clearance  
17 depths developed for the Adak OU B-1 clearance activities. A clearance depth of 4 feet bgs will exceed  
18 site-specific depths for recreational and wildlife management, and will meet residential clearance depths.  
19 The projected depth of intrusion associated with site-specific future activities relative to the OE/UXO  
20 clearance depth specified for this alternative is the determining factor in establishing the performance of  
21 this alternative.

22 Previously, the maximum depth of OE/UXO discovered at three sites was between 1 foot (ML-01A) and 2  
23 feet (C3-01A and C6-01A). The 2001 intrusive work at C3-01A indicates it is a probable OE/UXO  
24 burial/disposal site and that associated OE/UXO items may exist at depths greater than 4 ft bgs. This and  
25 other such disposal sites that are discovered will be cleared to a depth of 4 ft below the lowest depth that  
26 OE/UXO was found or to bedrock – whichever is encountered first. Clearance to 4 feet bgs is the only  
27 alternative that will satisfy the site-specific requirements for land transfer.

28 Alternative 2 (Surface Clearance) does not comply with this TBC. Even though surface clearance activities  
29 may reduce the presence of OE/UXO, they do not meet the clearance depth requirement of 2 feet for  
30 wildlife management and recreation, and without waivers available, remain non-compliant.

31 Alternative 1 (Adak NOFA/Facility-Wide Ordnance Awareness Program) also does not comply with the  
32 site-specific DDESB TBC. Alternative 4 will meet or exceed 18 AAC 75 cumulative risk requirements.

### 33 **10.1.3 Long-Term Effectiveness and Permanence**

34 Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to  
35 maintain reliable protection of human health and the environment over time, once cleanup levels have been  
36 met. The effectiveness of the alternative is dependent on the level of the relative residual hazard and the  
37 adequacy of response.

38 Alternative 3 (Surface and Subsurface Clearance) results in the highest scores for the relative residual  
39 hazards and adequacy of the response because the OE/UXO has been rendered safe and the exposure  
40 eliminated to 4 feet bgs. These factors combine to establish a high level of long-term effectiveness for  
41 Alternative 3.

1 Permanence is based on the need for engineering or institutional controls and maintenance activities to  
2 ensure continued protection from residual hazards. Alternative 3 clears OE/UXO, and does not rely on  
3 additional controls or maintenance for the site. After the OE/UXO has been cleared, it is assumed the  
4 clearance is permanent and complete to the level of certification as defined in the remedial action design  
5 documents. The combination of high effectiveness and permanence yields low relative residual hazards for  
6 this site, thereby providing the best solution for the long-term.

7 Alternative 2 (Surface Clearance) also involves a permanent OE/UXO clearance. However, the  
8 effectiveness is less because of the level of relative residual hazard and the adequacy of response when only  
9 clearing the surface of the site. Even though surface clearance of OE/UXO would reduce the presence of  
10 OE/UXO it would not remove it completely. Because C3-01A is a disposal area, there are some unique  
11 concerns associated with Alternative 2. In addition, both C6-01A and ML-01A are mortar impact areas and  
12 because the dud rate for this type of munition is moderately high and dud mortars are capable of burying  
13 themselves on impact, the possibility of subsurface OE/UXO remaining is of greater concern. Overall, the  
14 long-term effectiveness and permanence for Alternative 2 does not fully eliminate the relative residual  
15 hazard, and is not a complete solution for these three sites. Similar concerns exist for some of the 24  
16 AOPC sites.

17 Alternative 1 does not reduce the level of relative residual hazard, and remains inadequate as a solution.

18 Alternative 4 includes the cleanup and on-site or offsite treatment and disposal of ordnance contaminated  
19 soils that will result in a permanent solution.

#### 20 **10.1.4 Reduction of Toxicity, Mobility, and Volume through Treatment**

21 This criterion evaluates a remedial action's use of treatment to reduce the harmful effects of principal  
22 contaminants, their ability to move in the environment, and the amount of residual contamination  
23 remaining.

24 All UXO and OE containing energetic material under Alternative 3 will either be subject to treatment by  
25 blow in place or through collection for consolidated detonation at approved locations. Alternative 3 is the  
26 only alternative offering a complete reduction in OE/UXO, and is viewed as the best choice for this  
27 criterion.

28 Alternative 2 offers partial treatment of the OE/UXO. However, this alternative does not remove OE/UXO  
29 to the depth to which it may be present, thereby representing a potential for residual OE/UXO remaining  
30 below the ground surface. This alternative would reduce mobility concerns and reduce the potential  
31 volume of explosive material present at the surface of the site.

32 Alternative 1 does not provide any reduction in toxicity, mobility, or volume through treatment, as  
33 treatment is not a component. Therefore, this alternative does not take steps in risk reduction for this  
34 criterion.

35 On-site or off-site treatment and disposal of soils contaminated with ordnance-related compounds under  
36 Alternative 4 would satisfy this criterion. Currently available technologies include thermal desorption and  
37 composting, both of which are highly effective at reducing toxicity, mobility, and volume of contaminants.

#### 38 **10.1.5 Short-Term Effectiveness**

39 Short-term effectiveness considers how fast a remedial action reaches the cleanup goal and the risk that the  
40 remedial action poses to workers, residents, and the environment during the construction or implementation  
41 of the remedial action.

1 Both of the OE-clearance alternatives (2 and 3) are acceptable for short-term effectiveness criteria. Short-  
2 term effectiveness typically considers four components: community risk, worker risk, environmental  
3 impacts, and completion time. Community risk is a potential concern because of the proximity of roads to  
4 C3-01A and other sites. During intrusive investigations and any detonations of OE/UXO that are required  
5 as part of the clearance activities, road access will be restricted and exclusion zones established around the  
6 sites. For C6-01A and ML-01A, community risk is minimal due to its remote location and limited access.  
7 C6-01A and ML-01A are 1,000 meters and 100 meters, respectively, from the closest hiking trail, and are  
8 not on the way to any destination of general interest. These remote locations do however cause some  
9 logistical challenges for personnel and equipment due to lack of road access to C6-01A and ML-01A. As a  
10 result, staging of equipment and personnel would need to be performed in multiple phases.

11 Worker risk is always a consideration for OE-clearance (Alternatives 2 and 3) and is based on the amount  
12 and type of intrusive work involved. The site worker short-term risk is measured by the potential for an  
13 explosive accident/incident to occur. Though many precautions are taken to protect the site workers, the  
14 density and type of OE/UXO cannot be accurately determined because of the many different caches and  
15 types of ordnance found in C3-01A during the previous investigations. The risk of OE/UXO within this  
16 site is consistent with a disposal area where typically the items are found not fully destroyed by a  
17 demolition shot, or are abandoned by being buried. Prior investigations have shown the risk of OE/UXO  
18 within C6-01A and ML-01A to be consistent with a mortar impact area where dud-fired and low-ordered  
19 rounds are found. Given the potential for loss of limb or life when dealing with OE/UXO, all clearance  
20 activities are considered higher in risk.

21 As would be expected, Alternative 1 is considered the lowest short-term risk, and poses no worker risk  
22 hazards. The site factors and UXO factors do not change between Alternatives 2 and 3, but the logistics  
23 factors can involve scheduling and controlling crews, accommodating seasonal/weather issues, and  
24 providing access to medical assistance. The tundra environment at Adak is fragile and can take many years  
25 to return, as evidenced by the footprints of WWII Quonset huts still visible in many areas. OE/UXO  
26 clearance to 4 feet bgs is assumed to create a measurable, but not severe, environmental effect. Completion  
27 time is the last factor for short-term effectiveness. It is assumed each of the alternatives could be  
28 completed in less than 6 months, based on previous field activities on Adak.

29 Under Alternative 4, there is little short-term risk associated with the soil cleanup because of the small  
30 volumes and lack of acute toxicity. Personal protective equipment and adherence to standard protocols for  
31 sampling and cleanup will minimize any exposure risks to workers.

### 32 **10.1.6 Implementability**

33 Implementability addresses the technical and administrative feasibility of a remedy from design through  
34 construction and operation. Factors such as availability of services and materials, administrative feasibility,  
35 and coordination with other governmental entities are also considered.

36 Alternatives 2, 3, and 4 meet the technical and administrative OE/UXO requirements and are  
37 implementable. There are no extraordinary technical requirements due to access, available technology, or  
38 interference with subsequent responses. The personnel and general support services provided on Adak are  
39 a concern. The site terrain and logistics at each of the three sites may pose unique problems in the  
40 mobilization of equipment and personnel under Alternatives 2 and 3. Steep access and multiple streams are  
41 present near C3-01A. The waters of Mitt Lake bound the entire western end of ML-01A and implementing  
42 C6-0A presents several logistical hurdles, including steep access from the water, long overland access  
43 distances, and the uncertainty of DGPS radio access near Mt. Reed.

1 **10.1.7 Cost**

2 The cost summary sheets with assumptions for the three sites (C3-01A, C6-01A, and ML-01A) are  
3 presented in the RI/FS Report (ECC, 2001) and are based on costs for previously performed clearance  
4 activities performed at similar sites on Adak. Based on EPA guidance, the cost estimates were developed  
5 in the RI/FS Report to be accurate to a range of -30 percent to +50 percent, given the available information.  
6 Alternative 3 (OE/UXO Surface and Subsurface Clearance to 4 feet bgs) for the three sites is the most  
7 costly at \$450,674 for C3-01A, \$94,021 for C6-01A, and \$171,467 for ML-01A. Alternative 2 (Surface  
8 Clearance) is the second most costly at \$126,224 for C3-01A, \$34,759 for C6-01A, and \$50,327 for  
9 ML-01A. Costs for Alternative 1 are estimated to be \$50,000 for management of the program.

10 For Alternative 4, the cost for the chemical sampling and disposition of soil at is estimated to be \$15,305.  
11 These costs are based upon the assumptions that the 9 targets within 7 sites to be sampled will generate  
12 seven drums of hazardous waste that must be disposed of off-island.

13 An additional 24 sites will undergo final characterization and clearance. The costs for site recon, surface  
14 clearance, and subsurface clearance to 4 feet bgs have been estimated to \$692,163.

15 **10.1.8 State and Community Acceptance**

16 ADEC has had significant involvement over the past two years in the OU B process and supports the  
17 recommended cleanup remedy. ADEC did provide comments on the Proposed Plan that addressed four  
18 concerns: (1) the distinction between clearance for residential use as selected by Alternative 3 and  
19 clearance for unlimited use, (2) the designation of the party who will administer the Ordnance Awareness  
20 Educational Plan in the future, (3) the recommendation to craft institutional controls as part of the property  
21 conveyance such that they would “run with the land,” and (4) a recommendation to address improvements  
22 in ordnance detection and clearance equipment as part of the 5-year review process. ADEC’s signed  
23 statement at page vii of this Record of Decision sets forth its concurrence with the remedies selected and its  
24 concurrence with the disposition of its comments, subject to certain specified reservations.

25 Community concerns were voiced during the Proposed Plan briefing and subsequent RAB meeting, as well  
26 as through written comments provided by A/PIA. Community concerns generally centered on the level of  
27 documentation of ordnance survey and clearance activities conducted during the RI and the importance of  
28 the ongoing educational program. All comments received during the public comment period for the  
29 Proposed Plan, as well as written responses are included in the Responsiveness Summary attached to this  
30 ROD as Appendix A.

