



**FINAL**

9 January 2013

# **Action Memorandum**

Non-Time Critical Removal Action  
Operable Unit B-2

## **Former Adak Naval Complex**

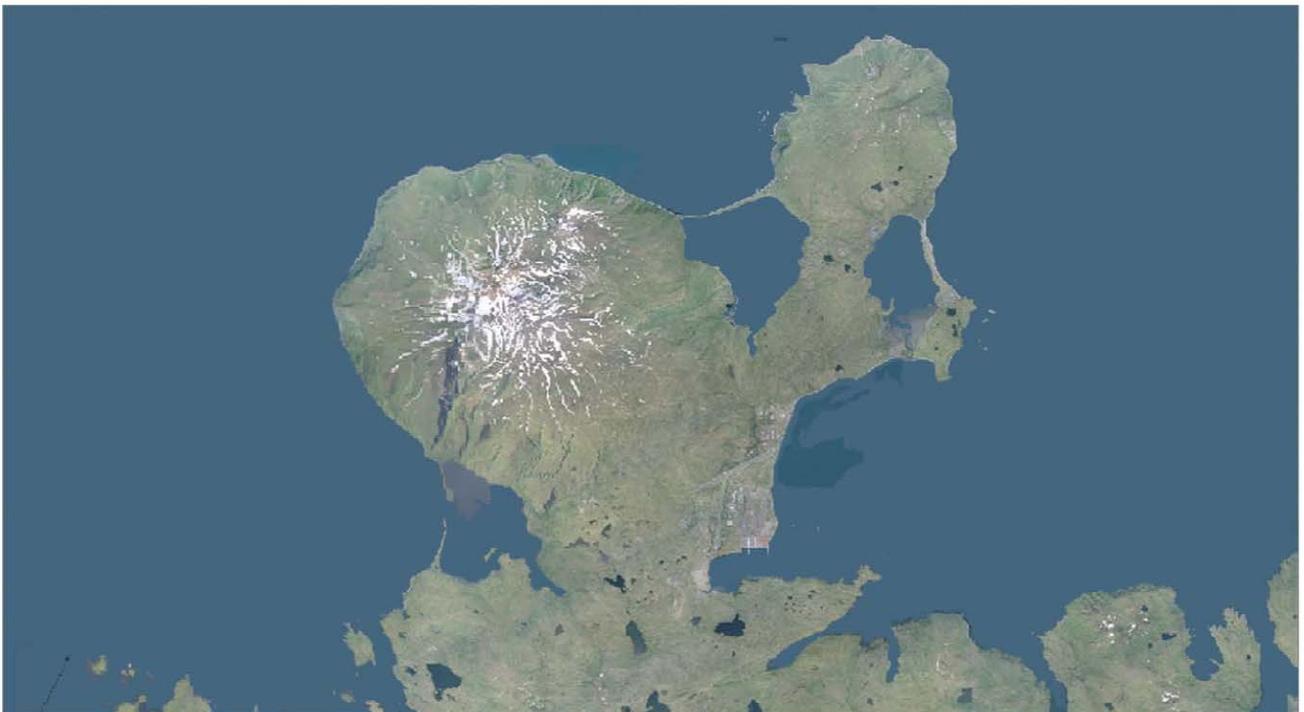
Adak Island, Alaska

**Department of the Navy**

**Naval Facilities Engineering Command, Northwest**

1101 Tautog Circle

Silverdale, WA 98315





FINAL  
ACTION MEMORANDUM  
NON TIME CRITICAL REMOVAL ACTION  
OPERABLE UNIT B-2  
FORMER ADAK NAVAL COMPLEX  
ADAK ISLAND, ALASKA

Prepared by:

NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST  
SILVERDALE, WASHINGTON

9 JANUARY 2013



## FORWARD

This Action Memorandum (AM) presents the selected Non Time Critical Removal Action (NTCRA) for Operable Unit (OU) B-2 located at the Former Adak Naval Complex, Adak Island, Alaska. The Former Naval Air Facility (NAF) Adak is included in the Former Adak Naval Complex. This AM presents the response actions selected for the five Remedial Action Areas (RAAs) associated with OU B-2. The work planned under the NTCRA is consistent with the remedial action that is proposed in the Record of Decision (ROD) that is being developed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The NTCRA includes removal of identified munitions and explosives of concern (MEC) in RAA-01, RAA-02, RAA-03, and RAA-05 to 2 feet below ground surface (bgs), and RAA-04 to 4 feet bgs.

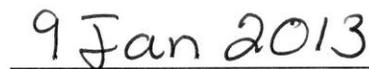
The U.S. Navy, through the Naval Facilities Engineering Command, Northwest (NAVFAC NW), is the lead agency under Executive Order 12580 and the Defense Environmental Restoration Program for the Former Adak Naval Complex and developed this AM consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as amended. This AM will be included in the administrative record for OU B-2, and will be available for public review at the following locations:

- City of Adak Information Repository
- Adak Update Website [www.adakupdate.com](http://www.adakupdate.com)
- NAVFAC NW, 1101 Tautog Circle, Silverdale, Washington, 98315

This AM provides the selected actions to ensure the future ROD-required remedy is met (subject to Public Comment and revision) and is effective at this site.



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Date

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## ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AM	Action Memorandum
AMNWR	Alaska Maritime National Wildlife Refuge
ANILCA	Alaska National Interest Lands Conservation Act
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EC	Engineering Control
EE/CA	Engineering Evaluation / Cost Analysis
EPA	Environmental Protection Agency
ESHA	Explosive Safety Hazard Assessment
FFA	Federal Facilities Agreement
IC	Institutional Control
LUC	Land Use Control
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MEC HA	Munitions and Explosives of Concern Hazard Assessment
NAF	Naval Air Facility
NAVFAC NW	Naval Facilities Engineering Command, Northwest
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NTCRA	Non Time Critical Removal Action
OB/OD	open burn/open detonation
OU	Operable Unit
RAA	Remedial Action Area
RAB	Restoration Advisory Board
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SAERA	State-Adak Environmental Restoration Agreement
TAC	The Aleut Corporation
USFWS	U.S. Fish and Wildlife Service

## 1. PURPOSE

This Action Memorandum (AM) is the decision document describing the U.S. Navy's Non-Time Critical Removal Action (NTCRA) at the Former Adak Naval Complex, Adak Island, Alaska. This NTCRA is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) since the Former Adak Naval Complex is currently included on the National Priorities List (NPL). The Navy is the lead agency, under Executive Order 12580, for the CERCLA actions at the Former Adak Naval Complex.

