Final

February 2013

Munitions and Explosives of Concern Quality Assurance Project Plan

Non-Time Critical Removal Action (NTCRA)
Operable Unit B-2 (OU B-2)
Various Remedial Action Areas

Former Naval Air Facility

Adak, Alaska

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

FINAL MEC QAPP
NTCRA at OU B-2 – February 2013

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FINAL

MUNITIONS AND EXPLOSIVES OF CONCERN QUALITY ASSURANCE PROJECT PLAN

NON-TIME CRITICAL REMOVAL ACTION OPERABLE UNIT B-2 (OU B-2) VARIOUS REMEDIAL ACTION AREAS

FORMER ADAK NAVAL AIR FACILITY ADAK, ALASKA

February 2013

Prepared For:

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

Prepared By:

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Suite 204
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Prepared Under:

Adak OU B-2, NTCRA Munitions Clearance
Contract Number N44255-12-C-3003

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MUNITIONS AND EXPLOSIVES OF CONCERN QUALITY ASSURANCE PROJECT PLAN

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

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EXECUTIVE SUMMARY

This Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP) is the primary operations document for the Non-Time Critical Removal Action (NTCRA) at Operable Unit (OU) B-2, Former Naval Air Facility (NAF) Adak, Adak Island, Alaska. This MEC QAPP comprises a series of worksheets that contain both general and specific information about the project.

USA Environmental, Inc. (USA) prepared this MEC-QAPP for Naval Facilities Engineering Command Northwest (NAVFAC NW) under Contract N44255-12-C-3003. This MEC QAPP was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) (U.S. EPA 2005), and the NAVFAC MEC-QAPP Template dated May 2009. This MEC QAPP consists of 37 worksheets that contain both general and specific information pertaining to the NTCRA at OU B-2. Of the 37 worksheets, 10 worksheets are not applicable to the MEC QAPP and will be presented under the Munitions Constituents (MC) QAPP (Appendix B). These 10 non-applicable worksheets include:

- MEC QAPP Worksheet #15 – Reference Limits and Evaluation Table
- MEC QAPP Worksheet #19 – Analytical SOP Requirements
- MEC QAPP Worksheet #23 – Analytical SOP References
- MEC QAPP Worksheet #24 – Analytical Instrument Calibration
- MEC QAPP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection
- MEC QAPP Worksheet #26 – Sample Handling
- MEC QAPP Worksheet #27 – Sample Custody Information
- MEC QAPP Worksheet #28 – Quality Control Samples
- MEC QAPP Worksheet #30 – Analytical Services
- MEC QAPP Worksheet #36 – Analytical Data Validation Summary (Steps IIa and IIb).

The remaining 27 worksheets are summarized below:

- MEC QAPP Worksheet #1 – Title and Approval Page. This worksheet provides the title page for the NTCRA at OU B-2.
- MEC QAPP Worksheet #2 – MEC QAPP Identification Information. This worksheet provides general information on the NTCRA at OU B-2 which includes a table of contents and MEC QAPP identifying information.
- MEC QAPP Worksheet #3 – Distribution List. This worksheet lists those entities who receive copies of the QAPP, subsequent revisions, addenda, and amendments.
- MEC QAPP Worksheet #4 – Project Personnel Sign-Off Sheet. This worksheet lists project personnel who will be performing the work under the NTCRA at OU B-2. These personnel have read the applicable sections of the MEC QAPP and will perform the tasks as described in the MEC QAPP and associated subsidiary documents.
- MEC QAPP Worksheet #5 – Project Organizational Chart. This worksheet presents USA's organization chart for the NTCRA at OU B-2.
- MEC QAPP Worksheet #6 – Communication Pathways. This worksheet lists the communication pathways for many key administrative and field communication drivers to include responsibility, affiliation, name of person responsible, contact number, and procedure.
- MEC QAPP Worksheet #7 – Personnel Responsibilities and Qualifications. This worksheet lists the names of team members, their role, their responsibility, and qualification for the NTCRA at OU B-2.
- MEC QAPP Worksheet #8 – Special Personnel Training Requirements. This worksheet lists all special project personnel, their qualification, and specific training requirements.

- MEC QAPP Worksheet #9 – Project Scoping Session Participants Sheet. This worksheet provides information on the project scoping meeting with regards to the MEC remedial action at the NTCRA at OU B-2. The information includes name/information on the participants, comments/decisions, action items, and consensus decisions made.
- MEC QAPP Worksheet #10 – Problem Definition. This worksheet describes the U.S. Environmental Protection Agency (U.S. EPA) Seven-Step Data Quality Objective (DQO) Process used to define the problem statement and Removal Action Objectives (RAOs) for the NTCR at OU B-2.
- MEC QAPP Worksheet #11 – Project Quality Objectives. This worksheet details the project quality objectives and systematic planning process statements for the NTCRA at OU B-2.
- MEC QAPP Worksheet #12 – Measurement Performance Criteria [MEC/Material Potentially Presenting an Explosive Hazard (MPPEH)]. This worksheet lists and describes the measurement performance criteria (e.g., project performance metrics along with the quality control (QC) sample or activity used to assess the performance). It also describes the auditing procedures for the definable features of work (DFW) for the NTCRA at OU B-2.
- MEC QAPP Worksheet #13 – Secondary Use of Data Criteria and Limitations. This worksheet lists the secondary data used to support the NTCRA at OU B-2. It also provides the source of the data, how data will be used to support this project and the data limitations.
- MEC QAPP Worksheet #14 – Summary of Project Tasks. This worksheet presents a list of the DFWs and all supporting subtasks for the NTCRA at OU B-2.
- MEC QAPP Worksheet #16 – Project Schedule/Timeline. This worksheet provides the project schedule for the NTCRA at OU B-2.
- MEC QAPP Worksheet #17 – Sampling Design and Rationale. This worksheet provides details on the project DFWs and related tasks that will be performed to meet the requirements and objectives of the NTCRA at OU B-2t. This worksheet will serve as the Technical Management Plan (TMP).
- MEC QAPP Worksheet #18 – Sampling Locations and Methods/SOP Requirements (MEC/MPPEH). This worksheet lists the Remedial Action Areas (RAAs) and the general MEC/MPPEH removal requirements for each location.
- MEC QAPP Worksheet #20 – Field Quality Control Sample Summary. This worksheet provides a summary of the field quality control for the NTCRA at OU B-2.
- MEC QAPP Worksheet #21 – Project Sampling SOP References. This worksheet lists the SOPs for the NTCRA at OU B-2. Actual SOPs are provided as Appendix A to this MEC QAPP.
- MEC QAPP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection. This worksheet identifies all field equipment and instruments (other than analytical instrumentation) that require calibration, maintenance, testing, or inspection and provide the SOP reference number for each type of equipment that will be used for the NTCRA at OU B-2.
- MEC QAPP Worksheet #29 – Project Documents and Records. This worksheet identifies the documents and records that will be generated for all aspects of the NTCRA at OU B-2.
- MEC QAPP Worksheet #31 – Planned Project Assessments. This worksheet discusses the different type of assessments for evaluating the project activities.
- MEC QAPP Worksheet #32 – Assessment Findings and Corrective Action Responses. This worksheet describes the activities for identifying and correcting any problems encountered during the NTCRA at OU B-2 that have the potential to impact data quality.
- MEC QAPP Worksheet #33 – QC Management Reports. This worksheet describes the content of each QC management report that will be generated for the NTCRA at OU B-2, including an evaluation of measurement error as determined from the assessments.
- MEC QAPP Worksheet #34 – Verification Process (Step I). This worksheet describes the processes that will be followed to verify project data. It describes how each item will be verified,

when the activity will occur, and what documentation is necessary, and identifies the person responsible.

- MEC QAPP Worksheet #35 – Validation Process (Steps IIa and IIb). This worksheet discusses the process for documenting and establishing the validation procedures and criteria for the NTCRA at OU B-2.
- MEC QAPP Worksheet #37 – Usability Assessment. This worksheet provides the final usability assessment criteria that will be used to verify that the work has been completed and is acceptable.

The MEC QAPP is supported by the following appendices:

- Appendix A – Standard Operating Procedures
- Appendix B – Munitions Constituents Quality Assurance Project Plan (MC QAPP)
- Appendix C – Construction Work Plan
- Appendix D – Forms
- Appendix E – Environmental Protection Plan/Waste Management Plan
- Appendix F – Basis for Target Selection Thresholds
- Appendix G – Geophysical Systems Verification Plan
- Appendix H – Quality Control Blind Seed Coordinates
- Appendix I – Maps
- Appendix J – Scoping Meeting Notes
- Appendix K – Project Screening Values.

In addition to the above MEC QAPP and appendices, the NTCRA at OU B-2 is supported by the following standalone project plans:

- Accident Prevention Plan (APP) – Site safety and health are controlled by the Accident Prevention Plan (APP) with its supporting Site Safety and Health Plan (SSHP)
- Explosives Safety Submission (ESS) – Explosives safety for the project is governed by the ESS.