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**Table 10-1  
Evaluation of Alternatives**

<b>Criteria</b>	<b>Alternative 1 NOFA/Facility-Wide Ordnance Awareness Program</b>	<b>Alternative 2 Surface Clearance</b>	<b>Alternative 3 Clearance to 4 ft. bgs</b>	<b>Alternative 4 Sampling/Removal and Disposal of Explosives Contaminated Soils</b>
<b>Threshold Criteria</b>				
Overall Protection	No reduction in risk other than that provided from the existing ordnance awareness and education program.	Slightly protective of human health and the environment.	Highly protective of human health and the environment.	Clean up of soils that contain ordnance-related contaminants will be protective of human health and the environment.
Compliance with ARARs/TBCs	Does not comply with the site-specific DDESB clearance depth.	Does not comply with the site-specific DDESB clearance depth.	In compliance with the site-specific DDESB clearance depth.	Will comply with ARAR/TBC for cleanup of contaminated soils.
<b>Balancing Criteria</b>				
Long-Term Effectiveness	No reduction in the level of residual hazard.	OE/UXO not fully eliminated. Moderate level of relative residual hazard remains.	OE/UXO rendered safe and exposure eliminated yielding a low relative residual hazard.	Cleanup and offsite disposal or on-site treatment will result in a permanent solution.
Short-Term Effectiveness	No further risk to community, workers, or environment beyond existing conditions.	Acceptable risk level for community, workers, and the environment.	Acceptable risk level for community, workers, and the environment.	Little short-term risk associated with the soil cleanup because of the small volumes and lack of acute toxicity.
Implementability	No services required.	Need specialized UXO personnel and equipment. Access to site problematic due to remoteness. Alternative is implementable.	Need specialized UXO personnel and equipment. Access to site problematic due to remoteness. Alternative is implementable.	Soil cleanup is easily implemented.
Reduction in Toxicity, Mobility and Volume	No reduction.	Partial reduction of OE/UXO. Mobility minimized, but volume of explosive material not eliminated.	Complete reduction of OE/UXO.	On-site treatment provides complete reduction of ordnance contaminated soils. Off-site treatment generally only reduces mobility.
Cost	\$0 (attributable to these sites, but \$50,000 for the island-wide management of the program as a one-time cost)	\$ 126,224 (C3-01A) \$ 34,759 (C6-01A) \$ 50,327 (ML-01A) \$ 187,962 (24 additional sites to undergo final characterization and clearance)	\$ 450,974 (C3-01A) \$ 94,021 (C6-01A) \$ 171,467 (ML-01A) \$ 692,163 (24 additional sites to undergo final characterization and clearance)	\$ 15,305
<b>Modifying Criteria</b>				
State Acceptance	Addressed in Section 10.1.8 and in the review of OU B scoping documents.			
Community Acceptance	Addressed in Appendix A, the Responsiveness Summary.			

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## 11.0 SELECTED REMEDY

3 For sites C3-01A, C6-01A, and ML-01A Alternative 3 is selected remedy because it permanently removes  
4 OE/UXO to 4 feet bgs. Ground surface is defined as the beginning of the mineral soil layer. As noted  
5 earlier in this ROD, discovery during the 2001 field season of probable WWII OE/UXO burial/disposal site  
6 at C3-01A and subsequent initial investigations and clearance activities indicate that OE/UXO at this  
7 location exists below 4 feet bgs. This disposal site, and any others where similar conditions are  
8 encountered, will be cleared to a depth of 4 feet below the lowest depth that OE/UXO was found or to  
9 bedrock – whichever is encountered first. It also achieves clearance depths that will allow for future  
10 residential land use throughout OU B-1. This also renders the real estate suitable for transfer to private  
11 sector ownership for reuse. The costs and implementability issues are considered acceptable for this  
12 alternative. The selected remedy is considered permanent and protective of human health and the  
13 environment.

14 Alternative 3 is also selected for the twenty-four OAPC sites. These sites are listed in Table 11-1. The  
15 implementation of this remedy will include final characterization to determine the extent of (clearance  
16 required at these sites. This approach will incorporate site reconnaissance, inspection, and geophysical  
17 investigation techniques consistent with those employed during the OU B-1 RI/FS to address concerns  
18 related to data gaps on specific portions of these sites. These are identified in EPA and ADEC comments on  
19 the OU B-1 RI/FS Report. After final characterization, 100 percent of all identified target anomalies to a  
20 depth of 4 ft bgs will be intrusively investigated and all OE/UXO will be cleared through blow in place or  
21 through consolidated detonation at an approved location on Adak.

22 Alternative 4 is selected for 7 of the 24 OAPC sites where ordnance related chemical contamination may be  
23 present in soils. Excavation until soil cleanup levels in Table 8-1 are met, followed by onsite or offsite  
24 treatment and disposal will also achieve residential cleanup levels at these sites. This will ensure  
25 achievement of consistent remedial actions for OU B-1 sites.

26 For the remaining 104 OU B-1 sites, Alternative 1 (NOFA/Facility-Wide Ordnance Awareness Program) is  
27 the selected as the remedy. The No Further Action selection for these sites is considered protective of  
28 human health and the environment, based on the evaluation processes developed and implemented during  
29 the PA and SI process that resulted in determinations of little or no OE/UXO hazards, or the results of RI  
30 and ESHA evaluations that resulted in similar determinations. The process of intrusive investigation and  
31 clearance of OE/UXO during field activities associated with one of these steps resulted in the effective  
32 clearance of OE/UXO at the site to support residential land use, thereby supporting the NOFA selection.

### 33 11.1 SELECTION RATIONALE

34 Based on information currently available, the Navy believes the Preferred Alternative meets the threshold  
35 criteria and provides the best balance compared to other alternatives evaluated with respect to the balancing  
36 and modifying criteria. The Navy expects the Selected Alternative to satisfy the following statutory  
37 requirements of CERCLA §121(b):

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- Protective of human health and the environment
- Compliance with ARARs and TBCs
- Cost-effective
- Utilize permanent solutions and alternative treatment technologies to the maximum extent practicable
- Satisfy the preference for treatment as a principal element

1 **11.2 DETAILED DESCRIPTION**

2 The elements of the selected remedy for sites C3-01A, C6-01A, and ML-01A includes:

- 3 • **Mobilize equipment and personnel to each site.** Survey and Clearance workers would  
4 access the sites by an all-terrain vehicle from a base of operations in the Adak downtown area.  
5 Radio repeaters would be placed in key locations to provide two-way communications with  
6 the base of operations
  
- 7 • **Provide on-site training and certification of field crews.** All personnel assigned to the  
8 geophysical investigation teams require an initial certification with the equipment used at the  
9 VDS site. This equipment includes: the Leica DGPS, EM-61, and Schonstedt detector
  
- 10 • **Clear surface.** Prior to performing geophysical surveys, the site would be cleared of all  
11 metallic items after having first located them through the use of hand-held  
12 magnetometers/gradiometers as described in Alternative 2
  
- 13 • **Conduct geophysical survey of each site.** Using proven equipment and techniques, gather  
14 geophysical data from the accessible portions of the site and transmit the data off-island for  
15 signal processing and data interpretation
  
- 16 • **Process the electronic geophysical data.** Using proven software and quality control  
17 methods, analyze the geophysical data and select anomalies to be further investigated and  
18 excavated
  
- 19 • **Identify target for excavation.** When anomalies have been evaluated, assign target numbers  
20 and provide coordinates and anticipated depths to on-island OE/UXO clearance personnel
  
- 21 • **Perform excavation and removal/destruction of targets.** On-island OE/UXO clearance  
22 personnel will return to each site and locate each target using DGPS-locating equipment.  
23 When located, OE/UXO clearance personnel will establish an exclusion zone and excavate  
24 the identified target(s). OE/UXO items will be handled in accordance with established UXO  
25 safety procedures (in accordance with OPNAVINST 8027.1G)
  
- 26 • **Perform QA/QC of the data collected during field activities.** QA/QC of the geophysical  
27 equipment will be performed by conducting daily repeatability checks prior to the beginning  
28 of each data acquisition file. Equipment checks will also be performed at specific areas and  
29 recorded in digital files in order to assess data trends over the duration of the project.

30 At the 24 OAPC sites all of the activities listed above for the previous three sites will also be implemented.  
31 In addition, and prior to implementing those steps, these sites will be subject to final characterization  
32 activities to address data concerns in specific portions of the sites. The final characterization approach will  
33 incorporate site recon, inspection, and geophysical investigation techniques consistent with those employed  
34 during the OU B RI/FS. To the extent that clearance of OE/UXO items is required at any of these 24 sites,  
35 clearance operations will be conducted as described above for the selected remedy for sites C3-01A,  
36 C6-01A, and ML-01A.

37 In addition to the above elements, the selected remedy for 9 targets within 7 of the 24 OAPC sites will  
38 include soil sampling at sites where explosives compounds may pose a risk to human or ecological  
39 receptors. Sampling will be performed where field observations indicate that breached ordnance or staining  
40 may have contaminated the soil with chemicals from OE/UXO. Field screening methods will be used to  
41 identify soils that are contaminated above cleanup levels in Table 8-1. All such soils at the sites listed in  
42 Table 5-4 will be excavated and containerized at the site. Confirmatory sampling to verify that cleanup

1 levels have been achieved will be done through fixed lab analyses. Based on considerations such as the  
2 final volume, chemical composition of contaminated soils from the sites, and costs, the soils will either  
3 undergo final treatment and disposal on-site, or off-site at a permitted facility. This alternative also assumes  
4 excavation and shipment for ultimate treatment and/or disposal of a nominal volume of soil (less than 1  
5 cubic meter per site) contaminated above the cleanup levels from each of these sites.

6 The common elements of the selected remedy for all of OU B-1 includes the following activities that will  
7 be undertaken by the Navy:

- 8           • Continue to provide the existing OE/UXO awareness and avoidance training program for  
9           Adak residents and visitors
  
- 10           • Provide the OU B-1 ROD and other key documents to the Bureau of Land Management  
11           (BLM) to maintain as part of the permanent file for conveyance of real estate to private  
12           ownership, and refer to the availability of this documentation in the interim conveyance  
13           executed by BLM. This intent of providing these references is to disclose to current and  
14           future landowners what is known about OE/UXO and the depth to which clearance actions  
15           were taken

16 As noted in previous sections of this ROD, these activities are not triggered by the specific requirements of  
17 any single AOC or site, rather, these are considered to be base-wide requirements to provide adequate  
18 educational awareness for current and future residents and visitors to Adak Island. The selection of the  
19 NOFA remedial action for any of the 104 OU B-1 sites in this ROD triggers the need for these programs on  
20 a base-wide basis.

### 21 **11.3 COST OF THE SELECTED REMEDY**

22 Costs for the Selected Remedy for the three RA sites were first presented in the Appendix E of the RI/FS  
23 Report (ECC, 2001). The costs have been reformatted and revised based on EPA FS costing guidance  
24 (EPA 2000) with the addition of contingency and project management factors (Table 11-2). Assumptions  
25 for production rates are indicated within the tables presented below. Costs assume that remote access  
26 vehicles/equipment will be available on Adak and will not have to be mobilized from off-island.  
27 Additional costs will be required if housing or office space is not available for temporary use by clearance  
28 personnel.

29 Estimated combined costs for the three RA sites are:

30	Combat Range 3, Site C3-01A	\$ 450,974
31	Combat Range 6, Site C6-01A	\$ 94,021
32	Mitt Lake Impact Area, Site ML-01A	<u>\$ 171,467</u>
33	Total Selected Remedy Cost	\$ 716,462

34 The 24 OAPC sites will be required to undergo final characterization and clearance to four feet bgs. A  
35 summary of costs associated with these activities is presented in Table 11-3. The costs have been estimated  
36 to \$692,163. These costs have been updated to reflect additional site-specific information obtained since  
37 the preparation of the Proposed Plan.

38 Alternative 4 is estimated to cost \$15,305 based on the chemical sampling and disposition of soil during the  
39 summer 2001 field season (Table 11-4). This represents the worst-case assumption that each of the 9 targets  
40 from 7 sites to be sampled will generate a drum of hazardous waste that must be treated and disposed of  
41 off-island.

1 For the remainder of the sites, Alternative 1 (NOFA/Facility-Wide Ordnance Awareness Program) costs are  
2 \$50,000. This is a one-time capital cost of the development of the training materials. These materials were  
3 first developed and put in place in 1997. They were updated in 2001 and provided by the Navy to the City  
4 of Adak.

5 **11.4 EXPECTED OUTCOMES OF THE SELECTED REMEDY**

6 Based on the selection of Alternative 3 (Clearance to a depth of 4 feet bgs) for, Site C3-01A, Site C6-01A,  
7 and Site ML-01A that were determined to pose a potential explosive safety hazard threat to human health  
8 and the environment; the Selection of Alternative 3 for the 24 OAPC sites along with completion of final  
9 characterization; the selection of Alternative 4 for 7 sites with potential ordnance-related chemical  
10 contamination; and the continued implementation of the Adak NOFA OE/UXO Ordnance Awareness  
11 Program for Adak residents and visitors, a number of actions are anticipated to progress:

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- Exposure to OE/UXO at three sites (C3-01A, C6-01A, and ML-01A) will be eliminated by clearance to 4 feet bgs.
- Sampling and cleanup work for the additional sites outlined in the OU B-1 ROD will be accomplished in one field season to eliminate exposure to explosives-related chemical contamination in soil.
- A FOST will be prepared for selected parcels.
- Selected parcels will be relinquished by the Navy to Department of Interior in accordance with land transfer agreements.