There are 11 sites requiring remedial action for munitions at the Former Adak Naval Complex. These sites have been subdivided into five Remedial Action Areas (RAAs) based on proximity and similar nature and extent of munitions contamination. The sites and their subdivision into RAAs are as follows:

- RAA-01
  - OB/OD-01
- RAA-02
  - C1-01
- RAA-03 West
  - MI-01, MI-02, MI-03
- RAA-03 East
  - HG-01, RR-01
- RAA-04
  - SA93-01, SA93-03
- RAA-05
  - ALDA-01, ALSW-01

The purpose of this NTCRA is to protect human health and the environment from the potential presence of munitions and explosives of concern (MEC) in the Remedial Action Areas (RAAs) within Operable Unit B-2. The five RAAs and their respective depths of removal are RAA-01, RAA-02, RAA-03, and RAA-05 to 2 feet below ground surface (bgs), and RAA-04 to 4 feet bgs. The Navy will reserve the opportunity to clear to deeper depths in each RAA if site conditions warrant (e.g., discovery of a disposal pit).

A Record of Decision (ROD) is being developed under CERCLA and will follow initiation of this NTCRA.

## **2. BACKGROUND AND SITE CONDITIONS**

The Former Adak Naval Complex is included the former Naval Air Facility (NAF) Adak and is located on Adak Island, approximately 1,200 miles southwest of Anchorage, Alaska in the Aleutian Island chain (Figure 1). The former Navy base occupies 76,800 acres on the northern half of the island. The U.S. Fish and Wildlife Service (USFWS) manages the southern half of the island, which is a designated 117,265-acre wilderness area within the Alaska Maritime National Wildlife Refuge (AMNWR). Figure 2 shows the location of each of the OU B-2 sites addressed in this AM in relation to all OU B-2 sites. Figures 3, 4, and 5 show the locations of the RAAs.

### **2.1 SITE HISTORY**

Military presence on Adak began in 1942 when it was used as a staging area during World War II. The Adak Naval Complex was operated by the Navy from about 1949 to 1997. The Naval Air Facility Adak was closed under the 1995 Base Realignment and Closure program on 31 March 1997. In September 2000, the federal government entered into a Land Transfer Agreement with The Aleut Corporation (TAC), a Native corporation. This agreement set forth the terms and conditions to transfer approximately 47,000 acres of the former Adak Naval Complex property to TAC. The transfer occurred on 17 March 2004 and included all of the downtown area, housing units, and industrial facilities. Parcel 4, which includes most of the land surrounding Andrew Lake at the north end of Adak Island and contains all of the OU B-2 sites, was not included in the land transfer.

### **2.2 SITE REGULATORY HISTORY**

The Former Adak Naval Complex was designated as a Superfund site when it was added it to the NPL by the Environmental Protection Agency (EPA) in 1994. In order to facilitate investigation and cleanup activities, the Navy, as lead agency, has entered into agreements with the EPA and Alaska Department of Environmental Conservation (ADEC):

- In 1993, the Navy, EPA, and ADEC signed a Federal Facilities Agreement (FFA). This agreement ensures the environmental impacts associated with past and present activities at the facility are thoroughly investigated and appropriate cleanup actions are taken to protect the public health, welfare, and the environment. It incorporates the EPA's cleanup process under CERCLA. CERCLA does not include petroleum as a hazardous substance, so the FFA stated that petroleum contamination cleanup would follow State of Alaska regulations under a separate two-party agreement between the Navy and the State of Alaska.