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ACRONYMS

2x std. dev	Two times the standard deviation
AAR	After Action Report
ADEC	Alaska Department of Environmental Conservation
AHA	Activity Hazard Analysis
ALSW	Andrew Lake Sea Wall
AOC	area of concern
AOPC	area of potential concern
APP	Accident Prevention Plan
bgs	below ground surface
BIP	blow in place
BCT	BRAC Coordination Team
BRAC	Base Realignment and Closure
BSI	blind seed item
CD	Compact Disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIRS	Contractor Incident Report System
cm	centimeter, centimeters
CMP	Change Management Plan
COB	close of business
CSM	conceptual site model
CWP	Construction Work Plan
DCN	Design Change Notice
DFW	Definable Feature of Work
DGM	digital geophysical mapping
DN	Deficiency Notice
DoD	Department of Defense
DDESB	Department of Defense Explosives Safety Board
DGM	digital geophysical mapping
DGPS	differential global positioning system
DMM	discarded military munitions
DN	Deficiency Notice
DOT	Department of Transportation
DQCR	Daily Quality Control Report
DQI	data quality indicator
DQO	data quality objective
DS	Demolition Supervisor
DVD	Digital Video Disk
EAP	Emergency Action Plan
EMM	earth moving machinery
EMT	Emergency Medical Technician
EPA	Environmental Protection Agency

EPP	Environmental Protection Plan
ESHA	Explosives Safety Hazard Assessment
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FCR	Field Change Request
FP	Follow-up Phase
FS	Feasibility Study
ft	foot, feet
FTP	File Transfer Protocol
GIS	geographic information system
GPS	global positioning system
GSV	Geophysical Systems Verification
HAZWOPER	Hazardous Waste Operations and Emergency Response
in	inch, inches
IP	Initial Phase
ISO	Industry Standard Object
IVS	instrument verification strip
MAUW	Modified Advanced Underwater Weapons
MC	munitions constituents
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MEC HA	Munitions and Explosives of Concern Hazard Analysis
m	meter
mm	millimeter, millimeters
MPPEH	material potentially presenting an explosive hazard
MRS	Munitions Response Site
NAF	Naval Air Facility
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NCR	Non-Conformance Report
NOSSA	Naval Ordnance Safety and Security Activity
NOSSAINST	NOSSA Instruction
NTCRA	Non-Time Critical Removal Action
NTR	Navy Technical Representative
OB	Open Burn
OD	Open Detonation
OU	Operable Unit
PAL	Project Action Limit
PM	Project Manager
PMO	Program Management Office
PMP	Project Management Professional
PP	Preparatory Phase
PPE	personal protective equipment

PQCM	Project Quality Control Manager
PrgM	Program Manager
PS	Project Superintendent
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
RAA	Remedial Action Area
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
Rcrit	Critical lateral radius of 2.5-ft (0.762-m)
RDX	Royal Defense Explosive; Cyclotrimethylene trinitramine
RFD	Remote Firing Device
RI	remedial investigation
RPM	Remedial Project Manager
RTK	real time kinematic
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
TAC	The Aleut Corporation
TBD	To Be Determined
TFU	thermal flashing unit
TMP	Technical Management Plan
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USA	USA Environmental, Inc.
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UV	Utility Vehicle
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
WMP	Waste Management Plan

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1.0 MEC QAPP WORKSHEET #1 – TITLE AND APPROVAL PAGE
(UFP-QAPP Manual Section 2.1)

Final

Munitions and Explosives of Concern Quality Assurance Project Plan

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Naval Air Facility Adak
Adak Island, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

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Contract No. N44255-12-C-3003

Review Signatures:

19 February 2013
Manok Synakorn/USA Project Manager Date

19 February 2013
James Walden/USA Project QC Manager Date

Approval Signatures:

19 Feb 2013
Justin Peach/Navy Remedial Project Manager Date

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2.0 MEC QAPP WORKSHEET #2 – MEC QAPP IDENTIFICATION INFORMATION

(UFP-QAPP Manual Section 2.2.4)

Site Name / Project Name:	RAA-01, RAA-02, RAA-03, RAA-04, RAA-05/ALDA-01, and RAA-05/ALSW-01 / Non-Time Critical Removal Action (NTCRA) at OU B-2 (OU B-2)
Site Location:	Adak Island, Adak
Site Number:	EO093
Operable Unit:	OU B-2
Contractor Name:	USA Environmental, Inc. (USA)
Contact Number:	(813) 343-6380
Contract Title:	NTCRA at OU B-2, Former Naval Air Facility (NAF) Adak, Alaska
Work Assignment Number:	Contract No. N44255-12-C-3003

1. This Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP) was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP) [U.S. Environmental Protection Agency (U.S. EPA), 2005] and U.S. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (U.S. EPA, 2002), Naval Sea Systems Command (NAVSEA) OP 5, Volume 1, seventh revision (NAVSEA, 2008) and Naval Ordnance Safety and Security Activity (NOSSA) Instruction (NOSSAINST) 8020.15C dated 10 January 2011.
2. Identify regulatory program: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
3. This MEC QAPP is project-specific for the NTCRA at OU B-2 RAA-01, RAA-02, RAA-03, RAA-04, RAA-05/ALDA-01 and RAA-05/ALSW-01 (Andrew Lake Seawall sweeps).
4. List dates of scoping sessions that were held: A scoping session for the Draft OU B-2 NTCRA Work Plans was executed on 29 November 2011 under another independent contract, Battelle Contract No. N62473-07-D-4013, Task Order No 023. As a result, the Draft version of the MEC QAPP (Battelle 2012) was developed based on the agreed-to project scope. A Regulatory Concurrence Letter is included with our MEC QAPP in Appendix L.
5. List dates and titles of any MEC QAPP documents written for previous site work that are relevant to the current investigation.
   - USA Environmental, Inc.; Final Remedial Investigation Report for OU B-2 Sites, Former NAF Adak, Adak Island, AK, May 2012
   - USA Environmental, Inc.; Final Feasibility Study Report for OU B-2 Sites, Former NAF Adak, Adak, Island, AK, May 2012
   - Battelle Memorial Institute; Draft Sampling and Analysis Plan (Field Sampling Plan and Munitions and Explosives of Concern Quality Assurance Project Plan), Non-Time Critical Removal Action for the Operable Unit B-2 Areas of Concern, Former Naval Air Facility Adak, Adak Island, Alaska, January 2012
6. The project stakeholders and lead organization for this NTCRA at OU B-2 include:
   - Lead Agency – Naval Facilities Engineering Command NW (Justin Peach, Navy Remedial Project Manager [RPM])
   - Navy 3rd Party Quality Assurance Contractor – Battelle Memorial Institute (Les Clarke, PM)
   - Stakeholders – U.S. EPA Region 10 (Christopher Cora), United States Fish and Wildlife Service (Merry Maxwell), The Aleut Corporation (Melvin Smith), and Alaska Department of Environmental Conservation (Guy Warren)

- MEC Contractor – USA Environmental, Inc., 720 Brooker Creek Blvd., Suite 204, Oldsmar, FL 34677 (Manok Synakorn, PM)

7. All QAPP element groups and required information are applicable to this NTCRA at Adak OU B-2. QAPP worksheets not used in the main body of this MEC QAPP, but included in the Munitions Constituents (MC) QAPP (Appendix B), include:

- Worksheet #15 – Reference Limits and Evaluation
- Worksheet #19 – Analytical SOP Requirements
- Worksheet #23 – Analytical SOP References
- Worksheet #24 – Analytical Instrument Calibration
- Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection
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- Worksheet #30 – Analytical Services
- Worksheet #36 – Analytical Data Validation Summary (Steps IIa and IIb).