25 The results of the OU B-1 ROD, once completed, are not anticipated to place any restrictions on the current  
26 or future use of Adak property. When the selected remedy is implemented, the OU B-1 sites will no longer  
27 pose a threat to human health or the environment in accordance with CERCLA guidance.  
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**Table 11-1  
Summary of Remedial Action Sites**

Candidate Site Name	Site Identifier/Name	Clearance to 4 ft bgs Alt. 3	Final Characterization and Implementation of Alt. 3 <sup>1</sup>			Alt. 4 Sampling, removal, onsite/offsite treatment and disposal of soils
			Geophysical Survey	Recon	Underwater Survey Dive	
Blind Cove/ Campers Cove Impact Area	BC-01		√			
Combat Range #3	C3-01 (C3-01A)	√				√
	C3-01 (C3-01B, C3-01C, C3-01D, C3-01E)		√			
	C3-04 (C3-04A)		√			√
Combat Range #6	C6-01 (C6-01A)	√				√
Combat Range #8	C8-01		√			√
	C8-03		√			
	C8-05 (C8-05A)		√			√
Finger Bay Ammunition Pier	FBAP-02				√	
Finger Bay Impact Area	FB-03		√			
	FB-01, FB-04			√		
Gun Emplacements	GUN-01, GUN-02, GUN-03, Shagak Bay			√		
Lake DeMarie Impact Area	DM-06 (DM-06A)		√			
Lake Jean Ammunition Complex	LJ-01		√			√ (3 targets)
Minefields	Husky Pass (a.k.a. Husky Pass Training)			√		
Mitt Lake Impact Area	ML-01 (ML-01A)	√				
	ML-01 (ML-01B)		√			
	ML-02 (ML-02A)		√			
	ML-02 (ML-02B)					√
WWII Ammunition Pier (Sweeper Cove)	AP-02				√	

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<sup>1</sup>The 24 additional sites undergoing final characterization will be cleared to 4 feet as necessary.

**Table 11-2  
Cost Estimate For Selected Remedies For C3-01A, C6-01A, and ML-01A**

1

ITEM	UNIT	QUANTITY	UNIT COSTS (\$)	COSTS (\$)
<b>1. COMBAT RANGE 3 (C3-01A) ALTERNATIVE 3 – OE/UXO CLEARANCE TO 4 FEET BGS</b>				
<b>A. Surface Clearance Costs (Alternative 2)</b>				
Direct Capital Costs (DCC) -Surface Clearance				
UXO Group Personnel (Total)	Sum	1	26,222	26,222
Additional Personnel	Hour	51.95	269.25	13,988
Equipment	Each	1	7,540	7,540
<b>Total DCC (Alternative 2)</b>				<b>47,750</b>
Indirect Capital Costs (ICC) – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	10.39	5,000	51,950
Project Management (8% of DCC)				3,820
Subtotal ICC				57,437
Capital/Indirect Contingency (20% DCC and ICC)				21,037
<b>Surface Clearance (Alternative 2) Combat Range 1</b>				<b>126,224</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
<b>DCC (Alternative 3) – Clearance to 4 Feet bgs</b>				
UXO Group Personnel (Total)	Sum	1	104,887	104,887
Additional Personnel	Hour	311.70	269.25	83,925
Equipment	Each	1	11,350	11,350
<b>Total DCC (Alternative 3)</b>				<b>200,162</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	10.39	5,000	51,950
Project Management (8% of DCC)				16,013
Subtotal ICC				70,463
Capital/Indirect Contingency (20% DCC and ICC)				54,125
<b>Clearance To 4 Feet bgs (Alternative 3) Combat Range 1</b>				<b>324,750</b>
<b>Total Intrusive Cost Combat Range 1 (Alts. 2 &amp; 3)</b>				<b>450,974</b>
<b>2. COMBAT RANGE 6 (C6-01A) ALTERNATIVE 3 – OE/UXO CLEARANCE TO 4 FEET BGS</b>				
<b>A. Surface Clearance Costs (Alternative 2)</b>				
Direct Capital Costs (DCC) –Surface Clearance				
UXO Group Personnel (Total)	Sum	1	2,524	2,524
Additional Personnel	Hour	5	269.25	1,346
Equipment	Each	1	7,540	7,540
<b>Total DCC (Alternative 2)</b>				<b>11,410</b>
Indirect Capital Costs (ICC) – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	1	5,000	5,000
Helicopter Transport	Each	1	10,000	10,000
Project Management (8% of DCC)				913
Subtotal ICC				17,556
Capital/Indirect Contingency (20% DCC and ICC)				5,793
<b>Surface Clearance (Alternative 2) Combat Range 6</b>				<b>34,759</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
<b>DCC (Alternative 3) – Clearance to 4 Feet bgs</b>				
UXO Group Personnel (Total)	Sum	1	10,095	10,095
Additional Personnel	Hour	30	269.25	8,078

**Table 11-2  
Cost Estimate For Selected Remedies For C3-01A, C6-01A, and ML-01A**

ITEM	UNIT	QUANTITY	UNIT COSTS (\$)	COSTS (\$)
Equipment	Each	1	11,350	11,350
<b>Total DCC (Alternative 3)</b>				29,523
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	1	5,000	5,000
Helicopter Transport	Each	1	10,000	10,000
Project Management (8% of DCC)				2,362
Subtotal ICC				19,862
Capital/Indirect Contingency (20% DCC and ICC)				9,877
<b>Clearance To 4 Feet bgs (Alternative 3) Combat Range 6</b>				<b>59,262</b>
<b>Total Intrusive Cost Combat Range 6 (Alts. 2 &amp; 3)</b>				<b>94,021</b>
<b>3. MITT LAKE IMPACT AREA (ML-01A) ALTERNATIVE 3 - OE/UXO CLEARANCE TO 4 FEET BGS</b>				
<b>A. Surface Clearance Costs (Alternative 2)</b>				
Direct Capital Costs (DCC) -Surface Clearance				
UXO Group Personnel (Total)	Sum	1	8,833	8,833
Additional Personnel	Hour	17.5	269.25	4,712
Equipment	Each	1	7,540	7,540
<b>Total DCC (Alternative 2)</b>				21,085
Indirect Capital Costs (ICC) – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	3.5	5,000	17,500
Project Management (8% of DCC)				1,687
Subtotal ICC				20,854
Capital/Indirect Contingency (20% DCC and ICC)				8,388
<b>Surface Clearance (Alternative 2) Mitt Lake 1</b>				<b>50,327</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC (Alternative 3) – Clearance to 4 Feet bgs				
UXO Group Personnel (Total)	Sum	1	35,333	35,333
Additional Personnel	Hour	105	269.25	28,271
Equipment	Each	1	11,350	11,350
<b>Total DCC (Alternative 3)</b>				74,954
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	3.5	5,000	17,500
Project Management (8% of DCC)				5,996
Subtotal ICC				25,996
Capital/Indirect Contingency (20% DCC and ICC)				20,190
<b>Clearance To 4 Feet bgs (Alternative 3) Mitt Lake 1</b>				<b>121,140</b>
<b>Total Intrusive Cost Mitt Lake 1 (Alternatives 2 &amp; 3)</b>				<b>171,467</b>

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**Table 11-2  
Cost Estimate For Selected Remedies For C3-01A, C6-01A, and ML-01A**

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ITEM	UNIT	QUANTITY	UNIT COSTS (\$)	COSTS (\$)
<b>ANNUAL OPERATION AND MAINTENANCE COSTS</b>				
<b>Annual O&amp;M Costs</b>				0
Present Worth Annual O&M Costs (5 years, 7% interest/year )				0
Present Worth Annual O&M Costs (25 years, 7% interest/year )				0
Contingency at 20% O&M Costs				0
<b>TOTAL O&amp;M PRESENT WORTH COSTS (30 Years)</b>				0
<b>TOTAL PRESENT WORTH COSTS-C3-01A</b>				450,974
<b>TOTAL PRESENT WORTH COSTS-C6-01A</b>				94,021
<b>TOTAL PRESENT WORTH COSTS-ML-01A</b>				171,467

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Notes:

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Cost based on Appendix E of the FS have been revised and reformatted in accordance with EPA FS Costing Guidance (EPA 2000)

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Production based on estimate by ECC of 2 acres per day for Alternative 2 effort.

6

Production based on estimate by ECC of 0.5 acre per day for Alternative 3 effort

7

Labor rates include overhead, G&A, profit, fringe, and award

8

General conditions hourly rate provided by ECC

9

Additional personnel includes site superintendent and additional support on island as required by scope

10

General conditions ODC rate provided by ECC

11

Geophysical equipment rates based on Foster Wheeler DCAA audited rates

12

Mobilization costs based on engineering estimate of \$2,500/person for airfare and per diem, regardless of acreage

13

Indirect costs based on engineering estimate of \$5,000 per acre

14

Indirect costs include engineering support, data management, project management, and client meetings

15

Present annual worth escalation based on 7 percent Federal Discount Rate less inflation of 4 percent annually

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

1

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
<b>1. COMBAT RANGE 3 (SITES C3-01 B, C, D, E, AND C3-04 A)</b>				
<b>A. Surface Clearance Costs (Alternative 2)</b>				
Direct Capital Costs (DCC) -Surface Clearance				
UXO Group Personnel (Total)	Sum	1	4,038	4,038
Additional Personnel	Hour	8	269.25	2,154
Equipment	Each	1	8,220	8,220
<b>Total DCC (Alternative 2)</b>				<b>14,412</b>
Indirect Capital Costs (ICC) – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	1.6	5,000	8,000
Project Management (8% of DCC)				1,153
Subtotal ICC				10,820
Capital/Indirect Contingency (20% DCC and ICC)				5,047
<b>Surface Clearance (Alternative 2) Combat Range 3</b>				<b>30,279</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
<b>DCC (Alternative 3) – Clearance to 4 Feet bgs</b>				
UXO Group Personnel (Total)	Sum	1	8,076	8,076
Additional Personnel	Hour	32	269.25	8,616
Equipment	Each	1	12,030	12,030
<b>Total DCC (Alternative 3)</b>				<b>28,723</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	1.6	5,000	8,000
Project Management (8% of DCC)				2,298
Subtotal ICC				12,797
Capital/Indirect Contingency (20% DCC and ICC)				8,304
<b>Clearance To 4 Feet bgs (Alternative 3) Combat Range 3</b>				<b>49,824</b>
<b>Total Intrusive Cost Combat Range 3 (Alternatives 2 &amp; 3)</b>				<b>80,103</b>
<b>2. COMBAT RANGE 8 (SITES C8-01, C8-03, AND C8-05A)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC –Surface Clearance				
UXO Group Personnel (Total)	Sum	1	1,666	1,666
Additional Personnel	Hour	3.3	269.25	889
Equipment	Each	1	8,220	8,220
<b>Total DCC (Alternative 2)</b>				<b>10,775</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.66	5,000	3,300
Project Management (8% of DCC)				862
Subtotal ICC				5,829
Capital/Indirect Contingency (20% DCC and ICC)				3,321
<b>Surface Clearance (Alternative 2) Combat Range 8</b>				<b>19,925</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
<b>Direct Capital Costs (Alternative 3)</b>				
UXO Group Personnel (Total)	Sum	1	3,331	3,331

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
Additional Personnel	Hour	13.2	269.25	3,554
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>18,915</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.66	5,000	3,300
Project Management (8% of DCC)				1,513
Subtotal Indirect Capital Costs (ICC)				7,313
Capital/Indirect Contingency (20% DCC and ICC)				5,246
<b>Clearance To 4 Feet bgs (Alternative 3) Combat Range 8</b>				<b>31,474</b>
<b>Total Intrusive Cost Combat Range 8 (Alternatives 2 &amp; 3)</b>				<b>51,399</b>
<b>3. LAKE JEAN (SITE LJ-01)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC –Surface Clearance				
UXO Group Personnel (Total)	Sum	1	555	555
Additional Personnel	Hour	1.1	269.25	296
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				<b>9,071</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.22	5,000	1,100
Project Management (8% of DCC)				726
Subtotal Indirect Capital Costs (ICC)				3,493
Capital/Indirect Contingency (20% DCC and ICC)				2,513
<b>Surface Clearance (Alternative 2) Lake Jean 1</b>				<b>15,077</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC – Clearance to 4 Feet bgs				
UXO Group Personnel (Total)	Sum	1	1,110	1,110
Additional Personnel	Hour	4.4	269.25	1,185
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>14,325</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.22	5,000	1,100
Project Management (8% of DCC)				1,146
Subtotal Indirect Capital Costs (ICC)				4,746
Capital/Indirect Contingency (20% DCC and ICC)				3,814
<b>Clearance To 4 Feet bgs (Alternative 3) Lake Jean 1</b>				<b>22,885</b>
<b>Total Intrusive Cost Lake Jean 1</b>				<b>37,962</b>
<b>4. MITT LAKE (SITES ML-01B AND ML-02A)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC –Surface Clearance				
UXO Group Personnel (Total)	Sum	1	1,110	1,110
Additional Personnel	Hour	2.2	269.25	592
Equipment	Each	1	8,220	8,220