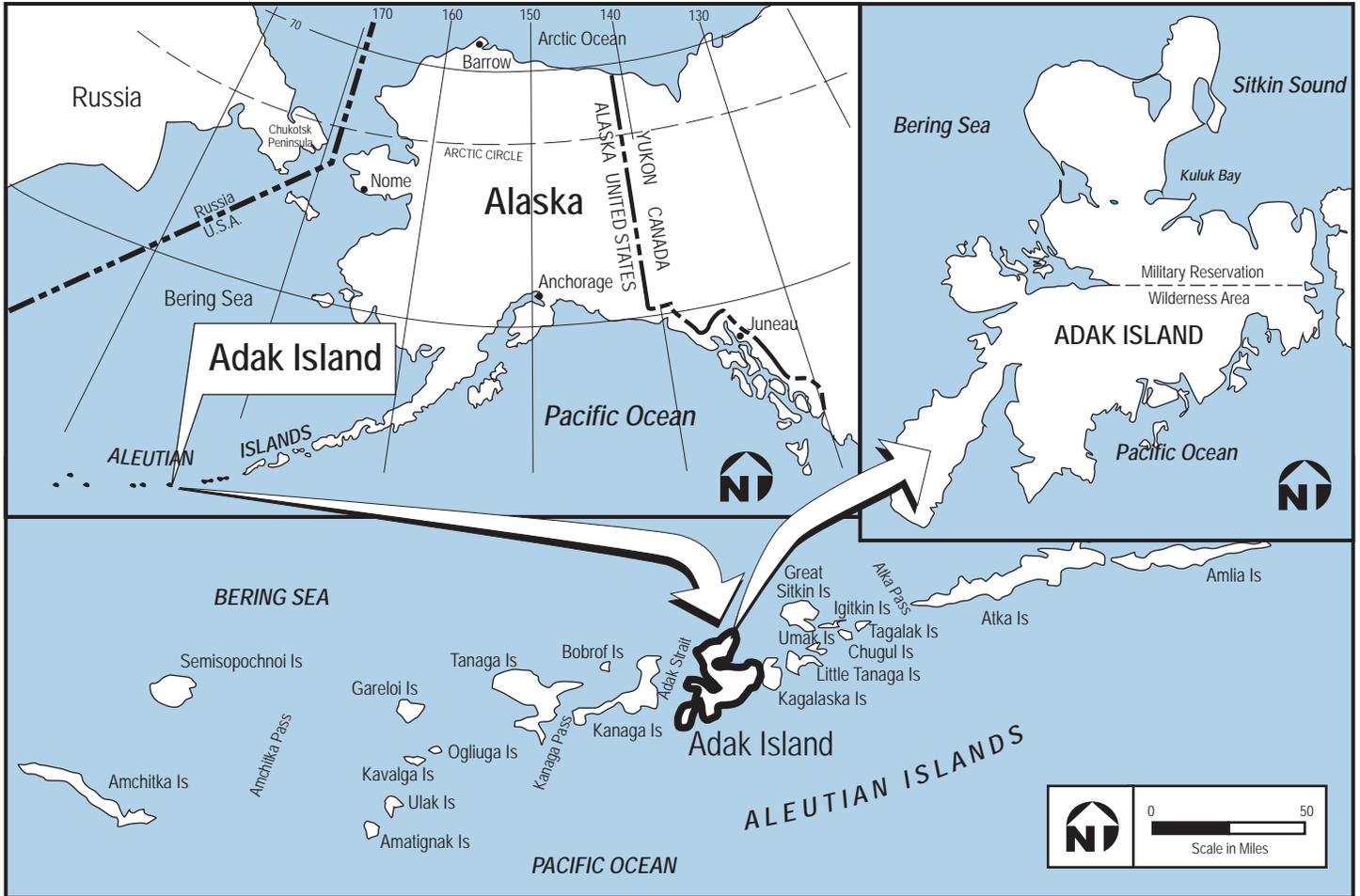


Figure 1. Adak Island and Vicinity

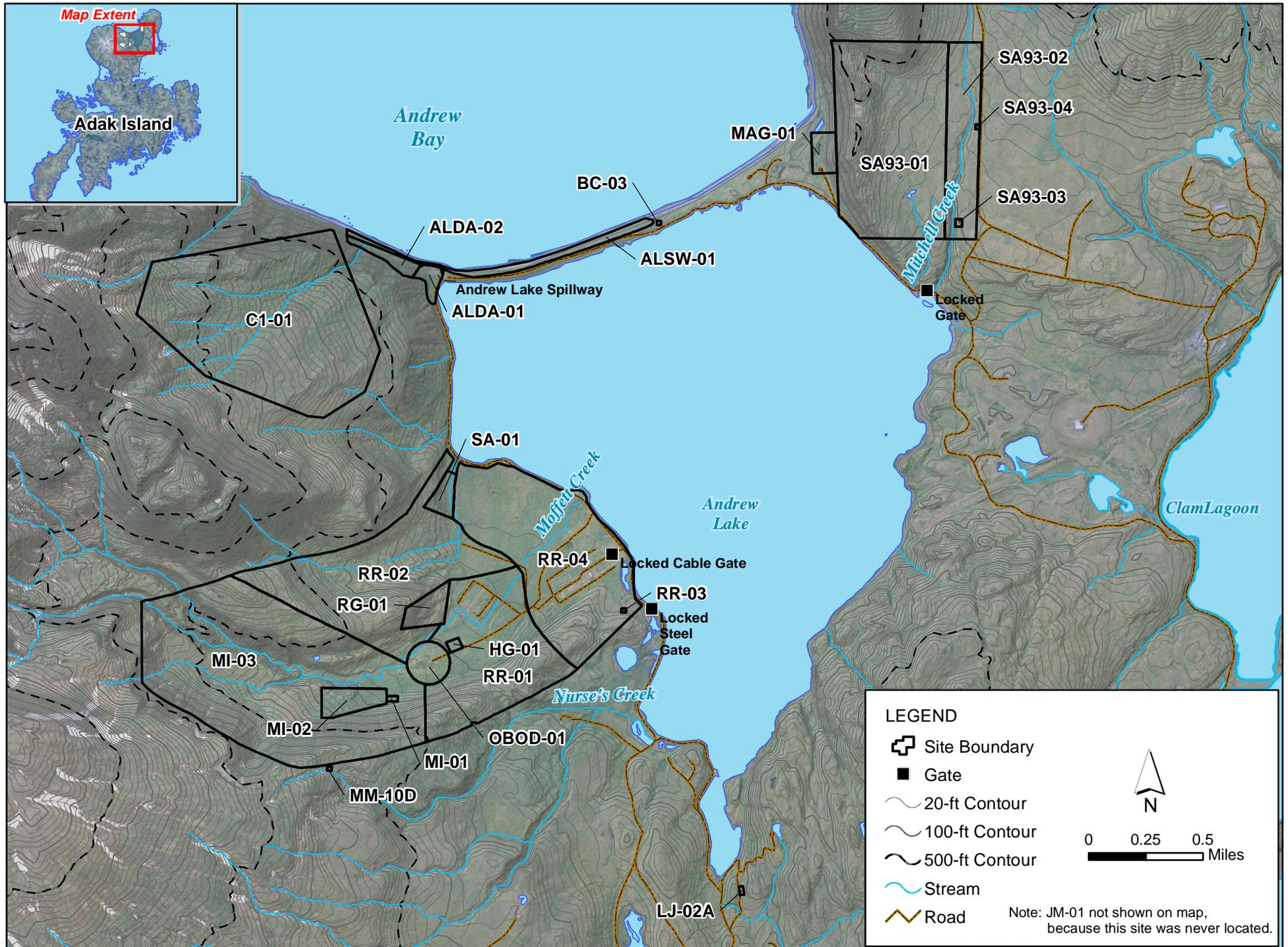


Figure 2 OU B-2 Sites, Adak Island, Alaska

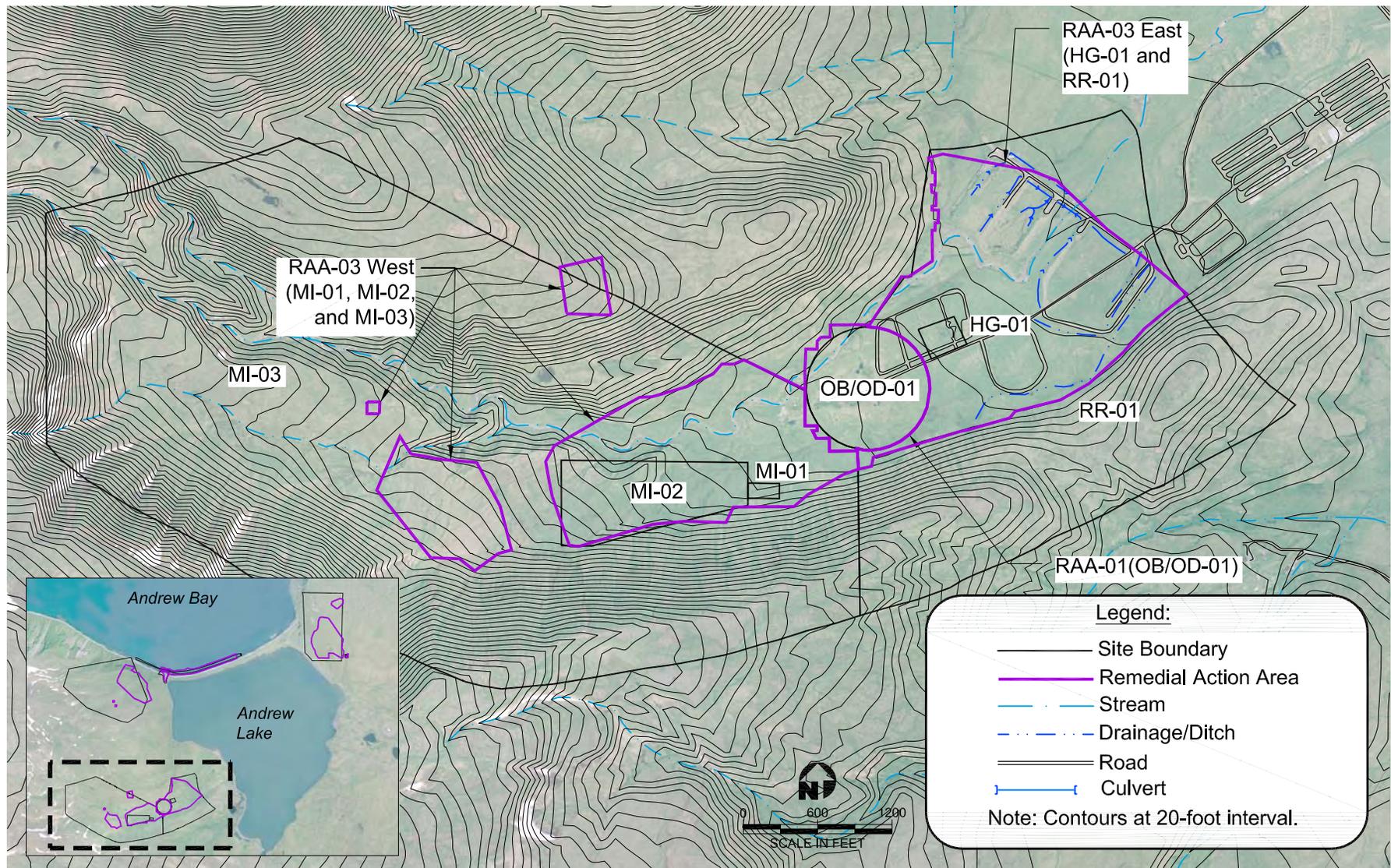


Figure 3 - Locations of RAA-01 and RAA-03 (West and East)