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3.0 MEC QAPP WORKSHEET #3 – DISTRIBUTION LIST

(UFP-QAPP Manual Section 2.3.1)

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Tony Tennyson	UXO Safety Officer (UXOSO) I	USA	(906) 450-5260	hdbadboy5@hotmail	
Jason Birchfield	UXO Safety Officer (UXOSO) II	USA	(210) 426-1080	c4user2@yahoo.com	

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4.0 MEC QAPP WORKSHEET #4 – PROJECT PERSONNEL SIGN-OFF SHEET

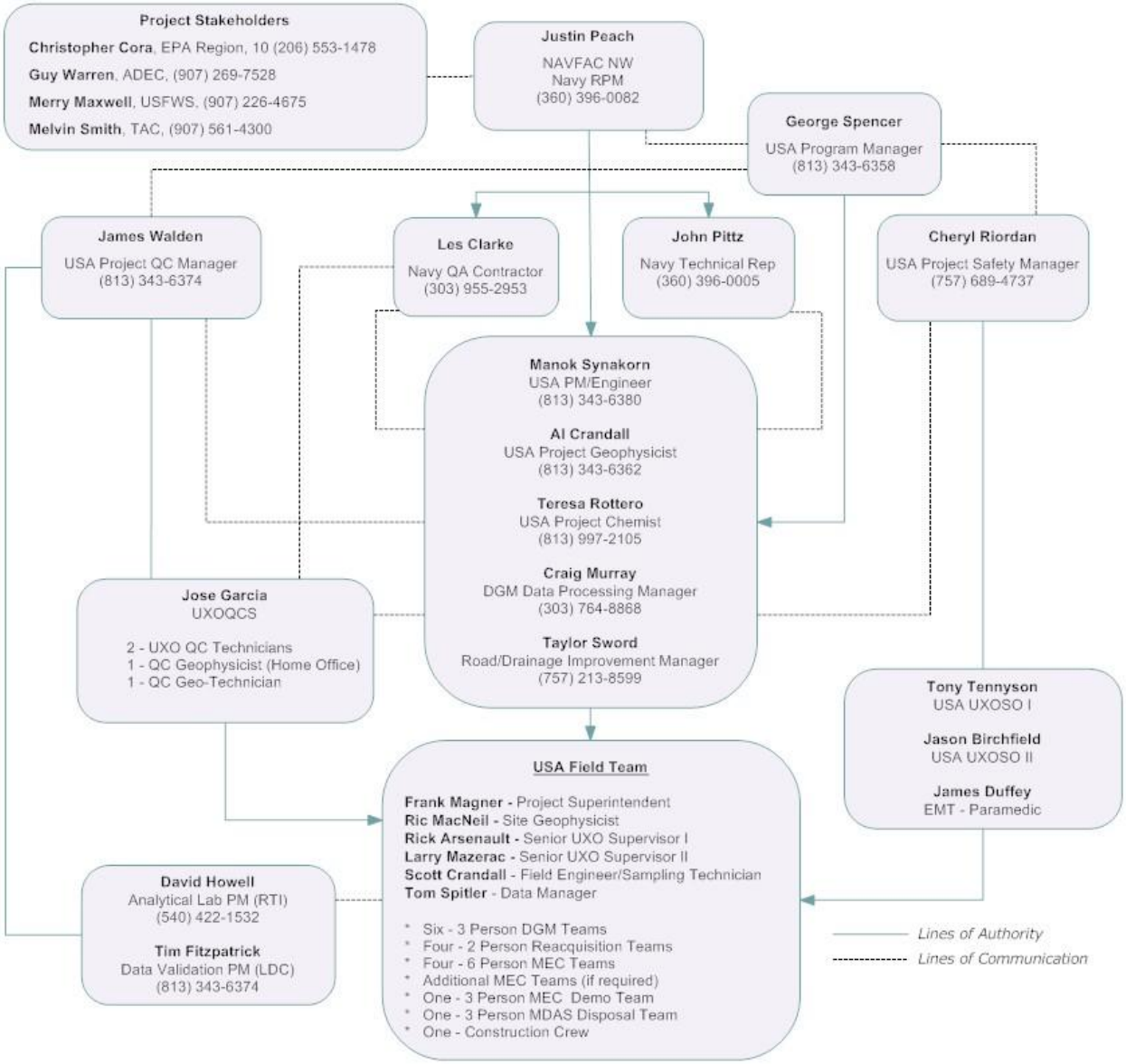
(UFP-QAPP Manual Section 2.3.2)

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	QAPP Section(s) to be Reviewed	Date QAPP Read
George Spencer	USA/Program Manager	(813) 343-6358	_____ gspencer@usatampa.com	All	
Manok Synakorn	USA/PM/Engineer	(813) 343-6380	_____ /msynakorn@usatampa.com	All	
Al Crandall	USA/Project Geophysicist	(813) 343 – 6362	_____ /acrandall@usatampa.com	All	
Ric MacNeil	USA/Site Geophysicist	(813) 767-0674	_____ /rmacneil@usatampa.com	All	
Scott Crandall	USA/Field Engineer/Sampling Technician/QC Geo-Technician	(813) 403-7705	_____ /scrandall@usatampa.com	All	
Brad Newlin	QC Geophysicist	(303) 220-5046	_____ /bknewlin@aol.com	MEC QAPP	
Christian TenBraak	DGM Project Manager	(303) 764-1923	_____ /Chris.TenBraak@parsons.com	MEC QAPP	
Craig Murray	DGM Data Processing Manager	(303) 764-8868	_____ /craig.murray@parsons.com	MEC QAPP	

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	QAPP Section(s) to be Reviewed	Date QAPP Read
Frank Magner	USA/Project Superintendent	(315) 568-4658	_____ /fjmeoduxo@aol.com	All	
Rick Arsenault	USA/SUXOS I	(831) 236-9604	_____ /Arsenault.rick@yahoo.com	All	
Larry Mazerac	USA/SUXOS II	(850) 447-3862	_____ /lmazerac@hotmail.com	All	
Jose Garcia	UXOQCS	(210) 380-3208	_____ /joeriversg@hotmail.com	All	
Tony Tennyson	USA/UXOSO I	(906) 450-5260	_____ /hdbadboy5@hotmail	All	
Jason Birchfield	USA/UXOSO II	(210) 426-1080	_____ /c4user2@yahoo.com	All	

5.0 MEC QAPP WORKSHEET #5 – PROJECT ORGANIZATIONAL CHART

(UFP-QAPP Manual Section 2.4.1)



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6.0 MEC QAPP WORKSHEET #6 – COMMUNICATION PATHWAYS

(UFP-QAPP Manual Section 2.4.2)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
Routine Daily Communications	USA	Frank Magner , Project Superintendent (PS)	(315) 730-2074/fjmeoduxo@aol.com	Daily, verbal, e-mail or phone, Project Superintendent to USA PM and Navy RPM
Daily Safety and Operations Briefing	USA USA USA USA	Frank Magner (PS) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II)	(315) 568-4658/fjmeoduxo@aol.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com	Daily, verbal, SUXOS/UXOSO to on-site project team members including Navy representatives
Daily Production Report (includes daily quality control [QC] and safety reports)	USA USA USA USA USA USA	Frank Magner (PS) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II) Jose Garcia (UXOQCS)	(315) 568-4658/fjmeoduxo@aol.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com (210) 380-3208, joeriversg@hotmail.com	Daily, electronic submittal to RPM/Munitions Project Manager
QA updates and required actions during implementation of the project	Battelle	Les Clarke (Navy QA PM)	(303) 955-2953/clarkef@battelle.org	Daily reports to QA, immediate notification of inspection failures and non-conformances and routine communications in accordance with Worksheets #34 and #35.
Discovery of discolored soil at an intrusive investigation site (e.g., breached munition) or unusual smells in the soil.	NAVFAC NW	Justin Peach (Navy RPM)	(360) 396-0082/ justin.peach@navy.mil (907) 592-2204 (Adak)	MC QAPP procedures will be used to execute soil sampling, removal or remediation

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
Onsite/real time MC QAPP minor modifications	USA	Manok Synakorn (PM)	(813) 343-6380/ msynakorn@usatampa.com	Immediate telephone call and fax or e-mail communication with USA PM and RPM regarding issues that may result in deviations from the approved QAPP. USA PM will inform the Navy RPM via telephone or e-mail about the decision taken and circumstances for the deviation. Verbal communications will be documented and followed up with a Field Change Request (FCR) within 24 hours, no implementation of the FCR until receipt of written approval from the Navy. The Navy will communicate with the regulators/stakeholders for routine project status, as well as critical project milestones and decision points.
Stop Work Order	USA USA USA USA USA USA USA	Frank Magner (PS) Manok Synakorn (PM) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II) Jose Garcia (UXOQCS)	(315) 568-4658/fjmeoduxo@aol.com (813) 343-6380/msynakorn@usatampa.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com (210) 380-3208, joeriversg@hotmail.com	The SUXOS, UXOQCS and UXOSO will have the authority to stop work if non-compliance to field QC procedures as specified in the SAP or breach of safety procedures as specified in the SSHP or ESS are noted. The SUXOS will communicate as soon as possible with USA PM and NTR informing them: (i) of stop work order, (ii) circumstances under which the order was given, and (iii) the anticipated time when the field work will resume. USA PM will communicate with Navy RPM

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
				about stop work order, circumstances under which the order was given, corrective action(s) being implemented and anticipated time-frame within which the field work will resume. To expedite resumption of field activities, the communication will be via telephone or e-mail. All communications will be documented in the project records.
Regular communication with NAVFAC Northwest RPM	USA USA	Manok Synakorn (PM) George Spencer (PrgM)	(813) 343-6380/msynakorn@usatampa.com (813) 343-6358/ gspencer@usatampa.com	Communication via mail to obtain written/formal approval of the planning documents [e.g., MC QAPP and communication via phone and e-mail to discuss project status and any issues.