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

1

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
<b>Total DCC (Alternative 2)</b>				9,922
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.44	5,000	2,200
Project Management (8% of DCC)				794
Subtotal ICC				4,661
Capital/Indirect Contingency (20% DCC and ICC)				2,917
<b>Surface Clearance (Alternative 2) Mitt Lake 01B &amp; 02A</b>				<b>17,500</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
<b>Direct Capital Costs (Alternative 3)</b>				
UXO Group Personnel (Total)	Sum	1	2,221	2,221
Additional Personnel	Hour	8.8	269.25	2,369
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				16,620
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.44	5,000	2,200
Project Management (8% of DCC)				1,330
Subtotal Indirect Capital Costs (ICC)				6,030
Capital/Indirect Contingency (20% DCC and ICC)				4,530
<b>Clearance To 4 Feet bgs (Alternative 3) Mitt Lake 01B &amp; 02A</b>				<b>27,180</b>
<b>Total Intrusive Cost Mitt Lake 01B &amp; 02A (Alternatives 2 &amp; 3)</b>				<b>44,680</b>
<b>5. LAKE DE MARIE IMPACT AREA (SITE DM-06A)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC – Surface Clearance				
UXO Group Personnel (Total)	Sum	1	997	997
Additional Personnel	Hour	1.975	269.25	532
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				9,749
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.395	5,000	1,975
Project Management (8% of DCC)				780
Subtotal Indirect Capital Costs (ICC)				4,422
Capital/Indirect Contingency (20% DCC and ICC)				2,834
<b>Surface Clearance (Alternative 2) Lake De Marie</b>				<b>17,005</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC – Clearance to 4 Feet bgs				
UXO Group Personnel	Sum	1	1,994	1,994
Additional Personnel	Hour	7.9	269.25	2,127
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				16,151
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.395	5,000	1,975

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
Project Management (8% of DCC)				1,292
Subtotal Indirect Capital Costs (ICC)				5,767
Capital/Indirect Contingency (20% DCC and ICC)				4,384
<b>Clearance To 4 Feet bgs Lake De Marie (Alternative 3)</b>				<b>26,302</b>
<b>Total Intrusive Cost Lake De Marie Impact Area</b>				<b>43,307</b>
<b>6. FINGER BAY SITE FB-03 (TARGETS FI19004, FI16001, FI18015, FI01001, FI02004)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC – Surface Clearance				
UXO Group Personnel (Total)	Sum	1	2,776	2,776
Additional Personnel	Hour	5.5	269.25	1,481
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				<b>12,477</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.44	5,000	2,200
Project Management (8% of DCC)				998
Subtotal Indirect Capital Costs (ICC)				4,865
Capital/Indirect Contingency (20% DCC and ICC)				3,468
<b>Surface Clearance (Alternative 2) Finger Bay 03</b>				<b>20,810</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC – Clearance to 4 Feet bgs				
UXO Group Personnel (Total)	Sum	1	5,552	5,552
Additional Personnel	Hour	22	269.25	5,924
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>23,506</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.44	5,000	2,200
Project Management (8% of DCC)				1,880
Subtotal Indirect Capital Costs (ICC)				6,580
Capital/Indirect Contingency (20% DCC and ICC)				6,017
<b>Clearance To 4 Feet bgs (Alternative 3) Finger Bay 03</b>				<b>36,103</b>
<b>Total Intrusive Cost Finger Bay FB-03</b>				<b>56,913</b>
<b>7. MOUNT MOFFETT MORTAR FIRING POINT</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC – Surface Clearance				
UXO Group Personnel (Total)	Sum	1	555	555
Additional Personnel	Hour	1.1	269.25	296
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				<b>9,071</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.22	5,000	1,100
Project Management (8% of DCC)				726
Subtotal Indirect Capital Costs (ICC)				3,493

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

1

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
Capital/Indirect Contingency (20% DCC and ICC)				2,513
<b>Surface Clearance (Alternative 2) Mount Moffett Mortar Firing Point</b>				<b>15,077</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC – Clearance to 4 Feet bgs				
UXO Group Personnel (Total)	Sum	1	1,110	1,110
Additional Personnel	Hour	4.4	269.25	1,185
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>14,325</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.22	5,000	1,100
Project Management (8% of DCC)				1,146
Subtotal Indirect Capital Costs (ICC)				4,746
Capital/Indirect Contingency (20% DCC and ICC)				3,814
<b>Clearance To 4 Feet bgs (Alternative 3) Mount Moffett Mortar Firing Point</b>				<b>22,885</b>
<b>Total Intrusive Cost Mount Moffett Mortar Firing Point</b>				<b>37,962</b>
<b>8. BLIND COVE (TRANSECTS SOUTH OF BC-01)</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC – Surface Clearance				
UXO Group Personnel (Total)	Sum	1	1,767	1,767
Additional Personnel	Hour	3.5	269.25	942
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				<b>10,929</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Helicopter Transport	Each	1	10,000	10,000
Off-Island Support	Acre	0.7	5,000	3,500
Project Management (8% of DCC)				874
Subtotal Indirect Capital Costs (ICC)				16,041
Capital/Indirect Contingency (20% DCC and ICC)				5,394
Surface Clearance Blind Cove BC-01 (Alternative 2)				<b>32,364</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
DCC – Clearance to 4 Feet bgs				
UXO Group Personnel (Total)	Sum	1	3,533	3,533
Additional Personnel	Hour	7	269.25	3,770
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>19,333</b>
ICC – Clearance to 4 Feet bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Helicopter Transport	Each	1	10,000	10,000
Off-Island Support	Acre	0.7	5,000	3,500
Project Management (8% of DCC)				1,547
Subtotal Indirect Capital Costs (ICC)				17,547
Capital/Indirect Contingency (20% DCC and ICC)				7,376
<b>Clearance To 4 Feet bgs Blind Cove BC-01 (Alternative 3)</b>				<b>44,256</b>

**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
<b>Total Intrusive Cost Blind Cove BC-01</b>				<b>76,620</b>
<b>9. HUSKY PASS/SHAGAK BAY</b>				
<b>A. Surface Clearance (Alternative 2)</b>				
DCC – Surface Clearance				
UXO Group Personnel (Total)	Sum	1	1,666	1,666
Additional Personnel	Hour	3.3	269.25	889
Equipment	Each	1	8,220	8,220
<b>Total Direct Capital Costs (DCC) (Alternative 2)</b>				<b>10,775</b>
ICC – Surface Clearance				
Mobilization/Demob (Proration per Site)	Each	1	1,667	1,667
Off-Island Support	Acre	0.66	5,000	3,300
Project Management (8% of DCC)				862
Subtotal Indirect Capital Costs (ICC)				5,829
Capital/Indirect Contingency (20% DCC and ICC)				3,321
<b>Surface Clearance (Alternative 2) Husky Pass/Shagak Bay</b>				<b>19,925</b>
<b>B. Clearance To 4 Feet bgs (Alternative 3)</b>				
UXO Group Personnel (Total)	Sum	1	3,331	3,331
Additional Personnel	Hour	13.2	269.25	3,554
Equipment	Each	1	12,030	12,030
<b>Total Direct Capital Costs (DCC) (Alternative 3)</b>				<b>18,915</b>
ICC – Clearance to 4 Ft bgs				
Mobilization/Demob (Proration per Site)	Each	1	2,500	2,500
Off-Island Support	Acre	0.66	5,000	3,300
Project Management (8% of DCC)				1,513
Subtotal Indirect Capital Costs (ICC)				7,313
Capital/Indirect Contingency (20% DCC and ICC)				5,246
<b>Clearance To 4 Feet bgs (Alternative 3) Husky Pass/Shagak Bay</b>				<b>31,474</b>
<b>Total Intrusive Cost Husky Pass/Shagak Bay</b>				<b>51,399</b>
<b>Subtotal Alternative 2 For 2001 Field Sites</b>				<b>187,962</b>
<b>Subtotal Alternative 3 For 2001 Field Sites</b>				<b>292,383</b>
<b>Subtotal Alternatives 2 and 3 For 2001 Field Sites</b>				<b>480,345</b>
<b>10. RECON SITES (COSTS PER SITE)</b>				
DCC – Recon				
UXO Group Personnel (Total)	Sum	1	884	884
Equipment	Each	1	5,440	5,440
Total DCC				6,324
ICC – Recon				
Off-Island Support	Acre	0.33	5,000	1,650
Project Management (8% of DCC)				506
Subtotal Indirect Capital Costs (ICC)				2,156
Capital/Indirect Contingency (20% DCC and ICC)				1,696
Recon Subtotal Per Site				10,176
Recon Subtotal	Sites	7	10,176	71,232
<b>RECON TOTAL</b>				<b>71,232</b>

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**Table 11-3  
Cost Estimate For Sites Undergoing Additional Investigation and Clearance**

1

ITEM	UNIT	QUANTITY	UNIT COST (\$)	COSTS (\$)
<b>11. Underwater Survey FBAP-02 and AP-02</b>				
DCC – Underwater Survey				
Labor	Each	1	69,863	69,863
Equipment	Each	1	45,750	45,863
Total DCC				115,613
ICC – Underwater Survey				
Project Management (8% of DCC)				9,249
Subtotal Indirect Capital Costs (ICC)				9,249
Capital/Indirect Contingency (20% DCC and ICC)				24,972
<b>Underwater Survey Total</b>				<b>140,586</b>
Total Alternative 2 For 2001 Field Sites				<b>187,962</b>
Total Alternative 3 For 2001 Field Sites				<b>292,383</b>
<b>TOTAL INTRUSIVE COSTS FOR 2001 FIELD SEASON SITES</b>				<b>692,163</b>

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3

Assumptions:

4

Cost based on Appendix E of the FS have been revised and reformatted in accordance with EPA FS Costing Guidance (EPA 2000)

5

Due to the close proximity locations and effort level of the sites, the following sites have been combined as AOCs to minimize costs:

6

Site acreage for Alternatives 2 and 3 are Combat Range 3 1.6 acre (C3-01-B: 0.22 acre, C: 0.22 acre, D: 0.22 acre, E: 0.22 acre, C3-04A: 0.74 acre); Combat Range 8 (Sites C8-01, C8-03, and C8-05A) 0.66 acre, or 0.22 acre each; Lake Jean (Site LJ-01) 0.22 acre;

7

Mitt Lake (Sites ML-01B and ML-02A) 0.44 acre, or 0.22 acre each; Lake DeMarie (Site DM-06A) 0.395 acre; Finger Bay FB-03

8

(Targets FI19004, FI16001, FI18015, FI01001, FI02004) 1.1 acre, or 0.22 each; Mt. Moffett Firing Point 0.22 acre; Blind Cove

9

(Transects South of BC-01) 0.7 acre (3 lanes of transect lines); and Husky Pass/Shagak Bay 0.66 acre.

10

Labor rates include overhead, G&A, profit, fringe, award

11

General conditions hourly labor rate and ODC rate are from ECC pricing

12

Alternative 2 production based on ECC's prediction of 2 acres per day

13

Alternative 3 production based on ECC's prediction of 1 acre per day

14

Recon cost for each site, assume that team has mobilized to the Island.

15

Proposed recon sites Husky Pass, Shagak, GUN-1, GUN-2, GUN-3, FB-01, and FB-04

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For Alt 2 - \$20K mob cost split between sites for total of \$1,667 per site

17

For Alt 3 - \$30K mob cost split between sites for total of \$2,500 per site

18

Off-island support calculated at \$5,000 per acre

19

UXO Group Personnel include for Alternatives 2 and 3 SUXO, UXO QC, UXOSS, UXO Technician III, UXO Technician II, and

20

UXO Technician I.

21

UXO Group Personnel for Recon includes SUXO, UXO QC, and UXO Technicians III and II.

22

Additional Personnel for Alternatives 2 and 3 include General Contractor and for Alternative 3 a four person Geo Team.

23

Equipment for Alternative 2 and Recon include Vallon and Schonstedt Locators, DGPS Stations, and vehicles.

24

Equipment for Alternative 3 includes Vallon, Schonstedt, and EM-61 Locators; DGPS Stations; HH Data Collection; and vehicles.

25

Mt. Moffett Mortar Impact Area costs were included in Appendix E of the FS and in the above tabulation. This site was recently transferred from OU B-2 to OU B-1 (see Section 13). Costs for all recently transferred sites in Section 13 are not shown here.