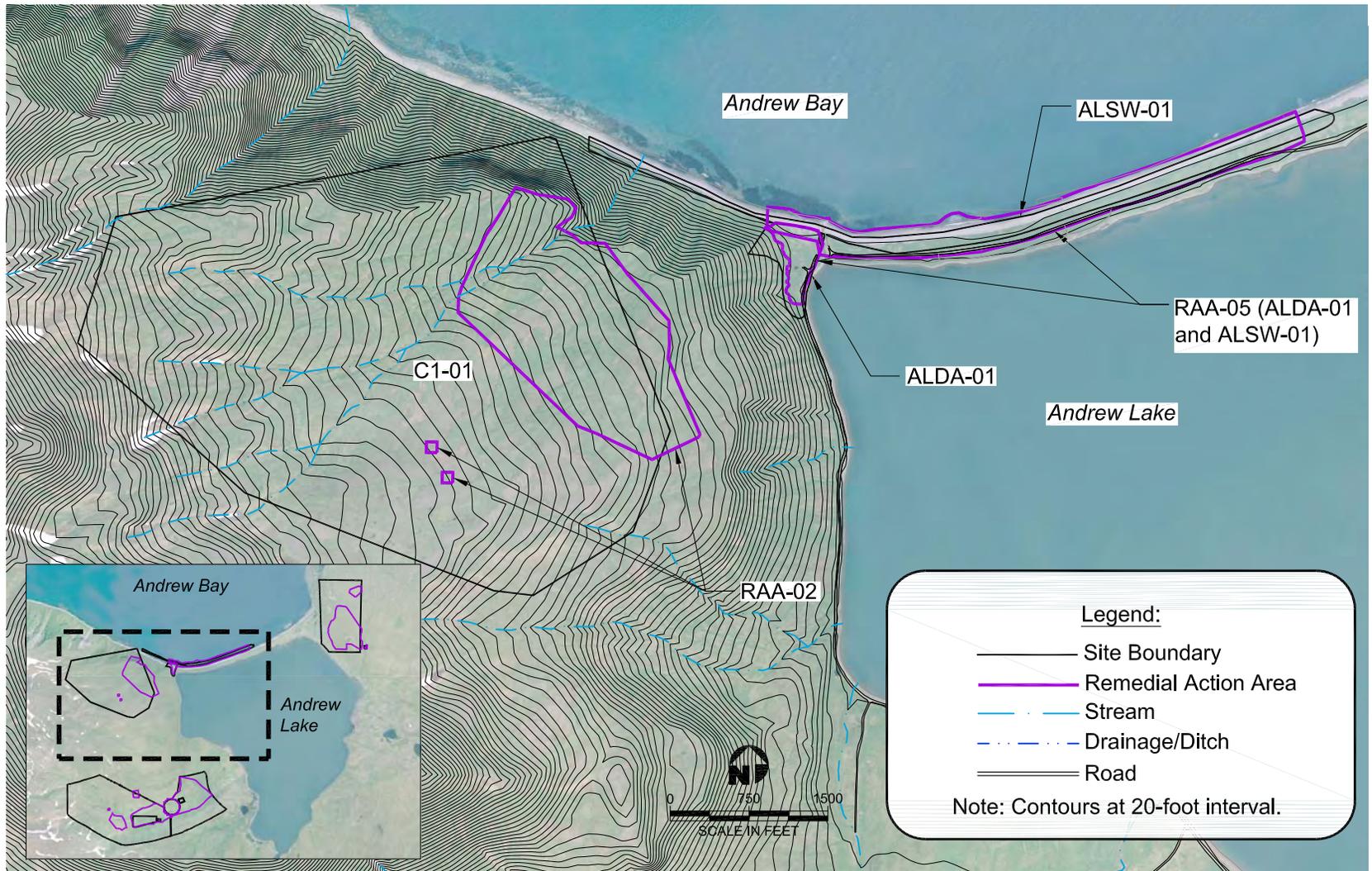


Figure 4 - Locations of RAA-02 and RAA-05

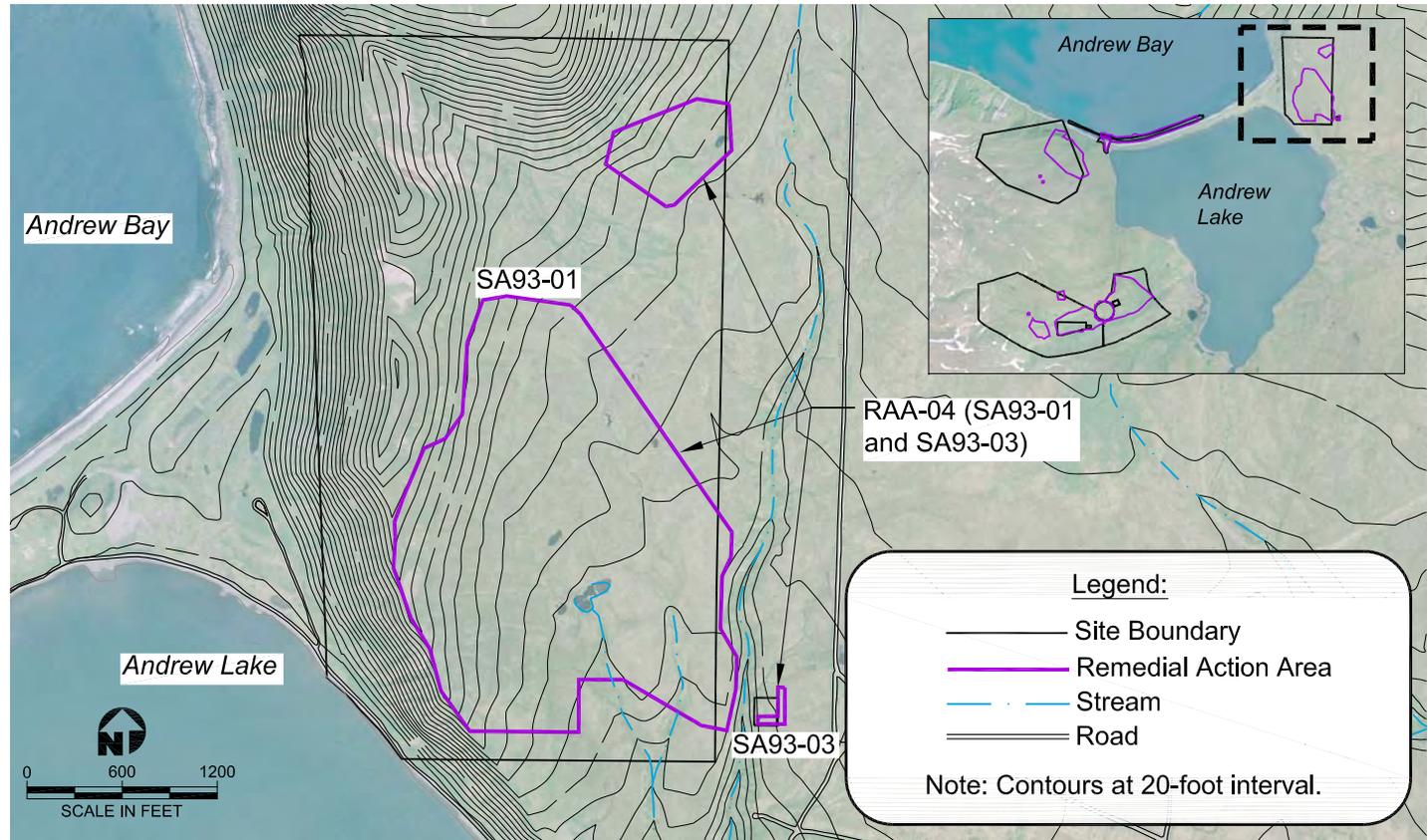


Figure 5 - Location of RAA-04

- In April 1994, the Navy and ADEC signed the State-Adak Environmental Restoration Agreement (SAERA) to implement site characterization and remediation of petroleum sites on Adak.

In 1998, the FFA was amended to divide Adak into OU A (chemical and petroleum sites) and OU B (MEC sites). The ROD for OU A was signed in April 2000 (U.S. Navy 2000). In 2001, OU B was divided into OU B-1 and OU B-2 to accommodate land transfer. The OU B-1 ROD was signed in December 2001 (U.S. Navy 2001).

The OU B-1 ROD requires an island-wide MEC educational awareness program to familiarize the public with (1) the history of ordnance use, storage, handling, and disposal on Adak; (2) basic characteristics and hazards of MEC on Adak; and (3) procedures that should be followed if suspected MEC is encountered. Although not specified in the OU B-1 ROD, access to the Parcel 4 area, which contains the OU B-2 sites, is restricted. Engineering Controls (ECs), including locked gates, fences, and posted signs, have been installed to discourage access to the OU B-2 sites.

OU B-2 includes ordnance sites in the Mt. Moffett/Andrew Lake Area. Of the 39 sites in OU B-2; 15 of these sites were determined to require no further action in the preliminary assessment and the remaining 24 sites have been divided into 3 categories, including the 11 associated with this AM and the NTCRA. All 11 of the sites associated with the NTCRA are Category 1 sites and are associated with RAAs-01, -02, -03, -04, and -05. The categories are described below.

- **Category 1 – FS Areas:** Category 1 sites require cleanup because MEC found at these sites pose unacceptable explosive safety risks to future land users.
- **Category 2 – Removal Action Complete:** Category 2 consists of one site, RG-01, which has been fully investigated and cleared as part of the RI and a removal action.
- **Category 3 – Institutional Control Only Areas:** Category 3 are considered to be fully investigated as part of the RI/FS and found to have acceptable (low) potential explosive hazards that are manageable through Institutional Controls (ICs) alone.