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7.0 MEC QAPP WORKSHEET #7 – PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

(UFP-QAPP Manual Section 2.4.3)

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
Justin E. Peach, PG, PE	RPM	NAVFAC NW	• Overall responsibility for the successful execution of the NTCRA • Provides direction to the contractor's project team • Primary Navy point of contact for the project • Lead interface with regulatory agencies	N/A
Kim Ostrowski	BEC	BRAC PMO	• Coordinate and lead BRAC Coordination Team (BCT) meetings. • Ensure consistent and timely communication with all team members on critical issues. • Facilitate early and often exchange of information between RPMs and BCT. • Assist on development of environmental clean-up strategy to expedite the disposal of the property. • Manage the Admin Record and make sure documents get into the Admin Record correlated to public notice. • Organize, prepare and co-chair Restoration Advisory Board meetings. Review minutes of meetings and keep RPMs informed.	N/A
Michael Green	Quality Assurance Officer (QAO)	NAVFAC LANT	• Oversight of quality assurance (QA) issues for entire program	N/A

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			• Review and approval of SAP, and all other QA/QC documents • Review of design process • Communication with Navy QA • Communication of issues to the RPM • Authority to suspend work if quality criteria are not adequately being met	
John Pittz	Navy Technical Representative	NAVFAC NW	• Maintaining Contracting Officer's Representative files • Monitoring and documenting contractor performance • Inspecting and accepting or rejecting contract • deliverables • Day-to-day administration of the project • Identifying issues that may impact scope, schedule, or budget and referring them to the contracting officer	• N/A
Manok Synakorn	USA Project Manager	USA	• Primary contact between USA and the Navy on this project • Responsible for the successful execution of this project • Coordinates work activities of USA personnel, ensures adequate resources are assigned • Monitors and reports and progress of the work • Ensures project deliverables are accurate and on time • Monitors the budget and schedule and notifies the RPM of any conditions which may require administrative actions	• B.S. in Engineering • Project Management Professional • Over 18 years of project management experience, with 9 years of experience working as project manager under the Military Munitions Response Program • Hazardous Waste Operations and Emergency Response (HAZWOPER)

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			• Ensures adherence to the quality requirements of the contract, project scope of work and QC documents • Ensures that the work meets the requirements of the technical specifications and complies with all applicable codes and regulations • Ensures that all work is performed in compliance with the Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP), Standard Operating Procedures (SOPs) and supporting documents	
Rick Arsenault and Larry Mazerac	SUXOS I and SUXOS II	USA	• Lead technical resource for the project • Directs unexploded ordnance (UXO) teams in executing the Statement of Work • Safety — Put no person in harm's way • Enforces safety exclusion zones • Manages the disposition of material potentially presenting an explosive hazard (MPPEH) • Certifies material documented as safe (MDAS) and other scrap	• Qualified SUXOS in accordance with DDESB TP-18 • HAZWOPER • HAZWOPER Supervisor
Jose Garcia	UXOQCS	USA	• Provide and maintain an effective QC system for all project tasks • Monitor QC activities to ensure conformance with authorized policies, procedures, and sound construction practices, and recommend improvements, as necessary	• Qualified UXOQCS in accordance with Department of Defense Explosives Safety Board (DDESB) TP-18 • HAZWOPER • HAZWOPER Supervisor

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			• Manage the blind seed program (installation, monitoring and reporting) • Conduct site meetings covering the requirements of the construction QC procedures, as appropriate • Perform reviews, inspections, and surveillances of USA (and its subcontractors') task order activities to ensure that task order procedures are being followed • Provide QC inspections of 10% of all intrusive investigations and 100% of no-finds • Inspect all MDAS • Manage QC mini-grid digital geophysical mapping (DGM) in each grid, process the data and investigate anomalies above the picking threshold • Conduct final grid inspections on all grids and report the results to QA • Inform QA of inspection failures and non-conformances in accordance with the requirements of the QC procedure • Stop work or require re-performance of any nonconforming activity resulting from improper application of prescribed procedures • Maintain awareness of the entire task order to detect conditions that may be adverse to quality	

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			• Monitor corrective action documentation for conditions adverse to quality, verify implementation of corrective actions • Track and evaluate corrective action	

Scott Crandall	QC Geo-Technician	USA	• Monitor DGM team compliance with MEC QAPP and DGM SOPs
			• BSI Installation and management
			• Environmental Sampling
			• Geophysical and Positioning Equipment QC
				• Masters in Environmental Geography (2007)
				• 4 years of experience in munitions related projects
				  ○ 2 years GIS Analyst
				  ○ 2 years Field Engineer, specializing in DGM, surveying, and soil sampling
				• HAZWOPER
				• First Aid/CPR Certified
				• Geosoft trained

Tony Tennyson and Jason Birchfield	UXOSO I and UXOSO II	USA	• Oversees all aspects of safety on this project • Prepares Activity Hazard Analysis (AHA) on all job tasks and briefs all project personnel on AHAs during Preparatory Phase Inspections • Ensures that all fieldwork is conducted in accordance with the SSHP • Provides safety guidance to field staff and subcontractors • Monitors and verifies that operations comply with the Explosives Safety Submission	• Qualified UXOSO in accordance with DDESB TP-18 • HAZWOPER • HAZWOPER Supervisor • 30-hour Construction Safety Training

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			(ESS) and no items are found which require amendment to the ESS	
Al Crandall	Project Geophysicist	USA	• Provide overall technical direction and scheduling for DGM surveys • Supervise data processing and interpretation. Pick targets • Coordinate with the data manager and Site Geophysicist to verify the accuracy and completeness of project DGM documentation and target lists, instrument verification strip (IVS) testing results, QC results and related DGM project documentation • Maintain project DGM equipment in compliance with project performance metrics	• B.S. in Electrical Engineering (1973) • 39 years of experience working with munitions geophysical systems, systems design, deployment, and DGM data • HAZWOPER • HAZWOPER Supervisor
Additional Personnel	UXO Technicians	USA	• Perform UXO safety escort to non-UXO personnel performing tasks within the exclusion zone • Conduct DGM target reacquisition (survey location stakeout and measurement), intrusive investigation and site restoration in compliance with the project performance requirements and SOPs • Conduct inspection of munitions debris and processing of MPPEH in compliance with project performance requirements and SOPs • Conduct MEC/material documented as an explosive hazard (MDEH) disposal operations in compliance with project performance metrics and SOPs	• Qualified UXO Tech IIIs. UXO Tech IIs and UXO Tech Is in accordance with DDESB TP-18 • HAZWOPER • Tech III, HAZWOPER Supervisor

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
			• Maintain and operate project equipment in compliance with owner's manuals, operators manuals, project performance metrics and SOPs	
James Walden	PQCM	USA	• Approval of QC requirements • Review of data • Coordination of data validation • Interaction with Navy QAO	

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8.0 MEC QAPP WORKSHEET #8 – SPECIAL PERSONNEL TRAINING REQUIREMENTS

(UFP-QAPP Manual Section 2.4.4)

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/ Certificates
General Project Operations	Site orientation, general work rules, administrative activities, MEC awareness	SUXOS	Mobilization	All site personnel	USA and subcontractor personnel	Project Office and SharePoint Site
	APP, SSHP	UXOSO				
	MEC QAPP/SOPs	UXOQCS				
	HAZWOPER / First Aid and cardiopulmonary resuscitation	Various OSHA accepted training providers	Prior to mobilization			
Digital Geophysical Mapping	Geonics EM61-MK2 with real time kinematic (RTK) differential global positioning system (DGPS), data logger, data management, Geophysical Systems Verification (GSV) procedures, Oasis Montaj and UX-Detect	Site Geophysicist	Mobilization and/or new personnel/ equipment	All personnel performing DGM		
	GSV Procedures (IVS testing and blind seed program)	Project Geophysicist		QC Staff		
Target Reacquisition (survey location stakeout and measurement)	Trimble Data Logger and RTK DGPS, hand-held metal detector	Field Engineer	Mobilization	Reacquisition Team, UXOQCS		

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/ Certificates
Intrusive Investigation	MEC Safety Training	SUXOS, UXOSO, UXOQCS	Mobilization	All site personnel		
MDAS Materials Management	MDAS Materials Management TFU Training	SUXOS	Prior to MPPEH field activities Prior to using the TFU.	UXOSO, UXOQCS, materials management team(s)		
MEC/MDEH Disposal	MEC/MDEH Disposal SOP	SUXOS	Prior to MEC/MDEH Disposal Activities	Demolition Team Personnel		
	Explosives driver training IAW SW020-AF-HBK-010, Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives and Related Hazardous Material	SUXOS or UXOSO	Mobilization or prior to designation as explosives driver	All personnel designated as explosives drivers by the SUXOS		

9.0 MEC QAPP WORKSHEET #9 – PROJECT SCOPING SESSION PARTICIPANTS SHEET

(UFP-QAPP Manual Section 2.5.1)

Project Name: NTCRA at OU B-2 **Projected Date(s):** FS1 April 2013 and FS2 April 2014 **Project Manager:** Manok Synakorn	**Site Name:** Operable Unit B-2 **Site Location:** Former Adak Naval Air Facility, Adak Island, Alaska

Date of Session: November 29, 2011

Scoping Session Purpose: Discuss and resolve comments on the Draft OU B-2 NTCRA Work Plans