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**Table 11-4  
Cost Estimate For Explosive-Related Chemical Investigations**

ITEM	UNIT	QUANTITY	UNIT COSTS (\$)	COSTS (\$)
<b>DIRECT CAPITAL COSTS</b>				
Sampling Team Personnel				
UXOSS	Hours	26	70	1,820
UXO Technician III	Hours	26	68.83	1,790
UXO Technician II	Hours	26	58.56	1,523
UXO Technician I	Hours	26	49.55	1,288
Subtotal-Labor				6,421
Equipment				
Test Kits	Each	9	100	900
Soil Containers (Drums)	Each	9	50	450
Schonstedt Locator	Each	9	4	36
DGPS Stations	Each	9	111	999
HH Data Collection	Each	9	34	306
Vehicles	Each	9	37	333
Subtotal-Equipment				3,024
Soil Transport and Disposal	Each	9	500	4,500
<b>TOTAL DIRECT CAPITAL COSTS (DCC)</b>				<b>13,945</b>
<b>INDIRECT CAPITAL COSTS</b>				
Mobilization/Demobilization				
Team	Each	9	500	4,500
Project Management (10% of DCC)				1,395
<b>TOTAL INDIRECT CAPITAL COSTS (ICC)</b>				<b>5,895</b>
Capital/Indirect Contingency (20% DCC and ICC)				3,968
<b>TOTAL CAPITAL COSTS</b>				<b>23,808</b>
<b>ANNUAL OPERATIONS AND MAINTENANCE (O&amp;M)</b>				
None				0
Present Worth Annual O&M Costs (5 years, 7% interest/year)				0
Present Worth Annual O&M Costs (25 years, 7% interest/year)				0
Contingency at 20% O&M Costs				0
<b>TOTAL O&amp;M PRESENT WORTH COSTS (30 Years)</b>				<b>0</b>
<b>TOTAL PRESENT WORTH COSTS</b>				<b>23,808</b>
<b>TOTAL OU B-1 CHEMICAL SAMPLING COSTS (9 TARGETS/7SITES)</b>	Each	9/14	23,808	<b>15,305</b>

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Notes:

Includes the targets in the following locations: C1-01 (2 targets), C3-01, C3-04, C6-01, C8-01, C8-05, LJ-01 (3 targets), ML-02B, and MM-10A (2 targets). Assume 2 hours of labor per target. Costs have been scaled down to reflect only the 9 targets in 7 OU B-1 sites addressed in the Proposed Plan: C3-01, C3-04, C6-01, C8-01, C8-05, LJ-01 (3 targets), and ML-02B.

Labor rates include overhead, G&A, profit, fringe, award;

General conditions hourly labor rate is from ECC pricing;

General conditions ODC rate is from ECC pricing;

Costs for Schonstedt, DGPS, and Hand-held data collection equipment based on monthly rates as follows:

Schonstedt=\$95/mo, DGPS=\$2660/mo, HH data coll=\$820/mo, Vehicle=\$895/mo,

Daily rate =mo/24days (6days/week for 4 weeks per month);

Mob/demob cost for each location, assumes that team has mobilized to the island;

Transport of soil off island and disposal is assumed to be one effort and cost is distributed among all sampling targets;

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## 12.0 STATUTORY DETERMINATIONS

2

Under CERCLA § 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs/TBCs, are cost-effective, and use permanent solutions and alternative treatment technologies or resource recovery technologies. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. This section discusses how the selected remedy meets these statutory requirements.

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### 12.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

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In accordance with CERCLA guidance, the selected remedies for the OU B-1 sites are considered protective of human health and the environment, as they remove OE/UXO items in sites that currently pose potential explosive safety hazards and may exceed risk-based chemical cleanup levels in soil.

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### 12.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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Pursuant to CERCLA and the NCP, existing cleanup authorities and programs will be used in the risk and hazard reduction actions. The risk or hazard reduction actions will comply with ARARs/TBCs. Applicable requirements are defined by the NCP (40 CFR 300.5) as those cleanup standards; standards of control; and other substantive requirements, criteria, or limitations promulgated under federal or state environmental and facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are defined (40 CFR 300.5) as those cleanup standards; standards of control; and other substantive requirements, criteria, or limitations promulgated under federal or state environmental and facility-siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site, address problems or situations sufficiently similar to those encountered at CERCLA sites and their use is well suited to a particular site.

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A requirement that is relevant and appropriate must be complied with to the same degree as if it were applicable. In addition to ARARs, the lead agency may, as appropriate, identify other advisories, criteria, or guidance as “to be considered” (TBCs). Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be considered ARARs (40 CFR 300.400[g][4]).

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ARARs/TBCs may be categorized as contaminant-, location-, or action-specific, as described below:

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- Contaminant-specific ARARs/TBCs set health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants.

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- Location-specific ARARs/TBCs set restrictions on activities within specific locations, such as wetlands and floodplains, and depend on the characteristics of a site and its immediate environment.

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- Action-specific ARARs/TBC set controls or restrictions on particular kinds of remedial activities (such as disposal) that may be selected to accomplish a remedy. These ARARs/TBCs may specify performance levels, actions, or technologies to be used to manage hazardous substances, pollutants, or contaminants.

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Although no activities are planned to occur outside of the boundary of the military reservation, any off-site activities must comply with all necessary federal, state, and local requirements. Occupational Safety and Health Administration (OSHA) requirements are also not considered ARARs pursuant to EPA’s adopted

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1 final rule on the NCP. The NCP identified specific OSHA requirements that must be complied with during  
2 all CERCLA response actions (i.e., 29 CFR 1910 and 1926).

3 The selected remedies comply with all ARARs and TBCs of DDESB, EPA, State of Alaska, and  
4 Department of Defense. Clearance to 4 feet bgs at C3-01A, C6-01A, ML-01A and the 24 OAPC sites will  
5 satisfy the DDESB site-specific requirements for land transfer without OE/UXO-related land use  
6 restrictions. Listed below are the chemical-specific, location-specific, action-specific ARARs/TBCs. Soil  
7 sampling at the 9 targets in 7 sites identified in Table 11-1 along with excavation of all soils above cleanup  
8 levels in Table 8-1, followed by onsite or offsite treatment and disposal of ordnance contaminated soils will  
9 meet State of Alaska 18 AAC 75 requirements for reduction of potential human health cumulative  
10 carcinogenic risks to no more than  $1 \times 10^{-5}$ .

11 *Chemical-Specific ARARs/TBCs:*

- 12 • Alaska Oil and Hazardous Substances Pollution Control regulations (18 AAC 75) are applicable to  
13 releases of hazardous substances including ordnance-related compounds during remedial actions.  
14 They specify cleanup levels for soils in the over-40-inch rain zone (18 AAC 75.340 and 341,  
15 Tables B1 and B2) and cleanup levels for groundwater and surface water (18 AAC 75.345).
- 16 • Alaska Water Quality Standards regulations (18 AAC 70) are relevant and appropriate for fresh and  
17 marine surface waters that could be impacted by chemical and turbidity releases from UXO/OE  
18 excavation and disposal activities. The regulation includes the protection of the growth and  
19 propagation of fish, shellfish, other aquatic life, and wildlife, as well as protection of uses (e.g.,  
20 harvesting for consumption of raw mollusks and other raw aquatic life). The regulations specify that  
21 turbidity standards not exceed 25 nephelometric turbidity units (NTU) above natural conditions. Total  
22 dissolved solids (TDS) may not exceed 1,500 mg/L, including natural conditions; increase in TDS may  
23 not exceed one-third of the concentration of the natural condition of the water body.
- 24 • 33 USC Section 1314, Clean Water Act. Ambient water quality criteria are relevant and appropriate  
25 for surface water that could be impacted by migration of OE-related contaminants in proximity to  
26 surface water bodies.

27 *Location-Specific ARARs/TBCs:*

- 28 • Clean Water Act (CWA), 40 CFR Part 320.1 et seq., 401 et seq. specifies criteria for evaluating effects  
29 to waters of the U.S. (including wetlands) and sets factors for considering mitigation measures  
30 associated with disrupting ground surface during excavation activities. The criteria would be  
31 applicable for any site excavation work within rivers, streams, tidal areas, and wetlands.
- 32 • Executive Order 11990, Protection of Wetlands (also 40 CFR Part 6, Appendix A). The requirement  
33 that federal agencies avoid adversely impacting wetlands wherever possible to minimize wetlands  
34 destruction and to preserve values of wetlands is applicable for any site excavation work within tidal  
35 areas and wetlands. Such areas may include C3-01A, C3-04, FBAP-02, and AP-02.
- 36 • Fish and Wildlife Coordination Act (16 USC 661-666c) is relevant and appropriate. It requires  
37 consultation with U.S. Fish and Wildlife Service to develop any appropriate protective measures  
38 before implementation of the project. Adequate provision shall be made for the conservation,  
39 maintenance, and management of wildlife resources and habitat to be affected. It is applicable to  
40 activities that might disturb wildlife resources or habitat.

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2 *Action-Specific ARARs/TBCs:*

- 3 • Federal Clean Water Act NPDES Stormwater regulations (40 CFR 122.26) are relevant and  
4 appropriate for point source discharge of stormwater from construction sites to surface water and  
5 provide for Best Management Practices such as erosion control for removal and management of  
6 sediments to prevent run-on and run-off.
- 7 • National Toxics Rule (40 CFR 131.36). Concentration limits for toxics, as well as acute and chronic  
8 exposure criteria for freshwater and marine water, are relevant and appropriate to protect human health  
9 and aquatic life. Application of these standards will ensure that releases during remedial action do not  
10 cause exceedances in water quality in nearby surface waters.
- 11 • Alaska Water Quality Standards regulations (18 AAC 70) are applicable to protect the growth and  
12 propagation of fish, shellfish, other aquatic life, and wildlife. The regulations specify that turbidity  
13 standards not exceed 25 NTU above natural conditions. TDS may not exceed 1,500 mg/L, including  
14 natural conditions; increase in TDS may not exceed one-third of the concentration of the natural  
15 condition of the water body.
- 16 • Alaska Oil and Hazardous Substances Pollution Control regulations (18 AAC 75.375) are applicable.  
17 They define situations where institutional controls are required, describe institutional controls, and  
18 specify criteria that institutional controls must meet.
- 19 • 18 AAC 75.365, Offsite or Portable Treatment Facilities. Requirements for approval of temporary  
20 treatment facilities are relevant and appropriate for soil contaminated with explosives-related  
21 contamination that may require on-site treatment.
- 22 • 18 AAC 75.370, Soil Storage and Disposal. Requirements for location, liner permeability for  
23 temporary stockpiling of ordnance-contaminated soils, and blending with other soils prior to treatment  
24 and disposal are applicable.
- 25 • Resource Conservation and Recovery Act (RCRA), 42 USC 6921-22, 40 CFR 260 through 270; These  
26 regulations establish requirements for the proper designation (40 CFR 261), storage, treatment, and  
27 disposal (40 CFR 262) of hazardous waste including OE/UXO as a potentially reactive (D003) or toxic  
28 (D008) hazardous waste. The requirements for the treatment of waste explosives through burning are  
29 contained within 40 CFR 265.382. The substantive requirements for the open burning of waste  
30 explosives (40 CFR 265.382), on-site transportation (40 CFR 263), storage (40 CFR 265.250),  
31 treatment (40 CFR 265.370), and land disposal restrictions (40 CFR 265.268) are relevant and  
32 appropriate.
- 33 • RCRA Management of Military Munitions, Military Munitions Rule (40 CFR 260 through 265 and  
34 270). Amendments to hazardous waste identification and management rules for military munitions, and  
35 definition of explosive emergencies are relevant and appropriate for the removal and management of  
36 unexploded ordnance pursuant to RCRA.
- 37 • Clean Air Act, (42 U.S.C. 1857-18571; 40 CFR 50-100). The Clean Air Act (CAA) regulates releases  
38 of specific substances into the air. Pursuant to the CAA, EPA has promulgated National Ambient Air  
39 Quality Standards (40 CFR 50), National Emission Standards for Hazardous Air Pollutants (40 CFR  
40 61), and New Source Performance Standards (40 CFR 60, 63). These standards are relevant and  
41 appropriate for air releases resulting from response actions such as detonation activities that may  
42 generate particulate matter emissions or that use commercially available equipment to demilitarize  
43 explosives.

- 1 • Alaska Clean Air Act regulations (18 AAC 50.300 through 50.380). The substantive requirements are  
2 relevant and appropriate for the burning and detonation of OE/UXO. These sections include, by  
3 reference, other chapters and sections of 18 AAC 50 that specify chemical emissions.
- 4 • U.S. Department of Transportation (49 U.S.C. 1803, 1804, 1808; 49 CFR 107, 171, 172).  
5 Requirements for the transport of hazardous materials and substances by land, sea, or air are applicable  
6 if off-site transport of hazardous materials should become necessary.