### 2.3 SITE CHARACTERISTICS

Adak Island experiences a polar maritime climate with persistently overcast skies, high winds, frequent and often violent storms, and a narrow range of temperature fluctuation throughout the year. The average total annual precipitation on Adak Island is about 60 inches, most of which falls as rain in the lower elevations. Average monthly precipitation varies from a low of about 3 inches during June and July to a high of 7 to 8 inches during November and December. Snowfall averages over 100 inches a year at sea level. Frost

heave is not likely a significant factor in MEC mobility at the majority of the sites in OU B-2.

Adak Island consists primarily of volcanic and sedimentary rocks, with a relatively thin layer of unconsolidated material (generally less than 10 feet) covering much of the bedrock. Only the downtown area is known to have more than 100 feet of unconsolidated material. Surficial deposits across the island were formed primarily by glaciation, volcanic activity, and erosion and deposition.

The surface water hydrology near the OU B-2 sites is characterized by several short, steep-gradient streams draining radially from Mount Moffett and Mount Adagdak. One major stream, Moffett Creek, drains off Mount Moffett into the valley on the western side of Andrew Lake and runs through RAA-03. A smaller, unnamed creek is located north of Moffett Creek. On the eastern side of Andrew Lake, a smaller drainage, Mitchell Creek, runs through RAA-04 from north to south and drops down a steep ravine to Andrew Lake.

The hydrogeology of northern Adak Island is limited by the low *permeability* of native surface materials and bedrock. Most undisturbed areas are covered by tephra (ash) deposits. Combined with steep slopes, these conditions offer little opportunity for water infiltration. Additionally, the combination of a thin layer of unconsolidated material over poorly jointed bedrock results in groundwater that is intermittent and limited laterally. The most notable exception in OU B-2 is the extensive flat area with permeable soil located in the Moffett Creek valley (RAA-03).

The native vegetation of Adak Island is that of a terrestrial-maritime tundra ecosystem. The tundra vegetation consists of grasses, lichens, mosses, and other species adapted to the wet, cold, and windy climate. This vegetation, often thick and spongy, is difficult to walk on and prevents easy access.

RAA-specific information, including areas, historical land use, access, terrain, and cultural resources, is provided in Table 1.