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Ray Kobeski, PE	RPM	Navy	(360) 396-0597	raymond.kobeski@navy.mil	RPM
Christopher Cora	EPA PM	EPA	(206) 553-1478	cora.christopher@epa.gov	EPA RPM
Guy Warren	ADEC PM	ADEC	(907) 269-7528	guy.warren1@alaska.gov	ADEC RPM
JoAnn Grady	Meeting Facilitator	Grady and Associates	(907) 321-3213	joanngrady@gmail.com	Facilitator
Eugene Mikell	ADEC Consultant	UXOPro	n/a	eugene@uxopro.com	ADEC Consultant
Tom Hall	EPA Consultant	TechLaw	(501) 753-7987	thall@techlawinc.com	EPA Consultant
Karla Brasaemle	EPA Consultant	TechLaw	(415) 762-0566	kbrasaemle@techlawinc.com	EPA Consultant
Les Clarke	Navy QA, PM	Battelle	(303) 955-2953	clarkef@battelle.org	Navy Consultant
Eric Zentner	Recorder	Boreal Communications	n/a	ejzentner@gmail.com	Recorder

Comments/Decisions: A scoping session for the Draft OU B-2 NTCRA Work Plans was executed on 29 November 2011 under another independent contract, Battelle Contract No. N62473-07-D-4013, Task Order No 023. As a result, the Draft version of the MEC QAPP (Battelle 2012) was developed based on the agreed to project scope. Scoping Sessions meeting notes are provided in Appendix K of this MEC QAPP.

Action Items: See attached Draft notes from the meeting in Appendix J. Upon receipt of concurrence from the EPA and ADEC, a Regulatory Concurrence Letter will be included with the Final MEC QAPP in Appendix J.

Consensus Decisions: See attached Draft notes from the meeting in Appendix J.

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10.0 MEC QAPP WORKSHEET #10 – PROBLEM DEFINITION

(UFP-QAPP Manual Section 2.5.2)

State the Problem

- **The problem to be addressed by the project:** Operable Unit B-2 at the Former Naval Air Facility Adak, Adak Island, Alaska has MPPEH on the surface and in the subsurface.
- The environmental questions to be asked:
  - Can the MPPEH located at the surface and in the subsurface be detected and located to within the criteria specified in Worksheet #12?
  - Have the anomalies from the geophysical data been investigated to determine conclusively whether they result from MEC/MDEH, MDAS, or a non-MEC-related source?
  - Are any MC present at the location of broken or breached MEC?
  - Are there any explosive soils, based on visual assessment, in the vicinity of broken or breached MEC?
- **A synopsis of secondary data or information from all site reports:** MPPEH have been detected, located, investigated and removed or destroyed in place on the surface or in the subsurface in OU B-2 RAAs: RAA-01, RAA-02, RAA-03, RAA-04, RAA-05/ALDA-01, and RAA-05/ALSW-01. MEC discovered range in size from 20-mm through 81-mm and include high explosive, white phosphorus fillers. Types of munitions include high explosive, smoke (white phosphorus), high explosive anti-tank and practice. The following site reports contain detailed information on MPPEH detection and removal activities performed at OU B-2.
  - Remedial Investigation (RI) Report, May 2012
  - Feasibility Study (FS) Report, May 2012
  - Preliminary Assessment Report, February 2000
  - Site Investigation Report, February 2000
- **The possible classes of contaminants and the affected matrices:** Classes of contaminants include MEC and MC. Surface and subsurface soils are the matrices of concern.
- **The rationale for inclusion of chemical and nonchemical analyses:** Chemical analyses (U.S. EPA 8330B) will be performed when broken or breached munitions are discovered where there is the possibility that explosives have leached into the soil.

Step 1. State the Problem	Operable Unit B-2 at the Former Naval Air Facility Adak, Adak Island, Alaska has MEC on the surface and in the subsurface.
Step 2. Identify the Decision	*Specifying the primary study question.* The primary study question to be addressed is the following: • Have all of the targeted subsurface anomalies from the DGM data in RAA-01, RAA-02, RAA-03, and RAA-04 been investigated and identified, if appropriate, as MPPEH? • Have all the subsurface anomalies within RAA-05/ALDA-01 been identified and investigated and identified, if appropriate, as MPPEH? The secondary study questions to be addressed are: • Were metals, munitions constituents or other contaminants found at any of the DGM target locations at levels above their project action limits (PALs) (MC QAPP, Worksheet #15)? *Determining the alternative actions.* The possible actions that would result from review of the data include: • Release of the property for its intended future use with the anticipated land use controls. • Not releasing the property for its intended future use; performing additional geophysical mapping and removal activities, performing additional sampling and remedial actions for munitions constituents and/or modifying the anticipated land use controls. *Specifying the decision statement.* The decision statement is as follows: • Determine whether the NTCRA objectives are not achieved, thereby requiring additional geophysical mapping and remedial activities and/or modifying the anticipated land use controls.
Step 3. Identify the Inputs to the Decision	*Identify the types of information that are needed to resolve the decision statement.* To resolve the decision statement, the planning team will need the following data: (1) DGM data from 100 percent survey of the RAAs (excluding RAA-05/ALSW-01 which only require monthly MEC/MDAS surface clearance) which includes coordinate information and documentation of areas determined to be inaccessible according to project definition. Note: bgs for OU B-2 is defined as below the mineral surface layer. The top of the tundra or grass is termed the 'walking surface'. Excavation depths are measured from the top of the mineral surface layer. (2) Field screening/measurement at breached munitions or stained soil for munitions constituents at any of the DGM target locations. Results will be verified by fixed-laboratory analysis, if required.
Step 4. Define the Study Boundaries	(1) The spatial boundaries comprise the RAA boundaries (See Figures in Appendix I) plus step-outs (if required). The temporal boundaries will be determined by USA and Navy RPM and defined in the final MEC QAPP. (2) Identify and record location inaccessible areas. Inaccessible areas are defined as: a. Areas with a slope greater than 30 degrees (verified with an inclinometer); or b. Areas with water (standing or running) which makes it either unsafe or impossible to collect DGM data; or Areas with debris (e.g., building foundations, concrete structures, target assemblies, etc.) which cannot be removed and which make it either unsafe or impossible to collect DGM data. (3) Coordinate data which show whether the anomalies selected are at, or are within a critical 2.5-ft (0.762-m) lateral radius (Rcrit (2.5-ft (0.762-m)) of the global positioning system (GPS) coordinates provided from the DGM data. (4) Positive documentation whether MPPEH is present at each investigated DGM target and investigate the DGM target site to a Rcrit (2.5-ft (0.762-m)) lateral radius: a. RAA-01: surface to 2-ft (0.6-m) below ground surface (bgs). b. RAA-02: surface to 2-ft (0.6-m) bgs. c. RAA-03: surface to 2-ft (0.6-m) bgs. d. RAA-04: surface to 4-ft (1.2-m) bgs. e. RAA-05/ALDA-01: surface to 2-ft (0.6-m) bgs.

Step 5. Develop a Decision Rule	*Specifying the Action Level.* All of the DGM targets from the DGM data, selected on the leveled time gate 1 channel, with varying anomaly selection thresholds, based on RAA, RAA section, and expected MEC (see Final GSV Report, Table 11-1), must be reacquired and investigated to the spatial requirement of a Rcrit (2.5-ft (0.762-m)) lateral radius and surface to 2-ft (0.6-m) or 4-ft (1.2-m) depth bgs. Breached munitions, discolored or stained soil, or investigation sites which exhibit odors must be sampled for munitions constituents. *Specifying the population parameter of interest and the theoretical decision rule.* The population parameter of interest is all target anomalies derived from the DGM in OU B-2 areas The theoretical decision rule would be stated as follows: • If all of the target anomalies are resolved and any breached munitions or soil which is discolored, stained or exhibits unusual odor is sampled and where required is remediated, the site would be acceptable for its intended land use provided the anticipated land use controls are implemented and maintained. Otherwise, additional remedial actions must be completed and/or the intended land use must be changed and/or the anticipated land use controls must be modified or changed. *Specifying excavation to depth decision, including find and no find discussions.* All selected target anomalies from the DGM data must be reacquired and investigated to the spatial requirement of a Rcrit (2.5-ft (0.762-m)) lateral radius, from the mineral surface to the depth of 2-ft (0.6-m) (for RAA-01, RAA-02 and RAA-03) and 4-ft (1.2-m) bgs (for RAA-04), If required by the Navy, further investigation of deeper targets will be performed based on practical and safety constraints to achieve DGM target resolution. No signal at the target location: A no-find is defined as when no detection signal is generated in the metal detector during intrusive investigation. • If a DGM target is not discovered within an Rcrit (2.5-ft (0.762-m)) lateral radius of the original GPS point, it will be classified as a no-find and no excavation is required. • Signal at interpreted target location: An anomaly is located within an Rcrit (2.5-ft (0.762-m)) radius of the reacquisition (survey location stakeout and measurement) pin flag using a hand-held detector. The following criteria will be applied to determine when the investigation may conclude: o either there is no analog response with a handheld detector; or o the excavation has been identified and verified as saturated with fragmentation and no metal larger than 3-inches (7.6-cm) in any dimension remains; or o it is identified and verified as cultural or construction material which cannot reasonably be removed; or o the target is verified as deeper than the excavation requirement for that RAA; or o the excavation fills with water and cannot be safely dewatered based upon an assessment by UXOSO and UXOQS; and, o the excavation is backfilled and leveled to grade. *Secondary questions action requirements.* All of the target anomalies from the DGM data must be reacquired and investigated. During the investigation process for each DGM target, there is a possibility of encountering breached munitions or soil contaminated with munitions constituents which will trigger sampling and soil removal if contaminants are discovered. • *Specifying MC sampling and soil removal*. If breached munitions, discolored soil or unusual odors are detected during intrusive investigations, the contractor will collect soil samples to determine if environmental impact is present. If MCs are detected above the screening criteria, soil removal will be completed in accordance with the MC QAPP (Appendix B).
Step 6. Specify Tolerable Limits on Decision Error	Worksheet #12 provides the performance criteria to be used for acceptance of the data used in decision making.