7 *Other Criteria, Advisories, or Guidance To Be Considered (TBC):*

- 8 • DoD Ammunition and Explosives Safety Standards, DoD 6055.9—STD. DoD policy issued by the  
9 DDESB establishes policies and procedures necessary to provide protection to personnel as a result of  
10 DoD ammunition, explosives, or chemical agents and contamination of real property currently or  
11 formerly owned, leased, or used by DoD. This is a TBC for identifying default clearance depths and a  
12 process for determining site-specific considerations to modify these depths.
- 13 • DoD policy on responsibility for OE/UXO post-transfer (DoD, 1997)— This policy requires that if  
14 applicable regulatory requirements are revised to reflect new scientific or health data and the remedy  
15 put in place by DoD is determined to be no longer protective of human health and the environment,  
16 DoD would return to perform such additional cleanup as would generally be required by regulatory  
17 agencies of any responsible party in a similar situation.

18 **12.3 COST-EFFECTIVENESS**

19 The selected remedies are considered to be cost-effective with respect to the level of protection of human  
20 health and the environment and the cost of the selected remedies. In making this determination, the  
21 following definition was used: “A remedy shall be cost-effective if its costs are proportional to its overall  
22 effectiveness” (NCP Section 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the overall  
23 effectiveness of those alternatives that satisfied the threshold criteria (i.e., were both protective of human  
24 health and the environment and were ARAR-compliant). Overall effectiveness was evaluated by assessing  
25 three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in  
26 toxicity, mobility, and volume through treatment; and short-term effectiveness). The removal and  
27 treatment of UXO through destruction will provide for permanent protectiveness for current and future  
28 Adak residents and visitors. The excavation, treatment and disposal of soils that contain ordnance related  
29 chemicals will also provide permanent protectiveness for current and future Adak residents and visitors.

30 **12.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT**  
31 **TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE**

32 The selected remedies represent the maximum extent to which permanent solutions and treatment  
33 technologies can be used in a practicable manner at a site. Of those alternatives that are protective of  
34 human health and the environment and comply with ARARs/TBCs, The Navy, EPA, and ADEC have  
35 determined that the selected remedies (Alternatives 1, 3, and 4) provides the best balance of tradeoffs in  
36 terms of the nine criteria, These determinations are described in Section 9.0, and summarized in Sections  
37 10.1.1 and 10.2.2, where the rationale is provided for the selected remedy components.

38 **12.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT**

39 The selected remedies use permanent solutions through removal and disposal of OE/UXO items through  
40 treatment of UXO through detonation, and through onsite or offsite treatment and disposal of ordnance  
41 contaminated soils.

1    **12.6    FIVE-YEAR REVIEW REQUIREMENTS**

2    Since there is the potential that OE/UXO contamination may still exist on Adak Island, the effectiveness of  
3    the OE/UXO Educational Awareness Program will be evaluated as part of the 5-year review process to  
4    assure that final remedial actions for OE/UXO on Adak Island remain protective.

1       **13.0     DOCUMENTATION OF SIGNIFICANT CHANGES SINCE THE PROPOSED PLAN**

2       This section of the ROD discusses significant changes that have occurred since the issuance of the  
3       Proposed Plan in May 2001 (U.S. Navy, 2001), including the site counts and disposition of sites described  
4       in the Proposed Plan. This discussion summarizes the inclusion of Mt. Moffett sites for final  
5       characterization and clearance and the inclusion of one new site (FB-03) that has been recently identified  
6       within OU B-1 for characterization and clearance. These changes were not considered to require the  
7       issuance of a new proposed plan. The decision to include Mt Moffett sites was based on discussions among  
8       the OU B Project Team, and was also discussed at the Public Meeting for the OU B-1 Proposed Plan. The  
9       sites on Mt Moffett are being addressed in same manner as the 27 sites selected for clearance to 4 feet bgs.  
10      This is also true for site FB-03.

11      The sites shown in Table 13-1 are proposed for addition to OU B-1 at this time. However, field conditions  
12      may dictate that some or all of these sites may not be completed by the end of the 2001 field season. The  
13      actual sites to be included in OU B-1 for transfer purposes will await completion of the field activities.  
14      These sites are being considered for inclusion in OU B-1 to facilitate transfer of real property to BLM and  
15      then to TAC.

16      **13.1     MT. MOFFETT SITES**

17      As a result of written and verbal comments provided by the EPA on the OU B-1 RI/FS Report and the OU  
18      B-1 Remedial Action Design Work Plan, the Navy has agreed to include the Mt. Moffett AOCs in the  
19      scope of this ROD for cleanup decisions. At the time of the release of the Proposed Plan, the Navy had not  
20      made a final decision on whether to include Mt Moffett AOCs in OU B-1 or OU B-2 decision documents.  
21      A description of the Mt. Moffett AOCs, and the selected remedy is presented below.

22      The Mt. Moffett AOCs identified through the PA, SI, and RI/FS process included combat ranges, impact  
23      areas (MM-01, -02, -03, -10, and -11), potential firing points (MM-04 and -22), an isolated fuze (MM-07),  
24      frag sites (MM-05, -06, -08, -09), and a chemical mortar training site (MM-23) (Figure 13-1). During the  
25      2000 field season, approximately 1,800 target anomalies were identified through the geophysical  
26      investigations and post-processing of data. Locations of these anomalies are recorded in the DGPS data  
27      system. These targets will be re-acquired and intrusively investigated. All OE/UXO will be addressed  
28      under Alternative 3, and the locations will be cleared to a depth of four feet. In this manner, these locations  
29      will be addressed in the same approach as the OAPC sites that will be subject to final characterization and  
30      clearance.

31      MM-14 and MM-20 were inadvertently removed from OU B-1 when the decision was made to separate  
32      OU B-1 and OU B-2. Both sites have undergone completed reconnaissance during the 2000 PA activities.  
33      Since no OE/UXO were found at the sites, both have been selected for NOFA.

34      A nearby site, BI-01 (Bay of Islands Impact Area Firing Point), was reconned in the 2000 field season and  
35      subsequently recommended for NOFA.

36      **13.2     FINGER BAY SITE**

37      One site was recently identified through the discovery of additional archival information. The new site is  
38      within the geographic boundary of OU B-1 and is included in the site summary Figure 4-2. This site and  
39      the selected remedial action are described below.

40      The additional site, FB-03, or Finger Bay Impact Area is a 31-acre site. It represents the historical impact  
41      area for mortars used in live fire power demonstrations. The site was investigated during the SI. No  
42      OE/UXO was found; however, numerous pieces of scrap associated with mortars were found. Since no

1 additional investigation in the form of X-Ts or mini-grids was done at this site during the RI, the Navy has  
2 agreed to re-evaluate several individual targets to help ensure that UXO is not present in a previously  
3 unidentified location within this AOC. These targets are: FI9004, FI16001, FI18015, FI01001 and  
4 FI02004. All OE/UXO will be addressed under Alternative 3, and the locations will be cleared to a depth  
5 of four feet. In this manner, these locations will be addressed in the same approach as the OAPC sites that  
6 will be subject to final characterization and clearance.

### 7 **13.3 COMBAT RANGE SITES**

8 Two sites within both Combat Range 1 (C1) and three from Combat Range 2 (C2) have been added back  
9 into OU B-1 for characterization and clearance to facilitate land transfer. At C1, the two sites to be added  
10 are located within steep terrain near Mt. Moffett located northwest of downtown Adak. These two sites  
11 from C1 include C1-02 (Time Fuze Site) located on the lower flanks of the west side of Mt. Moffett and  
12 C1-03 (Combat Range #1 Remainder) located on the north side of Mt. Moffett.

13 The three C2 sites are located northwest of downtown Adak on steep terrain along the western flank of Mt.  
14 Moffett and include C2-01A, C2-01B, and C2-02. These locations at C1 and C2 will be addressed in the  
15 same approach as the OAPC sites that will be subject to final characterization and clearance.

### 16 **13.4 CHEMICAL SAMPLING SITES**

17 Based upon observations during the 2001 field season, additional chemical sampling will be characterized  
18 in several sites; specifically at one open detonation site and several dozen burn sites within C3-01A, at two  
19 detonation sites within C3-04A, two targets within MM-10A, and at open detonation sites within C8-03.

### 20 **13.5 NEW SITE JM-01**

21 JM-01 (a suspected burial and detonation site for twenty 105mm mustard rounds) was recently discovered  
22 southeast of Lake Jean. However, there is insufficient information to draw conclusions about the nature and  
23 extent of OE and chemical contamination, much less required remedial actions. This site will be addressed  
24 as part of OU B-2 Record of Decision and will be excluded from the parcel of real estate to be considered  
25 in the FOST.

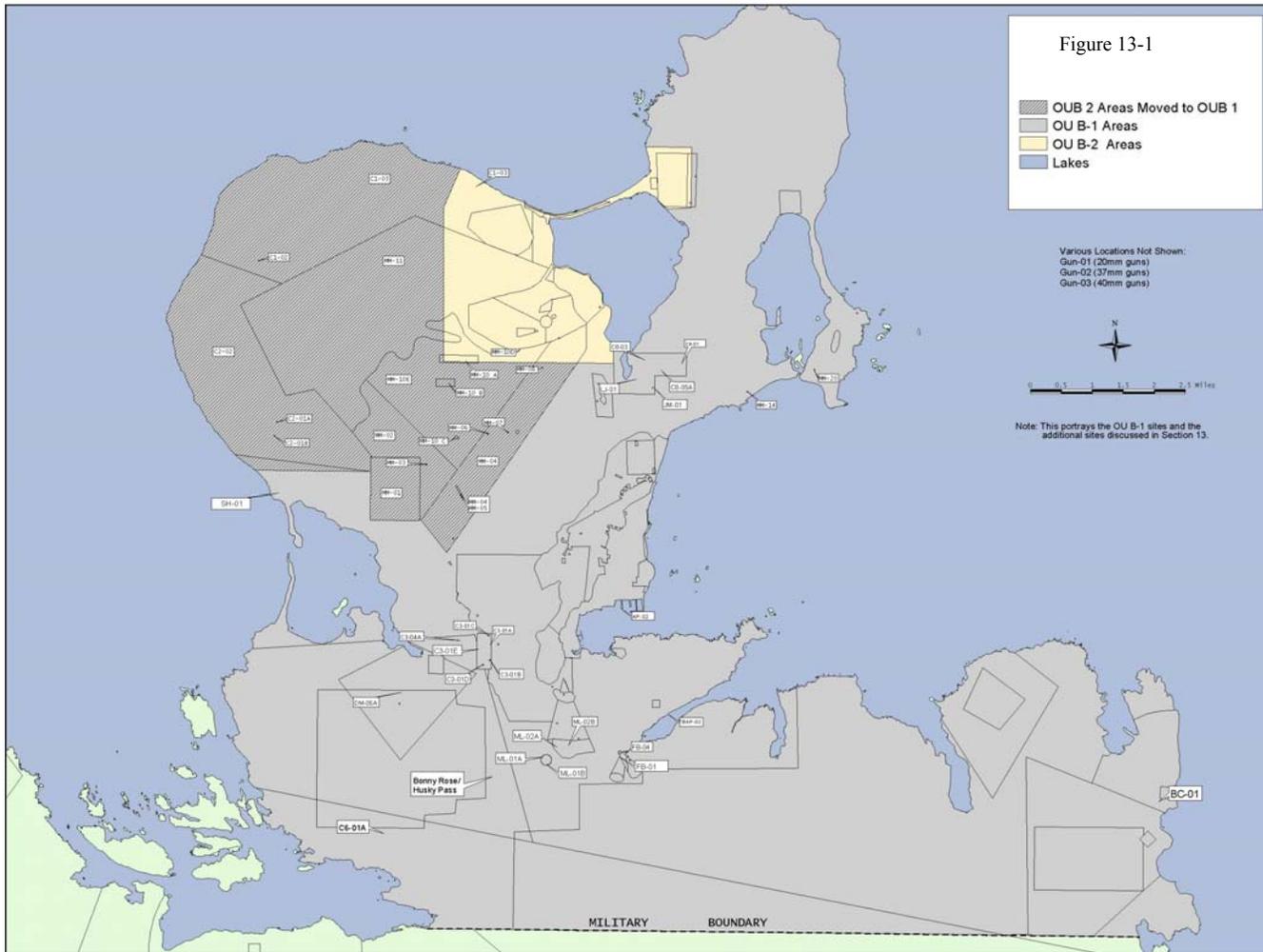
### 26 **13.6 CHANGES IN OU B SITE COUNTS**

27 As a result in changes in site nomenclature, since the publication of the Proposed Plan and Final OU B  
28 RI/FS, the identification of new sites, and the inclusion of former OU B-2 sites within OU B-1 to facilitate  
29 property transfer, the following summarize the revised site counts for OU B-1:

30 131 OU B-1 sites (including FB-03) + 22 transferred from OU B-2 + 2 (MM-14 and MM-20) = 155 OU B-  
31 1 sites.