**Table 1.** Summary of RAA Characteristics

RAA	Area/ Accessible Area <sup>a</sup>	Previous Land Use	Access/Terrain	NRHP Eligible Cultural Resources Historic Site
RAA-01 (OB/ OD-01)	19.4 acres (majority is wetland)	Used for detonation of munitions from military training activities and MEC removal operations (1940s through 1990s). RCRA interim status hazardous waste treatment unit area.	Direct access via gravel range entry road, which branches from main access road along the west side of Andrew Lake. Relatively flat, but hummocky in some locations and marshy in others; several craters resulting from previous disposal events. Elevation ranges from 110 to 130 feet asl. The center and southern portion of RAA-01 are occupied by wetlands.	Collapsed wooden structures and an abandoned bridge at OB/OD-01
RAA-02 (C1-01)	74 acres (access to site is very difficult, access on site is difficult)	Combat range mortar impact area (WWII training range). Locations of firing points and targets unknown.	Indirect access via a hike from the Andrew Lake range area. Steep and rocky in most areas; inaccessible along northern boundary. Elevation ranges from about 500 to 1,300 feet asl. Several small wetlands have been mapped in the area.	None found
RAA-03 West (MI-01, MI-02, and MI-03)	71 acres (majority is wetland)	Combat range mortar impact area and disposal area.	Indirect access via gravel range entry road that terminates at OB/OD-01. Terrain ranges from relatively low and flat in the eastern portion near the OB/OD area to steep and inaccessible at the western end and along the southern border. Elevations range from 130 feet asl on the valley floor to 920 feet asl along the flanks of Mount Moffett. Wetlands mapped through much of the main target/impact area.	None found
RAA-03 East (HG-01 and RR-01)	78 acres (majority is wetland)	RR-01: Hand grenade and 40-mm impact area. Locations of firing points and targets are uncertain. HG-01: Hand grenade training range. Remnants of a berm with throwing pits are located near the east side of the range.	Direct access via range entry road, which branches from the main access road along the west side of Andrew Lake. RR-01 is generally flat in the northern portion and can be uneven and marshy, while steep slopes in the south make the southern third of RR-01 inaccessible. HG-01 is relatively flat with steep slopes on the berm protecting the throwing pits. Elevations range from about 50 to 500 feet asl. Lowland areas bordering the creek are often saturated with pooled water.	Rifle range at RR-01

RAA-04 (SA93-01 and SA93-03)	104 acres (majority is accessible)	Combat training range with multiple impact areas. Target areas apparent from distribution of MEC.	Indirect access via walk from gravel road originating from the east side of Andrew Lake near the Recreation Center. On the west of SA93-01, a steep ridge forms a cliff above Andrew Lake. To the east of the ridge, terrain falls gently toward a deep drainage ravine. SA93-03 is generally flat with a deep ravine abutting the site on the west. Most of the site is on a plateau 300 to 400 feet above the lake. Central elevations range from 220 to 320 feet asl, and steep ridges just over 500 feet asl are located west and north of the RAA. Areas of standing water or streams in the south-central portion of RAA-04.	None found
RAA-05 (ALDA-01 and ALSW-01)	ALDA-01: 6.7 acres ALSW-01: 270 acres <sup>b</sup> / 21 acres (majority of terrestrial area is accessible)	ALDA-01: Debris disposal area with possible bombing and OB/OD craters. ALSW-01: Designated a munitions response area based primarily on historical and continuing observations of accumulated MEC along the tidal and upland zones.	Direct access to ALDA-01 via main access road running along the western shore of Andrew Lake. Direct access to ALSW-01 via unimproved road originating on the east side of Andrew Lake near the Recreation Center. Terrain of ALDA-01 generally flat, steep slopes along western edge and a line of craters trends NW to SE across site. ALSW-01 transitions from flat atop seawall to very steep along the sides (north and south). Most of ALDA-01 lies at elevations ranging from about 20 to 40 feet asl; however, a cliff on the west side of the area rises to heights of over 200 feet asl. Wetland vegetation and soils in the southern portion of ALDA-01.	Underground bunker and four Quonset hut depressions at ALDA-01, underground bunker at ALSW-01

<sup>a</sup> – Note that steep slopes (slopes greater than 30 degrees) or areas of standing water are not considered accessible.

<sup>b</sup> – 250 acres in offshore area

asl – above sea level

OB – open burn

OD – open detonation

mm – millimeter

MEC – munitions and explosives of concern

NRHP – National Register of Historic Places

RAA – Remedial Action Area

## 2.4 LAND USE

The Navy intends to relinquish Parcel 4 to the USFWS for use as a wildlife refuge when the required cleanup actions are complete. The anticipated future land uses are wildlife management, research, recreation, and most significantly, subsistence (primarily hunting and fishing) under the Alaska National Interest Lands Conservation Act (ANILCA). Possible depths of intrusive activities for recreation and wildlife management are expected to be less than 2 feet, and the potential depths of intrusive activities for subsistence are expected to be less than 4 feet. Potential research activities, such as archeological investigations or soil sampling, may include intrusive activities greater than 4 feet.

## 2.5 PREVIOUS INVESTIGATIONS AND ACTIONS

A Remedial Investigation/ Feasibility Study (RI/FS) was completed for OU B-2 in May 2012 (U.S. Navy 2012). The RI/FS is intended to serve as the Engineering Evaluation / Cost

Analysis (EE/CA) for the purposes of this AM. Results of the RI/FS evaluations are summarized below.

**MEC Contamination.** Data collected in 1999, 2000, and 2008 were used to document the nature, extent and distribution of MEC contamination at OU B-2. This includes data from (1) site reconnaissance to assess site accessibility and potential for MEC transport by erosion or slope failure, (2) instrument-aided surveys to assess the presence of MEC on the surface, and (3) geophysical and intrusive investigations to assess the presence of underground MEC. The potential for erosion and off-site MEC transport was evaluated through investigations of erosion features, unstable slopes, and other areas deemed likely to erode, and by determining whether MEC was present in these areas based on geophysical and intrusive investigation results. Overall, the potential for erosion and off-site MEC migration was considered low at all locations based on the results of this evaluation.

MEC found at OU B-2 include mortars, rockets, projectiles, bombs, grenades, small arms, and other miscellaneous explosive devices. Table 2 shows the number of MEC detected in the RAAs and how far below the ground surface the items were found. This information was used to develop the boundaries for MEC removal, which are shown in Figures 3, 4, and 5.

**Munitions Constituents (MC) Contamination.** During the 2008 OU B-2 RI, 28 soil samples, nine groundwater samples, seven sediment samples, and four surface water samples were collected at 14 OU B-2 sites and analyzed for MC. MC was detected only in soil samples. Of the 18 chemicals analyzed for in the soil samples, only nitroglycerin and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) were detected. Nitroglycerin was detected at a single location at OB/OD-01, and RDX was detected in three separate samples at RG-01.

**Table 2.** MEC Distribution by Depth

Distribution of MEC by Depth (Percentage)	RAA-01 (OB/OD-01)	RAA-02 (C1-01)	RAA-03 West (MI-01, MI-02, and MI-03)	RAA-03 East (HG-01 and RR-01)	RAA-04 (SA93-01 and SA93-03)	RAA-05 (ALDA-01 only)
Surface	25%	56%	2%	14%	15%	93%
Near Surface (0 to 0.5 ft bgs)	67%	22%	66%	79%	45%	0%
Subsurface (0.5 to 2 ft bgs)	8%	22%	32%	7%	36%	7%
Subsurface (2 to 4 ft bgs)	0%	0%	0%	0%	4%	0%
Total Quantity	12	9	87	29	67	15

RAA – Remedial Action Area

MEC – munitions and explosives of concern (consists of UXO and DMM in this table)

ft bgs – feet below ground surface

## **2.6 CURRENT ACTIONS**

Annual Land Use Control (LUC) inspections are conducted to ensure the integrity of the ECs are maintained. These include fencing, signs and gates at the Parcel 4 boundaries. ICs include educational awareness such as seminars given to the school children, maps and posters with MEC warnings, and educational videos. Random interviews are also conducted to monitor the effectiveness of the ICs.