Step 7. Optimize the Design	DGM data will be collected over 100% of the site. The DGM data will be processed and DGM targets will be selected from the data using amplitude-based picking thresholds which are described in Appendix F (Anomaly Pick Thresholds). DGM targets selected from the data will be reacquired and investigated by carefully excavating and removing the overburden and positively identifying the DGM target source using the criteria defined in Worksheet #12. In the case where the DGM target source is identified as a munition and that munition is breached or broken, soil sampling for MC will be performed following the procedures in Appendix B (MC QAPP). MEC/MDEH will be disposed of by detonation using procedures described in Appendix A (SOPs). Munitions debris will be inspected according to the three-step inspection process discussed in Worksheet #12 and if determined to be MPPEH, will be further certified and verified as either MEC, MDEH or MDAS. MDAS will be managed in accordance with Appendix A (SOPs) and Appendix E Environmental Protection Plan/Waste Management Plan (EPP/WMP).

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11.0 MEC QAPP WORKSHEET #11 – PROJECT QUALITY OBJECTIVES

(UFP-QAPP Manual Section 2.6.1)

As noted in Worksheet #10, U.S. EPA's seven-step data quality objective (DQO) process was used during the planning stages for this project. The systematic planning process statements are presented below.

Who will use the data?

NAVFAC Northwest and BRAC PMO will be using the NTCRA data. The former NAF Adak BRAC team includes representatives from ADEC, U.S. EPA Region 10, and the USFWS.

What are the Project Action Limits?

For each decision unit, documentation of the resolution of all of the DGM target locations as derived from the DGM data or documentation of mechanical excavation and hand inspection will be considered as evidence that the remedial action objective of reducing the threat to human health and the environment posed by hazards from potential sub-surface MEC/MDEH has been achieved.

What will the data be used for?

The NTCRA data will be used to ensure that the selected anomalies and areas of mass anomalies were completely cleared of MEC/MDEH so the property can be utilized for the planned future land use that includes wildlife management, subsistence and recreational activities.

What types of data are needed?

- DGM data to use for identifying DGM anomalies (changes in sensor response above background) above a selection threshold. Selected DGM anomalies are reported as DGM targets with associated target ID, interpreted target location, response value, and any comments from the analyst.. Selected DGM targets are provided to the reacquisition and intrusive teams. DGM data will be validated by IVS tests (twice daily). IVS tests must meet the amplitude and positioning criteria specified in the GSV Plan (Appendix G). DGM data must also demonstrate detection of the blind seed Industry Standard Objects (ISOs) to the criteria specified in the GSV Plan (Appendix G) and Final GSV Report.
- Accurate target coordinate data from reacquisition (survey location stakeout and measurement) to ensure the correct anomalies are investigated. Reacquisition teams will relocate the interpreted DGM target location provided from the DGM data, and measure a new coordinate for the stakeout location using RTK DGPS.
- Intrusive investigation data to document MPPEH identification and management. The intrusive investigation team will document results for each and every DGM target location, regardless of the result of the investigation.
- Photographs are required to document inaccessible areas, munitions and other items/areas outside what would be considered normal. Inaccessible areas are defined as areas with greater than a 30-degree slope, covered in water, or otherwise not accessible by personnel without using extraordinary means (e.g., rappelling, etc.).
- MC soil sampling will be conducted if breached munitions, discolored soil or unusual odors are detected during intrusive investigations. Soil samples will be taken to determine if explosives are present. If explosives are detected above the screening criteria, soil removal will be completed in accordance with the MC SAP (Appendix B).
- QC documentation to document the effectiveness of the removal actions. QC will execute the three phases of control methodology and will conduct follow-on inspections for each Definable Feature of Work (DFW) for each day the DFW is performed. Activities which do not have follow-on inspections will be documented using the QC Surveillance Report.

How "good" do the data need to be in order to support the environmental decision?

- DGM data must meet the minimum QC test criteria specified in SOP 2 (Digital Geophysical Mapping) and the IVS and blind seed criteria specified in the GSV Plan (Appendix G).
- Reacquisition of target coordinates (survey location stakeout and measurement) data to be accurate to within 0.5-ft (15-cm)
- Intrusive investigation data for 100% of the target anomalies
- Positive identification of 100% of MPPEH recovered during intrusive investigations.
- Disposition data for 100% of MEC/MDEH recovered during intrusive investigations

Table 11-1: Methods of Obtaining Data

Data Type	Where	When	How
DGM data	Data will be collected in all accessible areas in RAA-01, RAA-02, RAA-03, and RAA-04.	Data will be recorded digitally at the time of geophysical mapping.	Data will be digitally recorded using the data logger that goes with the EM 61 Mk 2.
Target coordinate data from reacquisition (survey location stakeout and measurement)	Data will be collected at each target coordinate position after survey location stakeout and measurement	Data will be recorded after the DGM target has been staked out.	Data will be electronically recorded using the data logger that goes with the RTK DGPS equipment.
MPPEH intrusive investigation data	Data will be collected at the point of investigation.	Data will be recorded at the time of intrusive investigation for each DGM target.	Data will be recorded by hand onto the UXO team dig sheet or in electronic data logger.
Munitions constituents sampling	Data will be collected at the point of investigation.	Samples will be taken when discolored soil or unusual odors are detected.	Samples will be sent to third party laboratory for analysis in accordance with the MC SAP (Appendix B).
MEC/MDEH Disposition Data	Data will be collected at the point of disposal [e.g., either the Adak Open Burn/Open Detonation (OB/OD)] disposal range or the target location if a blow in place (BIP) is required.	Data will be recorded at the time of disposal.	Data will be recorded by hand onto the MEC/MDEH Disposal Form or in electronic data logger.
MDAS Disposition Data	Data will be collected at the point of documentation and point of disposal (e.g., when transferred to a scrap dealer or when delivered to a qualified recycler for demilitarization).	Data will be recorded at the time of documentation and at the time of transfer of the material.	Data will be recorded by hand onto the UXO team dig sheet or in electronic data logger. Transfer of custody of the material will occur using a Department of Defense (DoD) Form 1348-1A
Photographic Data	Photos will be taken of MEC/MDEH, inaccessible areas and other items or areas which may be of interest.	Photos will be taken at the time of discovery.	Digital photos will be taken.

How much data are needed?

All anomalies selected as targets will be investigated to an Rcrit (2.5-ft (0.762-m)) lateral radius and a depth of 2-ft (0.6-m) bgs (RAA-01, RAA-02 and RAA-03) or to 4-ft (1.2-m) bgs (RAA-04) measured from the target coordinate location as pinpointed and marked during the reacquisition (survey location stakeout and measurement) process. During the investigation process for each DGM target, there is a possibility of encountering breached munitions or soil contaminated with MC which will trigger sampling and soil removal if contaminants are discovered.

The target number, grid number, depth, orientation, fuze type by function, ordnance type, nomenclature, and status fired/unfired for each MEC item will be recorded in the project database. A MEC accountability log will be established to track MEC/MDEH from discovery to disposal. MEC identification will be consistent the Army TM or Navy OP Publications with consideration of the Navy NIRIS database.

Where, when and how should the data be collected/generated?

- Worksheet #17 provides a narrative of the activities resulting in the data described below.
- The schedule is provided in Worksheet #16.
- The data will be collected and recorded in the manner and form described in the SOPs identified in Worksheet #21.

Who will collect and generate the data? How will the data be reported?

All of the surface clearance, intrusive investigation and MPPEH data will be collected and generated by UXO technicians, qualified to the standards of training and experience required by DDESB TP #18 for their respective positions on the project. All other data, including reacquisition (survey location stakeout and measurement), geophysical, soil sampling and survey, will be collected by craft labor and geosciences field operators. In addition:

- The RTK DGPS target coordinates data and reacquisition repositioning data are logged using a RTK DGPS base station and rover units by the Reacquisition Team.
- Preliminary MPPEH identification is made by the UXO Technician II and then verified by the UXO Technician III Team Leader. MEC/MDEH identification is verified by the SUXOS, UXOQCS, or UXOSO.