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**Figure 13-1 Additional Sites Identified For Remedial Action**



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**Table 13-1  
Additional Sites Identified For Remedial Action Under OU B-1**

Candidate Site Name	Site Identifier/Name
Combat Range #1	C1-02
	C1-03
Combat Range #2	C2-01A
	C2-01B
	C2-02
Bay of Islands	BI-01
Finger Bay	FB-03
Mount Moffett	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	

4

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**APPENDIX A  
RESPONSIVENESS SUMMARY**

3 The responsiveness summary addresses public comments on the proposed plan for remedial action at OU  
4 B-1 at Adak Island, Alaska. The proposed plan was issued on May 14, 2001 (U.S. Navy, 2001). The  
5 public comment period was held from May 14 through June 12, 2001. A public meeting was held on Adak  
6 Island on May 29, 2001 to present the proposed plan and accept oral and written public comments. A  
7 similar opportunity was provided in Anchorage on May 31, 2001. A RAB meeting was also held on May  
8 30, 2001 on Adak (with a teleconference connection to Anchorage RAB members).

9 Eighteen comments or questions were received verbally at the Adak Island public meeting. Four comments  
10 were received at the RAB meeting from two on-island residents and an Anchorage RAB member.  
11 Comments were also solicited from a pre-printed comment form attached to the proposed plan. Written  
12 comments were to be submitted to the Navy at the address included with the proposed plan. The proposed  
13 plan was mailed to addressees on the Adak Community Relations Plan mailing list; it was also sent to the  
14 Anchorage repository, the on-island repository, and it was distributed to island residents prior to the  
15 proposed plan meeting. The proposed plan was also added to the Adakupdate.com website on May 14,  
16 2001 with directions to on-line users to submit comments electronically. As of the end of the public  
17 comment period, no comments had been received electronically via the Adakupdate website. As of the end  
18 of the public comment period, written comments had been received from the Aleutian/Pribilof Islands  
19 Association and ADEC.

20 Nine comments and questions received at the Adak public meeting addressed the approach to ordnance  
21 survey and cleanup on Adak; one addressed ordnance survey maps, three addressed responses by the Navy  
22 to future ordnance discoveries, one addressed the ordnance-related chemical contamination, two addressed  
23 the land transfer process, one addressed Rommel Stake removals, and one addressed the contract under  
24 which the ordnance work has been conducted. The comments/questions and responses are presented below.

25 **The following comments and questions address the approach to ordnance survey and cleanup on**  
26 **Adak:**

27 1. Is clearance of ordnance to a depth of 1 ft. sufficient (at the Clam Lagoon minefield site)?

28 *Response:* Yes. The ordnance experts that were consulted as part of the plan for clearing the  
29 minefield were very confident that one foot would be a sufficient clearance depth for the  
30 mines in that area since mines are not placed at depths greater than one foot below  
31 ground surface. All (100% coverage) of the area was covered twice. Navy is very  
32 confident that all mines have been removed.

33 2. What about if the weather brings in addition cover or material that may cover mines  
34 deeper than 1 foot.

35 *Response:* In some cases that would be a concern. At this site, there is almost no chance of  
36 additional coverage with wind-blown debris; the site is too far from the shoreline.

37 3. How deep could ordnance be detected at the minefield site?

38 *Response:* The ordnance detection system used at the Clam Lagoon minefield is adequate to detect  
39 mines to 18" below ground surface). Based on the site characteristics, a detection depth  
40 of 18 inches was adequate for the site. At other sites, Navy used detection equipment  
41 capable of detecting ordnance-related items to greater depths when site characteristics  
42 required such depths.

1 4. Do tundra knolls and surface clutter interfere with detectors? What is considered the  
2 ground surface?

3 *Response:* No. These do not affect the detectors. The top of the ground surface (0 feet bgs) starts  
4 with mineral soil, not surface vegetation or other debris.

5 5. Would the detectors have been affected by water?

6 *Response:* No. Testing was done of the ordnance detectors in the field conditions that occurred on  
7 the sites that were investigated on Adak. These tests demonstrated that our data set has a  
8 high reliability.

9 6. Did the 2000 field season investigation criteria change from previous years?

10 *Response:* Yes, the criteria changed prior to commencement of the field season based on the work  
11 plans and methods developed through the OU B Project Team efforts. These criteria  
12 included geophysical and investigation methods that are more stringent than the 1999  
13 work. Data from the 1999 work was compared to the 2000 criteria. The 1999 data that  
14 meet the 2000 data quality criteria were used, while some of the 1999 data were not used.

15 7. What process was used to investigate an area?

16 *Response:* Initially, a surface sweep of the path to be walked by the geophysical data collection team  
17 was conducted to remove any surface OE/UXO items and metallic debris that would have  
18 interfered with the subsurface ordnance detection system. The Geophysical Team  
19 collected subsurface data by walking a path, or transect, and recording the location of  
20 potential ordnance items (anomalies). Based on the information gathered by the  
21 Geophysical Team, UXO investigation teams excavated these anomalies to determine if  
22 they were ordnance or non-ordnance items. Prior to executing the investigation, the  
23 Navy's contractors were required to demonstrate their capability to detect and relocate  
24 ordnance items with the required statistical reliability.

25 8. Is there any part of the south half of the island that's dangerous?

26 *Response:* Combat ranges that were investigated in the northern part of the island suggest a low  
27 ordnance density. However, the Navy has not investigated any of the combat ranges on  
28 the south half of the island. The Corps will address this area under the Formerly Used  
29 Defense Sites (FUDS) program.

30 9. If the metal detectors only go down to a depth of 18 inches, how can we say that  
31 minefields are clear to 4 feet?

32 *Response:* At a minefield, no mines would be expected below 18 inches. So, that was the depth to  
33 which the investigation was conducted. All other locations, except the minefield  
34 locations, have been investigated to a depth of 4 feet using instrumentation proven to  
35 detect ordnance down to this depth.  
36

37 **The following comment and question addresses the ordnance survey maps generated for Adak:**

38 10. Have the land use maps and other materials being presented here been presented to the  
39 public on previous occasions?

1 *Response:* Yes, the graphics have been presented at several previous meetings and workshops to get  
2 community input on land use and activities. These are also in the information repository.  
3 They are full size poster board graphics.

4 **The following comment and question addresses ordnance-related chemical contamination:**

5 11. Will ordinary water filters or other treatment technologies filter out ordnance  
6 contaminants from drinking water?

7 *Response:* Some ordnance chemical contamination sampling has already been done on Adak, as part  
8 of the previous RI/FS. As far as we know, the OB/OD range was used more than any  
9 other area for ordnance related purposes. We did extensive sampling for groundwater,  
10 surface water, and subsurface and surface soil contamination in this area for ordnance  
11 chemical constituents in that area. No contamination was found at any levels that would  
12 be a threat to human health and the environment, so filtration of such contaminants from  
13 Adak drinking water is not an issue. As a follow up to this question, EPA provided  
14 information to the person who asked the question regarding portable camping filters that  
15 are considered effective at removing nitroamine class explosive compounds.

16 **The following comments and questions address the Navy's response to future ordnance discoveries**  
17 **on Adak:**

18 12. If an item or ordnance is found, who will respond?

19 *Response:* Navy and DoD are responsible for responding to any discovery of ordnance on Adak and  
20 any additional clean up required.

21 13. What would be the timetable for response?

22 *Response:* The Navy would decide on a case by case basis. Some ordnance discovery doesn't  
23 require immediate response because it doesn't pose any immediate threat. Typically, a  
24 picture would be taken of the discovery, sent to the Navy, and an ordnance specialist  
25 would determine the nature of the hazard, if any. Based on this information, a decision  
26 on what kind of response and when it would be taken would be made. It really depends  
27 on what type of ordnance is discovered. A decision on the required response is usually  
28 made within a day of receipt by Navy of information about the discovery.

29 14. Would you use a [response] team from Anchorage to help?

30 *Response:* Currently, response is provided by Explosive Ordnance Disposal Detachment Mobile  
31 Unit Eleven based at Naval Air Station Whidbey Island, Washington, but in the future a  
32 response could be initiated from Anchorage by another Explosive Ordnance Disposal  
33 Unit detachment.

34 **The following comments and questions address the land transfer process:**

35 15. How does OU A play in the land transfer?

36 *Response:* All OU A cleanup required to enable land transfer has been completed. There is still  
37 some petroleum site cleanup yet to be completed, but petroleum sites are not subject to  
38 CERCLA 120(h) covenant requirements and, therefore, not an obstacle to land transfer

39 16. What effect did budget cuts have on potential land transfer?

1 *Response:* Navy believes that there is adequate budget to complete all work needed to enable land  
2 transfer.

3 **The following comment and question addresses the contract under which the ordnance survey and**  
4 **cleanup was conducted on Adak:**

5 17. Why was ECC brought in vice FWENC?

6 *Response:* The Navy follows Federal Acquisition Regulations (FAR) in awarding all contract work.  
7 Navy awarded a contract to ECC and issued delivery orders against that contract to  
8 perform ordnance investigation and clearance work at Adak by following FAR  
9 procedures.

10 **The following comment and question addresses Rommel stake removals on Adak:**

11 18. Will there be any more Rommel stake removal?

12 *Response:* Navy believes it has removed all known, accessible Rommel stakes from areas where  
13 they pose a hazard. However, the issue of Rommel stake removal is not part of this ROD.

14 **The following comments and questions address issues raised at the May 30, 2001 Adak RAB meeting:**

15 19. Mr. Martin said his concern was that the Navy performed work in 1997 and 1998 that the  
16 regulatory agencies did not approve.

17 *Response:* Mr. Oates noted that those work plans were part of Operable Unit B, and that the issues  
18 were more about national policy rather than approval of the work plans. He said that one  
19 thing that came out of the OU B dispute was the project team came up with something  
20 that will work on Adak, and it will make it a better place to live. Mr. Oates also stated  
21 that much of the work performed by the Navy before the dispute was able to be retained  
22 and ultimately used.

23 20. Mr. Martin said he noticed that there was an Adak-specific requirement for OU B-1 that  
24 states 30 percent slopes are not accessible. He stated that a 30 percent slope was not that  
25 extreme and it was not uncommon for him to hike in that type of terrain.

26 *Response:* The OU B Project Team agreed that a 30-degree slope delineated accessible from  
27 inaccessible areas. That doesn't mean that it is not possible to climb in these areas, but it  
28 was agreed that these areas are very unlikely to be accessed on a regular basis compared  
29 to those areas with less severe slopes. It was stated that consideration for historical  
30 practices in a particular area was part of the evaluation process. It was further stated that  
31 while it was possible that someone will access areas with greater than a 30-degree slope,  
32 this would be the exception rather than the rule. Areas adjacent to these "inaccessible"  
33 areas were thoroughly investigated and that the data from these areas provides an  
34 indication of the likelihood of UXO contamination in the surrounding (inaccessible)  
35 areas. Generally, it was agreed to by the project team that people are much more likely to  
36 walk in the areas where the slopes are less than 30 degrees.

37 21. Tim Roy stated he was The Aleut Corporation representative on the OU B project team  
38 and he had not been receiving emails.

39 *Response:* Tim Roy is on the OU B project team distribution list for The Aleut Corporation, as are  
40 Chris Gates and Vince Tutiakoff.

1 22. Cathy Villa asked if the comment period for the OU B-1 proposed plan could be  
2 extended beyond the June 12, 2001 due date, since some of the RAB members had just  
3 received their copies in the mail.

4 *Response:* The Proposed Plan has been available on the adakupdate.com web site since May 14<sup>th</sup>,  
5 and since the document is only 12 pages in length, no extension of the comment period  
6 was planned.

7 **The following comments and questions addresses A/PIA concerns:**

8 23. The proposed plan, along with other Navy briefings and presentations, seems to  
9 emphasize the number of miles of geophysical investigation conducted, but provides little  
10 to no discussion of the grid spacing for the different areas. The grid spacing issue will  
11 probably become a sore point with the public in the future as they become more aware of  
12 the reality of the spacing of grids for the various types of ordnance suspected. Indeed,  
13 other criteria were taken into consideration during development of investigation  
14 methodologies for the various sites and types of ordnance. But learning about these  
15 methodologies, understanding them, and feeling comfortable with them is a long process,  
16 and would probably be a struggle for the average person reviewing the various technical  
17 documents on the subject.