Two efforts toward remedy of the munitions hazards at Parcel 4 are on-going with the completion of the RI/FS.

- Associated with this AM, the NTCRA for RAAs-01, -02, -03, -04, and -05 will begin during FY13 and conclude over the next several field seasons.
- At the same time, a Proposed Plan has been developed and was finalized in FY12. The Proposed Plan will be used to develop the ROD which is scheduled to be completed in FY14. The remedial actions associated with the NTCRA are consistent with those being developed in the ROD.

## **2.7 STATE AND LOCAL ACTIONS TO DATE**

As the lead agency, the Navy regularly coordinates current and planned activities with the EPA and ADEC and receives regulatory concurrence of the activities, as well as confirmation of completion. The Regulatory / Navy Project Team is active and meets regularly to ensure reasonable efforts to closure are pursued. Other local actions include the Restoration Advisory Board (RAB) which is active and meets twice yearly. TAC, the USFWS, and the City of Adak are all active stakeholders.

## **2.8 POTENTIAL FOR CONTINUED STATE/ LOCAL RESPONSE**

The Navy is the lead agency for response actions at the site. There is no potential for state or local response actions at OU B-2.

## **2.9 ENGINEERING EVALUATION / COST ANALYSIS AND PUBLIC INVOLVEMENT**

The Final RI/FS serves the purpose of the EE/CA for this project, as the RI/FS exceeds the requirements for an EE/CA and is functionally analogous. The RI/FS has been included in the Administrative Record for this project. The FS was made available, along with the

Administrative Record, to the public through a Public Notice in the Anchorage Daily News on 13 September 2012, posting to the Adak Update website, with a notice sent to subscribers, and placement in the City of Adak Information Repository. No comments were made by the public on the document.

A public comment period on the work presented in the Action Memorandum and Proposed Plan was held from 27

### **3. THEATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES**

As part of the RI/FS, separate risk evaluations characterized potential explosive hazards from MEC, as well as potential risks posed to human and ecological receptors by MCs in environmental media at OU B-2.

#### **3.1 SUMMARY OF ESHA AND MEC HA ASSESSMENT SCORES**

Two tools were used to estimate the risks and hazards posed by MEC at the OU B-2 sites. All 24 Category 1 to Category 3 sites were evaluated using the Adak-specific *Explosive Safety Hazard Assessment* (ESHA) and the 11 Category 1 sites were further evaluated using the EPA Interim MEC Hazard Assessment (MEC HA). The results of the 11 sites associated with this AM are summarized below.

The Adak ESHA evaluated explosive safety while considering the unique character of the island. This tool takes the MEC results (e.g., how much, what depth, and what types of MEC were found) from the RI and determines how much risk/hazard is likely to be present. Results range from a likelihood of low risk (A) to extreme risk (E). The ESHA follows CERCLA principles and includes extensive input from Adak stakeholders. The following is known about MEC risks/hazards on Adak:

- Areas where MEC is known to occur or is indicated to be present based on historical land use are likely to have a higher chance of explosive hazards than areas where MEC has been searched for and has either not been found or has been removed
- Different types of MEC can detonate in different ways if disturbed, and, if detonated, can result in different types of adverse consequences
- When MEC is located where it is likely to be disturbed by current and/or future land use activities, there is a potential for explosive hazards
- There is greater potential for explosive risk where public exposure is greatest (for example, increased contact or easier accessibility)

The MEC HA is used to help evaluate current or baseline explosive hazards to people, based on current and reasonably anticipated future land use activities, as well as the explosive hazards following CERCLA cleanup actions. This tool identifies the potential magnitude of the hazard present, ranging from least hazardous/lowest potential explosive conditions (4) to most hazardous/highest potential explosive conditions (1). MEC HA scores were developed for sites that received an ESHA score of C (moderate hazard level) or D (high hazard level) (i.e. Category 1 sites).

For each site, the potential for MEC exposure was evaluated assuming no cleanup actions were being conducted and the reasonably anticipated future land use of Adak OU B-2 is an unrestricted wildlife refuge. The sites received ESHA scores of A, C, or D and MEC HA scores of 1 through 4. Table 3 provides site-specific scoring details and results for each site.

**Table 3.** ESHA and MEC HA Scoring Results

Site Name	ESHA Score	MEC HA Rank	Scoring Details
RAA-01			
OB/OD-01	D	2	Fuzing (critical hazard rating), MEC present; MEC at surface. MEC HA score related to type of MEC and type of operational area.
RAA-02			
C1-01	D	1	40-mm projectiles (critical hazard rating), MEC present; MEC at surface. MEC HA score related to type of MEC and type of operational area.
RAA-03 West			
MI-01	D	1	40-mm projectiles (critical hazard rating), MEC found; MEC at surface. MEC HA score related to type of MEC
MI-02	D	1	40-mm projectiles (critical hazard rating), MEC found; MEC at surface. MEC HA score related to type of MEC and type of operational area.
MI-03	D	1	40-mm projectiles (critical hazard rating), MEC found; MEC at surface. MEC HA score related to type of MEC and type of operational area.
RAA-03 East			
HG-01	D	1	Hand grenades (catastrophic hazard rating), MEC found, MEC at surface. MEC HA score related to type of MEC and type of operational area. Scores do not reflect 80 percent geophysical survey and removal in 1999 and 2008.
RR-01	D	1	40-mm grenades (catastrophic hazard rating), MEC present; MEC at surface. MEC HA score related to type of MEC and type of operational area.
RAA-04			
SA93-01	D	1	Multiple MEC encountered (critical hazard rating); MEC at surface. MEC HA score related to type of MEC and type of operational area.
SA93-03	A	4	Scores reflect 100 percent geophysical survey and removal to a depth of 2 feet in 2008, but do not account for investigation completeness issue (use of transects instead of expansion grids) on boundary of site.
RAA-05			
ALDA-01	C	2	100 percent survey, limited intrusive investigation, variety of DMM intermingled with subsurface debris. MEC HA score is high due to type of MEC (60-mm mortars).
ALSW-01	D	3	Variety of highly deteriorated MEC, including bombs, mortars, grenades and projectiles, bursters, and flares (critical hazard ratings), MEC at surface. MEC HA score related to type of MEC and uncertainty regarding amount of MEC/nature of site.