The listing of forms needed for recording the data is provided in Appendix D.

- Progress will be presented using color-coded maps created in the project geographic information system (GIS) using ArcGIS 9.x software. The maps will reflect the work to be accomplished, the work completed by the production teams and the QC accomplished on the work completed by the production teams. Maps of the RAAs and the project grid layout are presented in Appendix I.
- Results of the intrusive investigations are captured by the intrusive teams. Overall results are reported as tables generated from the database which contains the data from the intrusive team dig sheets. This information includes the date, team information, a unique target identifier, target coordinates, DGM target response value and space for the team to enter DGM target source identification (e.g., item nomenclature, MDAS or MEC/MDEH assignment and so forth).
- Data from the dig sheets are entered into the project database. Dig results, photographs of MEC/MDEH encountered, confirmation that the DGM target was removed, and MEC/MDEH destruction information will be entered in this way.
- QC data will be captured and included into the project database for every target checked.
- A summary of the data will be included in the final report (and interim reports, as needed).

How will the data be archived?

- Hardcopy data (field- and/or laboratory-related) will be transcribed into the project's database and stored in the project files after undergoing QC review.
- Data recorded on electronic devices (e.g., Palm devices, tablet computers, data loggers, etc.) will be downloaded daily and archived to secure storage [e.g., compact disk/digital video disk (CD/DVD), dedicated portable hard drive, SharePoint site, file transfer protocol (ftp) site, etc.].
- Digital cameras will be downloaded daily and the photographs archived to secure storage.
- Project data will be placed on a SharePoint site for review by the stakeholders. The Navy will determine the degree of access permitted to individual stakeholders. Data in the SharePoint site are automatically archived and backed up as a matter of routine site maintenance and protection. At the conclusion of the project, all the data from the SharePoint site are archived to disk and submitted to the Navy with the After Action Report (AAR).

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12.0 MEC QAPP WORKSHEET #12 – MEASUREMENT PERFORMANCE CRITERIA (MEC/MPPEH)

(UFP-QAPP Manual Section 2.6.2)

The tables below identify the data quality indicators (DQIs), measurement performance criteria, and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems.

Table 12-1: Measurement Performance Criteria Table

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
Technology-aided Surface Removal ---------- Handheld Electromagnetic Metal Detector	Response	Daily instrument check to determine whether the instrument is functioning properly	Positive response to the presence of seed items in the IVS	Daily	Repair or replace a malfunctioning instrument. Make the logbook entries.
	Completeness	QC inspection of surface clearance	Technology-aided Surface Removal removes MPPEH and any metal, 3-in (7.6-cm) or greater in any dimension, from the surface which might interfere with the DGM equipment	Upon Completion or Interim, As Needed	If QC finds MPPEH or any metal 3-in (7.6-cm) in any dimension on the surface, a non-conformance report is generated and the grid is returned to the SUXOS for rework.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
Technology-aided Surface Removal ---------- RTK DGPS	Accuracy	Check of positional error at a known monument.	Positional error for the RTK DGPS at a known monument will not exceed ± 0.328-ft (±10cm).	Daily	Re-establish or re-test the benchmark(s) and control points until the required accuracy is achieved.
Digital Geophysical Mapping ---------- Geophysical	Precision	IVS test and noise strip.	Interpreted down-line positioning of installed targets [Industry Standard Objects (ISO)] will not exceed ±9.8-in (25-cm). ISO target amplitude measured by DGM equipment will not exceed the larger of 20% or 2x the standard deviation of previous week's average.	Minimum of twice Daily (before DGM operations and at end of DGM operations for each crew for each production day).	If failure occurs in the morning, do not proceed with DGM field activities until failure is resolved and criterion is passed. If failure occurs at the end of the collection day, notify QA.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
Sensor Data	Accuracy	Detection and DGM location and amplitude of QC blind seeds. Blind seeds to be installed at the rate of one per full grid, including consolidation of partial grids into an equivalent full grid.	All blind seeds must be detected and selected in the DGM data and target lists. The DGM interpreted position of the blind seed(s) must lie within an Rcrit (2.5-ft (0.762-m)) of the known (surveyed) location. The DGM blind seed item (BSI) amplitude should be equal to or greater than the 3mV selection threshold recommended for all initial target selections before screening for RAA specific intrusive investigation pick threshold. Table 11-2 in the Final GSV Report documents the expected minimum BSI response by RAA and BSI depth.	Per blind seed occurrence in DGM data.	Data are withheld, report failure to QA and root cause analysis performed.
	Accuracy	QC audit of DGM processed data.	Grid corners will be selected during the data processing of the DGM data. Interpreted location of grid corners must lie within an Rcrit (2.5-ft (0.762-m)) of known (surveyed) location.	Per Grid corner occurrence in DGM data.	Data are withheld, report failure to QA and root cause analysis performed.
	Accuracy	Accuracy of interpreted DGM target locations will be compared to measured reacquired (stakeout) locations.	Interpreted locations of DGM targets must be within an Rcrit (2.5-ft (0.762-m)) of actual (reacquire) locations.	Per reacquired DGM target.	Data are withheld, report failure to QA and root cause analysis performed.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
	Accuracy	Comparison of primary DGM target picks to QC picks and comparison of combined primary and QC picks to QA target picks.	Relative percent difference between primary and QC lists is less than ±10%. Relative percent difference between primary/QC lists and QA list is less than ±10%.	Per QC submitted lot (i.e., grid, RAA, etc.)	Data are withheld, report failure to QA and root cause analysis performed.
	Completeness	All DGM grid data will be checked by the data processors to ensure adequate coverage is obtained.	The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether recollection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks. 98% DGM data density (along line) will be <= 0.5-ft (15-cm).	All DGM data will be reviewed.	Identify data gaps and fill-in as necessary.
	Completeness	Examination of production DGM data files by QC for correct collection settings and GPS functionality.	All settings are correct and GPS is functioning correctly. Additional teams check if failure is observed.	One team AM, one team PM.	Reset survey settings/GPS and recollect affected data