18 This comment is not about whether or not these grid spacings are adequate for thorough  
19 characterization. But we do strongly recommend that the Navy continue to focus on  
20 education of the public on the work done, and work to address the vital issue of  
21 “perception.” Much effort has been dedicated to this very issue of perception by  
22 education and involvement of the public. But it is critical to continue with work in this  
23 area to develop public any possibility of “buy in” on the methodologies and remedies  
24 selected. The project is and has been moving forward at a very fast rate, much faster than  
25 the public can be expected to follow. So, the public, including concerned community  
26 members and the Aleut tribes of the region, will need some time to understand the  
27 decisions made in the past and the work completed. That means questions about “old  
28 issues” will probably continue to arise far into the future. It will be important for the  
29 Navy to be careful to not dismiss such concerns as “old issues,” or “already talked to  
30 death.” This would not be taken well by the public as it would tend to contribute to  
31 apathy and to reinforce a common public opinion that the Department of Defense might  
32 not really care about their comments, going forward with plans and decisions without  
33 consideration of public input. Navy briefings and documents do mention the  
34 involvement of the public including stakeholders in the past, so that shows consideration  
35 on this issue.

36 Educating the public and working on the perception issue will not necessarily result in  
37 agreement or buy in from the public. It is only stressed here as an important and vital  
38 part of this project.

39 As evidenced during the Proposed Plan briefing at the Public Meeting on Adak last  
40 month, there was a comment of concern from the public about the grid spacings, and also  
41 about the areas called “inaccessible.” On the first issue, it would be helpful to present  
42 information on the percentage of area within each site that was actually covered by  
43 geophysical investigation. This, as opposed to miles walked at some designated spacing,  
44 will paint a more realistic picture for people trying to understand the work done. Indeed,  
45 it might be more difficult for people to accept the work if presented this way, but it is  
46 reality, and people might come to accept it as reasonable if the evaluation, scoring, and  
47 decision-making process is explained.

1 On the second issue of “accessible” versus “inaccessible” areas, this one will be difficult  
2 to address because people might not agree with these designations for some areas. A  
3 “motivated hiker” could include a family picking berries on a fairly steep hill. As one  
4 member of the public commented, a 30-degree slope isn’t really that steep as to call it  
5 completely inaccessible.

6 *Response:* Grid spacing, other details about the geophysical survey approach to investigate  
7 ordnance, and the ordnance safety assessment methodology used for Adak will be  
8 described in the Record of Decision. The Navy appreciates the comments regarding the  
9 importance of stakeholder involvement and the ordnance safety awareness educational  
10 program for Adak residents and visitors.

11 With regard to the second issue, the operational definition of “inaccessible” was defined  
12 during the early stages of the RI/FS as a reasonable benchmark to differentiate lands on  
13 Adak on the basis of slope. This benchmark was developed with input and review  
14 solicited from all project team members and stakeholders. It is acknowledged that  
15 members of the public may have greater or lesser abilities to access specific areas that  
16 may be this steep.

17 24. The presentation of the Proposed Plan at the Public Meetings on Adak in May seemed to  
18 be much too technical for the public. Although the presentation was interesting, it  
19 probably was difficult for the public to follow. It is a challenge to present work of this  
20 complexity and extent in a way that is easy for the “lay person” or community member to  
21 understand, but this is certainly key to public acceptance of the work completed. The  
22 work completed by the Navy on Adak is remarkable and very impressive, but certainly  
23 not complete. It has indeed been a lengthy and sometimes very difficult challenge to all  
24 parties involved, and will continue to involve challenges into the future. As mentioned  
25 previously, it is very important to continue efforts to work with the public and the  
26 community, to continue with the education and public awareness process, and to address  
27 comments and concerns as they arise.

28 So, the point here is that while it is good to savor the project successes to date, it is also  
29 important to remember that the project is not done. Involvement of the public, the  
30 community, and stakeholders will continue far into the future.

31 *Response:* The Navy agrees that the educational program is a critical component of the institutional  
32 controls selected as part of the overall remedy. Details of this component will be  
33 described in detail in the Institutional Controls Management Plan currently being  
34 developed by the Navy.

35 25. Good statements! This gets the facts up front and doesn’t make any attempt to hide the  
36 fact that the Navy can’t guarantee everywhere will be 100% safe. Also, this clearly states  
37 that “the Navy will also continue to respond to any future discoveries of OE/UXO.”

38 *Response:* The Navy appreciates the comment.

39 26. Good writeup about the history of Adak, including an accurate account of Aleut history  
40 there. In the future, it would be good to add that the site of the NAS was actually an  
41 active seasonal hunting/fishing camp used by Aleuts from other villages. We do  
42 understand that it is also good to keep these types of documents as short as possible so  
43 that they are readable and not too long, so such text additions may need to be reserved for  
44 other documents.

45 *Response:* The introduction section of the ROD will be revised to reflect this information.

1 27. As discussed previously, the Proposed Plan focuses on the number of acres covered, but  
2 it is not clear what this coverage represents. Is it a function of miles? Actual square feet  
3 of land that was investigated using geophysical survey methods? Does it include those  
4 lands which were in between grid lines, but were not actually checked with geophysical  
5 survey equipment?

6 *Response:* This information will be included in a summary table in the Record of Decision.

7 28. The glossary section is good, but could use some improvement. In the future, it would  
8 helpful to the reader if the terms “NOFA” and “anomalies” were re-written in layperson’s  
9 terminology. Also, under the definition of FUDS, recommend clarifying that FUDS  
10 don’t necessarily need to have contained ordnance items; it also applies to other types of  
11 hazards and contamination associated with former military sites.

12 *Response:* The reviewer’s comment is noted.

13 29. Under definition for “Record of Decision,” shouldn’t it say “feasibility study”?

14 *Response:* The reviewer’s comment is correct.

15 **The following comments and questions address ADEC concerns:**

16 30. Although the ordnance sites were investigated and cleared using methodology that had  
17 the consent of project team members and the best technology available to date, due to  
18 limitations of these technologies, we cannot state that Adak is 100 percent clear of  
19 ordnance and explosives (OE) and unexploded ordnance (UXO). Despite the residential  
20 use designation established for Adak, residents must not confuse this with *unrestricted*  
21 *use*. Residents and visitors must exercise caution when engaging in activities in and  
22 around known or suspected ordnance sites and follow procedures outlined in the  
23 ordnance awareness program.

24 *Response:* As stated in ADEC's comment and acknowledged in the Proposed Plan, it is not possible  
25 to entirely eliminate the potential for encountering OE/UXO. While the proposed  
26 remedies for OU B-1 sites will, in most cases, allow residential land use, the need for  
27 maintaining the existing ordnance education and awareness program for Adak Island is  
28 recognized by the Navy and will be incorporated as an institutional control for OU B-1 in  
29 the Record of Decision (ROD). This institutional control will provide residents and  
30 visitors with information on the past ordnance use, storage, handling, and disposal  
31 practices on Adak as well as necessary procedures to be followed should they encounter  
32 OE/UXO items on Adak. For OU B-1 sites designated for residential use, no other  
33 institutional controls or land restrictions will apply.

34 31. The Navy is committed to providing awareness training in the form of Blue Card briefing  
35 for all island residents and visitors. The Navy must reach an agreement with the Aleut  
36 Corporation prior to completion of land transfer to determine which party will be  
37 responsible for ensuring training is implemented and continued for the life of reuse on  
38 Adak.

39 *Response:* The Navy acknowledges its responsibility to provide an ordnance awareness and  
40 education program on Adak for all island residents and visitors. The Navy also  
41 recognizes that responsibility for maintaining this program as an effective part of the  
42 selected remedy for OU B-1 sites after property conveyance rests with the Navy  
43 regardless how the program is administered.

1 32. All future property owners on Adak must be informed of the history of their property in  
2 order to make responsible decisions regarding land use. To accomplish this, ADEC  
3 requires the Navy to implement institutional controls that “run with the land.”

4 *Response:* The general institutional control of maintaining the existing ordnance awareness and  
5 education program will be included in the ROD for OU B-1. As stated above, the Navy  
6 is committed to maintaining this institutional control and retains this responsibility  
7 regardless of land ownership. For sites within OU B-1 designated for residential land  
8 use, no other institutional controls or land use restrictions will be imposed.

9 For any OU B-1 sites that employ land use restrictions as part of the selected remedy (e.g.  
10 land use limited to recreational purposes or wildlife refuge) Navy will provide specific  
11 descriptions of the applicable land use restrictions as well as complete legal descriptions  
12 of the sites to which these land use restrictions apply. These restrictions will be recited in  
13 the conveyance documentation prepared and executed by Department of Interior to  
14 convey the property to The Aleut Corporation, and will "run with the land".

15 33. ADEC is aware that despite the soundness of the technology used to cleanup Adak,  
16 improvements in technology are made every day, including technology related to  
17 ordnance investigation and clearance. ADEC reserves the right to evaluate technologies  
18 available at the time of the CERCLA 5-year Review to determine the need for additional  
19 work on former ordnance sites if a higher degree of cleanup standard is warranted. If  
20 additional work is determined necessary, work may include performing additional  
21 investigative activities as well as removal.

22 ADEC is aware that the Navy is committed to removing all ordnance items found and  
23 reported on Adak. If ordnance items are found and reported, ADEC reserves the right to  
24 require the Navy to perform investigative activities in the area surrounding the found  
25 ordnance item in addition to performing removal, using the best technology available at  
26 that time. Determination to conduct additional investigative activities will be made based  
27 on evaluation of location of found ordnance item, type, size, and quantity.

28 *Response:* The OU B Project team agreed to data quality objective (DQOs) to support remedial  
29 decisions for OU B-1 sites during the development of the Remedial Investigation and  
30 Feasibility Study (RI/FS) work plans for OU B. These DQOs included criteria for  
31 ordnance detection technology used to gather data in support of OU B-1 proposed  
32 remedial decisions. Based on the review conducted by the OU B Project Team, the data  
33 used in support of the proposed remedial decision for OU B-1 meets these DQOs.  
34 Therefore, these decisions are fully supportable as protective of human health and the  
35 environment.

36 The Navy recognizes the obligation under CERCLA to perform a five-year review to  
37 determine the effectiveness of the proposed remedy. This review should be based on the  
38 effectiveness of the remedy in place in meeting the remedial action objectives as stated in  
39 the ROD. Should the CERCLA five year review of the remedies in place for OU B-1  
40 conclude that additional remedial actions are necessary to meet the remedial action  
41 objectives as stated in the ROD, the Navy will participate with ADEC and EPA to  
42 determine what additional remediation is necessary to protect human health and the  
43 environment.

44 The Navy will conduct additional cleanup at Adak pursuant to and consistent with DoD  
45 policy memorandum from Under Secretary of Defense, “Responsibility for Additional  
46 Environmental Cleanup After Transfer of Real Property”, dated July 25, 1997. This  
47 policy requires that if applicable regulatory requirements are revised to reflect new

1 scientific or health data and the remedy put in place by DoD is determined to be no  
2 longer protective of human health and the environment, DoD would return to perform  
3 such additional cleanup as would generally be required by regulatory agencies of any  
4 responsible party in a similar situation.

5 As stated in ADEC's comment, the Navy recognizes its responsibility to respond to all  
6 ordnance items found on the current military reservation on Adak. This responsibility  
7 includes any investigation required in the area surrounding the found ordnance item.

8 34. DEC also request[s] that the OU B-1 ROD discuss the following subjects in substantially  
9 greater detail than presented in this proposed plans:

10 - The maximum depth below ground surface at which OE/UXO could be expected to  
11 exist on Adak, and the reasons for concluding that penetration or other placement or  
12 migration of OE/UXO would not have occurred below that level.

13 - Any site-specific determination(s) made under DDESB 6055.9-STD C12.3.4.3.

14 - The "reasonably likely future land use" for each site, as referred to (but not  
15 described) in the second column of page 7 of the Proposed Plan.

16 *Response:* As suggested by ADEC, the Navy will provide more detailed discussion in the OU B-1  
17 ROD for the following subjects:

18 - The maximum depth below ground surface at which OE/UXO could be expected to  
19 exist on Adak, and the reasons for concluding that penetration or other placement or  
20 migration of OE/UXO would not have occurred below that level (see Section 5.8).

21 -Any site-specific determination(s) made under DDESB 6055.9-STD C12.3.4.3 (see  
22 Section 7.2.1)

23 - The "reasonably likely future land use" for each site, as referred to (but not described) in  
24 the second column of page 7 of the Proposed Plan (see Table 6-1).