Notes:

- bgs – below ground surface
- DMM – discarded military munitions
- ESHA – Explosives Safety Hazard Assessment
- MEC HA – Munitions and Explosives of Concern Hazard Assessment
- MEC – munitions and explosives of concern
- mm – millimeter
- RI – Remedial Investigation

**ESHA Score Explanation:**

- A or B = Adak Institutional Control Site
- C or D = Feasibility Study Site

**MEC HA Rank Explanation:**

- 1 = Most hazardous: Sites with the highest potential explosive hazard condition, site conditions not compatible with land use
- 2 = Sites with a higher potential for an explosive event, site conditions not compatible with land use
- 3 = Sites with moderate potential for explosive hazard that are considered safe for current use without further munitions responses
- 4 = Least hazardous: Sites with conditions that are compatible with current and reasonably anticipated future land use

### **3.2 CHEMICAL RISKS**

Chemical risk assessments evaluated whether past releases of MCs to soil, sediment, surface water, groundwater, and air in OU B-2 resulted in potential risks to human health or the environment under current and reasonably anticipated future land and water uses. Risks to current and future workers, hypothetical future residents, and future recreational users were evaluated. Potential exposure pathways included ingestion and skin contact with soil, sediment, surface water, and groundwater, and dust inhalation. Risks to wildlife/mammals, birds, plants/vegetation, and aquatic and benthic organisms (e.g., aquatic insects) also were evaluated. Potential exposure pathways included ingestion and/or direct contact with soil, sediment, surface water, and/or groundwater. More detailed information on the risk assessments is provided in the RI.

MC sample results were compared to EPA Region 10 human health risk-based screening concentrations, Adak ecological risk-based screening concentrations, and Adak background concentrations. Based on the concentrations observed during the RI, and current and reasonably anticipated future land uses, risks posed to human health are well below ADEC's target health goals. In Alaska, the target health goal for potentially cancer causing chemicals is  $1 \times 10^{-5}$  (a risk of contracting cancer of 1 in 100,000), and the target health goal for non-cancer chemicals is a *hazard index* of 1. No additional risk assessments or cleanup actions are required to further address risks to human health from MCs. The concentrations of chemicals detected in soil, sediment, surface water, groundwater, and air are not high enough to pose unacceptable risk to wildlife/mammals, birds, plants/vegetation, and aquatic and benthic organisms. Therefore, existing concentrations of MC are protective of human health and the environment at the OU B-2 sites.

### **3.3 RISK CONCLUSIONS**

Based on the MEC hazards and chemical risk assessment findings, the RI/FS made recommendations regarding the status and future action for each OU B-2 site. The 11 sites associated with this AM were determined to pose unacceptable MEC hazards to future users.

#### **4. ENDANGERMENT DETERMINATION**

Actual or threatened releases of pollutants and contaminants from this site may present an imminent and substantial endangerment to public health, welfare, or the environment.

## 5. PROPOSED ACTIONS AND ESTIMATED COSTS

Implementation of the NTCRA allows remediation to what is anticipated to be the final remedy of the RAAs in advance of the currently proposed CERCLA Remedial Action timeline (field work beginning in FY16), accelerates risk and hazard reduction, and serves to reduce the acreage which the Navy must actively manage.

The remedy for the RAAs includes removal of all identifiable MEC to beyond the depth that any has ever been found in the RAAs. For example, in RAAs-01, -02, -03, and -05, no MEC has ever been found greater than 2 feet bgs. Therefore, within approved mV threshold detection criteria (Appendix F, Anomaly Target Selection Threshold Rationale, Draft OU B-2 NTCRA MEC QAPP, U.S. Navy 2011), all detectable MEC to 2 feet bgs will be removed. The same criteria are applied for RAA-04 to 4 feet bgs.

The sequence of work is a surface clearance and vegetation removal, digital geophysical mapping, data interpretation, target reacquisition, anomaly excavation, and site restoration. The specific work practices and sequence are presented in the Draft OU B-2 NTCRA MEC QAPP.

The NTCRA includes options to remove all anomalies determined to potentially be MEC to their depth of detection. Modeling based on the prior work performed at the site shows less than 1% of the excavations will extend to greater than 2 feet bgs (RAAs-01, -02, -03, and -05) or 4 feet bgs (RAA-04). If these options are exercised, the long term Navy requirement for ICs will be reduced.

Applicable or Relevant and Appropriate Requirements (ARARS) are developed and presented in the RI/FS. ARARS are met with the remedy proposed through this AM.

RI/FS included evaluation and development of costs for a variety of remedial options. These included:

- No Action / LUCs,
- MEC Removal to 0.5 feet bgs,
- MEC Removal to 2 feet bgs
- MEC Removal to 4 feet bgs,
- MEC Removal to Depth of Detection

Table 4 presents the anticipated costs and duration of the preferred remedy for each of the RAAs.

**Table 4.** Summary of Costs and Durations for RAAs-01, -02, -03, -04, and -05

<b>Alternative</b>	<b>Cost/ Duration</b>	<b>RAA-01 (OB/ OD-01)</b>	<b>RAA-02 (C1-01)</b>	<b>RAA-03 West (MI-01, MI-02, and MI- 03)</b>	<b>RAA-03 East (HG-01 and RR-01)</b>	<b>RAA-04 (SA93-01 and SA93- 03)</b>	<b>RAA-05 (ALDA-01 only)</b>
Surface and Subsurface MEC Removal	Capital O&M NPV Duration	\$1.7M \$0.3M \$2.0M 3 months	\$4.7M \$0.3M \$5.0M 10 months	\$7.2M \$0.3M \$7.5M 13 months	\$6.1M \$0.3M \$6.4M 12 months	\$6.8M \$0.3M \$7.1M 14 months	\$1.4M \$3.6M \$5.0M 1.5 months

Notes:

bgs – below ground surface

LUC – Land Use Control

MEC – munitions and explosives of concern

NPV – Net present value

O&M – Operations and Maintenance

RAA – Remedial Action Area

RAAs-01, -02, -03 and -05 – Detectable MEC removal to 2 ft bgs

RAA-04 – Detectable MEC removal to 4 ft bgs

MEC removal in ALDA-01 also includes beach sweeps of ALSW-01 for 50 to 75 years

## **6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

An unacceptable munitions risk has been determined to be present at the Former Adak Naval Complex, Adak Island, Alaska. Funding is presently available to remediate the five RAAs in advance of the ROD. Remediation of the RAAs under this NTCRA will accelerate the completion of Remedial Action at Adak, serve to dramatically reduce the acreage the Navy must actively control, and functionally eliminate munitions risk in OU B-2 thereby further protecting human health and the environment.

## **7. OUTSTANDING POLICY ISSUES**

There are no outstanding policy issues involved in this NTCRA.

## **8. RECOMMENDATIONS**

It is recommended that the NTCRA be approved. Generation of Work Plans was initiated during FY12, with field work planned to be conducted in FY13 and Y14. Remedial action in the five RAAs will serve to accelerate protection of human health and the environment by accomplishing remedial goals approximately four years sooner than what would be possible following signing of the ROD.

## 9. REFERENCES

- U.S. Navy, U.S. Environmental Protection Agency (EPA), and Alaska Department of Conservation (ADEC). 2000. *Record of Decision for Operable Unit A, Former Adak Naval Complex, Adak Island, Alaska*. Prepared by URS Greiner, Inc. for Environmental Field Activity, Northwest under Contract N62474-89-D-9295. March 2000.
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- U.S. Navy. 2011. *Draft Field Sampling Plan and MEC QAPP, NTCRA, OUB-2, Former Adak Naval Complex, Adak Island, Alaska*. Prepared by Battelle Memorial Institute for NAVFAC NW under Contract N62473-07-D-4013. November 2011.
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