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
Target Reacquisition (survey location stakeout and measurement) ---------- Handheld Electromagnetic Metal Detector	Response	Daily instrument check to determine whether the instrument is functioning properly.	Positive response to the presence of metal (ferrous and non-ferrous) in the IVS.	Daily	Repair or replace a malfunctioning instrument. Make the logbook entries.
Target Reacquisition (survey location stakeout and measurement) for: 1. Interpreted DGM anomalies 2. MEC 3. MC Positional Data: RTK DGPS Note: RTK DGPS is checked at a known point	Accuracy	Comparison of interpreted DGM target location and stakeout location.	Reacquired DGM target locations are within 0.5-ft (15cm) of the interpreted DGM target location.	Daily	If any target is out-of-specification instruct reacquire team to re-stakeout the interpreted DGM target location.
	Accuracy	Check of positional error at a known monument.	Positional error for the RTK DGPS at a known monument will not exceed 0.328-ft (10-cm).	Daily	Re-establish or re-test the benchmark(s) and control points until the required accuracy is achieved.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
Intrusive Investigation ---------- Anomaly Resolution	Accuracy	SUXOS, UXOSO, or UXOQCS verification of MEC/MDEH identification. Correct categorization of MPPEH.	Type, condition and fuze condition of UXO/discarded military munitions (DMM) correctly identified, consistent the Army TM or Navy OP Publications with consideration of the Navy NIRIS database. MPPEH correctly assigned as MEC, MDEH, or MDAS.	Daily	Stop intrusive investigations, brief and retrain personnel. Fill out the DGM target dig sheets correctly. Make the QC logbook entries.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
	Accuracy	QC of 10% of investigated targets to ensure removal of targets to contract specifications and 100% of No Finds, with large coil Vallon.	Each interpreted DGM target location has been searched to a maximum Rcrit (2.5-ft (0.762-m)) and to 2-ft (0.6-m) bgs (for RAA-01, RAA-02 and RAA-03) or 4-ft (1.2-m) bgs (for RAA-04) of the pin flag position or to the confirmed target source. Either there is: • No remnant analog response with a White's DFX 300 all metals detector, or • The excavation has been identified and QC verified as saturated with fragmentation and no metal larger than 3-in (7.6-cm) in any dimension remains, or • It is identified and QC verified as cultural or construction material which cannot reasonably be removed, or • The target is QC verified as deeper than the excavation requirement for that RAA, or • The abandoned target hole is QC verified as insufficiently dewatered, or • The target is QC verified, with large coil Vallon, as a no find (a no find rate >8% per grid is reported to QA for analysis),and • The excavation is backfilled and leveled to grade.	Per Grid upon completion	Should any of the measurement performance criteria are not met, a deficiency notice or nonconformance report is prepared by QC. QC submits the report to the SUXOS for rework of the grid and to QA for a root cause analysis.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
	Accuracy	QC audit of DGM target identification data	DGM target identification (e.g., depth, length, weight, and type) is congruous with the original DGM anomaly amplitude and size.	Daily	Investigation results not consistent with DGM anomaly characteristics will cause review of geophysical data and possible re-check of the DGM target by the field QC team to verify DGM target source was correctly identified.
	Completeness	QC audit of intrusive investigation procedures	Intrusive investigations are performed in strict compliance with SOP 7 (Target Reacquisition) and SOP 8 (Intrusive Investigation)	Daily	Stop intrusive investigations, brief and retrain personnel. Fill out the anomaly dig sheets correctly. Make the QC logbook entries.
	Completeness	QC audit of intrusive investigation dig sheets	Intrusive investigation dig sheets are filled out completely and accurately for each DGM target	Daily spot check/Per Grid upon completion	Stop intrusive investigations, brief and retrain personnel. Fill out the DGM target dig sheets correctly. Make the QC logbook entries.
Disposal of MEC/MDEH ---------- Disposal	Accuracy	Demolition Supervisor verification of proper positioning of explosives for disposal	Donor explosives are placed correctly for the type of munition(s) being destroyed. Disposal team follows the guidance from NAVSEA OP 5 and U.S. Army Corps of Engineers (USACE) disposal manuals.	Per event	Stop activity until full compliance is assured. Brief and retrain personnel, or replace personnel. Make the logbook entries.
	Completeness	SUXOS verification of complete destruction	All explosive materials (MEC, MDEH and donor explosives) placed in a disposal shot are consumed by the explosion and there are no kickouts.	Per event	If measurement performance criteria are not met, perform an additional disposal of remaining materials.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
	Completeness	QC audit of restoration of the site	All fragmentation larger than 3-in (7.6-cm)in any dimension, donor explosives residual material (e.g., cap wires, etc.) are removed from the site. Hole(s) is backfilled, leveled to grade and re-seeded.	Per event	If QC finds MPPEH or any metal 3-in (7.6-cm) in any dimension is found or the holes are not properly backfilled, a deficiency notice is generated and the grid/area is returned to the SUXOS for rework.
MPPEH Management ---------- MDAS Documentation	Accuracy	SUXOS verification of the correct materials category assignment for recovered materials.	Materials removed from excavations are correctly identified as MEC, MDEH, or MDAS. UXO/DMM are identified consistent the Army TM or Navy OP Publications with consideration of the Navy NIRIS database, MDAS and MDEH are identified by weight and type. MDEH is further categorized by the hazard (estimated type and weight of explosives residue or component).	Daily	Stop activity until full compliance is assured. Brief and retrain personnel, or replace personnel. Make the logbook entries. Should any comingling of MDAS/MDEH occur, all affected material will undergo a 100% inspection and 100% re-inspection to properly classify and re-document the explosive status of the material.
	Completeness	QC audit of MEC/MDEH management.	Each item of MEC/MDEH “determined safe to move” is properly logged into the storage magazine and the magazine card is filled out correctly and signed. Safe to move MEC/MDEH is stored in the storage magazine and accounted for on a magazine card. Final disposition is accounted by zeroing the magazine card and cross accounted using the demolition operations report.	Daily/As Needed	Stop activity until full compliance is assured. Brief and retrain personnel, or replace personnel. Make the logbook entries.

Task ---------- Data Type	Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency	Action If Failure Occurs
	Completeness	QC audit of MPPEH management	MPPEH that has been reclassified and certified as MDAS is segregated from other materials stored in a locked container to prevent cross contamination and is accounted for by weight. Final disposition is accounted for using a DD Form 1348-1 when the material is certified safe, flashed and transferred to a qualified recycler.	Daily	Stop activity until full compliance is assured. Brief and retrain personnel, or replace personnel. Make the logbook entries.
Site Restoration ---------- Restoration Documentation	Completeness	QC audit of restoration activities.	Holes from intrusive investigations are backfilled and leveled to grade. Ruts from utility vehicles (UVs) are smoothed and backfilled where needed. Water runoff, if it was re-routed, is routed back to its original path. Engineering controls (temporary culverts/road mats/etc.) were removed and leveled to grade. Bare spots are re-seeded and raked.	As completed/per grid upon completion	QC will issue a deficiency notice and require rework until the measurement performance criteria are met.

Table 12-2: Definable Features of Work and Task Auditing Procedures

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Project Management and Support (Pre-mobilization Tasks)					
GIS Setup	Verify the GIS will access all the existing project data or that the data have been entered or converted to a compatible format	PP	Once	The GIS system is set up and can access the required project data, new and historical.	Do not proceed with field activities until criterion is passed
Document Management and Control	Verify that a document management and control process is in place	PP	Once	PM will verify a SharePoint site is in place to manage and control project documents.	Do not proceed with field activities until criterion is passed
Data Management	Verify that a data management process is in place for all project data	PP	Once	PM will verify a SharePoint site is up and functioning and all personnel who require access have access granted and verify that they can access the site.	Do not proceed with field activities until criterion is passed
Subcontracting	Verify subcontracts and purchase agreements are in place by placing signed copies in the Project Manager's project file.	PP/IP	Once/upon addition or change to subcontract or purchase agreement	Subcontracts and purchase agreements are in place	Do not proceed with field activities until criterion is passed
NTCRA Technical Approach	Document that the technical approach is agreed upon by the project team by verifying that the approval pages are signed.	PP/IP	Once/upon technical change	Approval pages for all project documents are signed.	Do not proceed with field activities until criterion is passed
NTCRA Operational Approach	Document that the operational approach is agreed upon by the project team by verifying that the approval pages are signed.	PP/IP	Once/upon operational change	Approval pages for all project documents are signed.	Do not proceed with field activities until criterion is passed
NTCRA Work Plan	Document that the NTCRA Work Plan was reviewed and approved by the project team by verifying that the approval pages are signed.	PP/IP	Once/upon a change	Approval pages for all project documents are signed.	Do not proceed with field activities until criterion is passed.
Attend Teleconferences and Project Meetings as Necessary	Verify that all client required teleconferences and meetings are attended	PP/IP/FP	As necessary	All client required teleconferences and meetings were attended	Contact client and confirm requirements and attend as directed.
Exclusion Zone Access	Granting EZ access to Navy QA personnel	PP/IP	Once/ change of	The UXOSO has conducted a risk assessment in accordance	The UXOSO will conduct risk assessment in

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
			personnel	with NAVSEA OP5 for EZ access and the PM has prepared a letter granting EZ access to Navy QA personnel	accordance with NAVSEA OP5 and the PM will draft the letter before Navy QA personnel are granted access to the EZ
Explosives Drivers' Certification	PQCM verifies all personnel designated to transport explosives have completed drivers' training in accordance with NAVSEA SW020-AF-HBK-010, completed the Department of Transportation (DOT) medical examination and have the medical wallet card in their possession. Verify personnel are authorized in writing to transport explosives	PP	Once/ change of personnel	All personnel designated as explosives drivers have current drivers training and medical clearance; all supporting documents are part of the project files	Remove any personnel from the designated drivers list that do not have current drivers' training or DOT medical clearance. Prepare letter designation for all personnel assigned to transport explosives prior to proceeding with task.
Authorization for Personnel to Inspect and document MPPEH	PM to verify personnel were authorized by the Commanding Officer, NAVFAC NW to inspect MPPEH and document the safety status as MDAS or MDEH. PM to maintain the authorization letter on file in the project office.	PP/IP	Once/change of personnel	USA has received authorization from the Commanding Officer of NAVFAC NW for selected personnel to inspect MPPEH and document the safety status as MEC/MDEH or MDAS. Letter is maintained at the field office.	Hold all MPPEH: Submit a letter to the Commanding Officer, NAVFAC NW with names, positions, sample signatures and qualifications of personnel requesting authorization to inspect MPPEH and document the safety status as MEC/MDEH or MDAS.
MDAS Certification (Offsite Disposal)	The QC team will verify that all MDAS containers are locked sealed and have a 1348-1A attached; that each signatory ensured that the chain of custody was maintained before signing the 1348-1A. Each 1348-1A is signed by the SUXOS and a Navy QA representative.	IP/FF	For each container of MDAS	Each MDAS container is locked sealed and has a signed 1348-1A attached. The signatories ensured the chain of custody was maintained and the SUXOS and a Navy QA representative are the signees	Hold any container that does not meet each criterion for recertification and verification of its explosive safety status and chain of custody.
Authorization to use rental/leased vehicles for transporting explosives	PM will verify that the rental/leasing agency has provided written authorization for USA to use their vehicles to transport explosives or other hazardous materials./	PP	Once	USA has written authorization from the rental/leasing agency to use their vehicles to transport explosives or other hazardous materials.	Do not transport explosives or other hazardous materials in rental/leased vehicles until written authorization from the rental/leasing agency is received onsite.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DFW - Site Preparations and Mobilization					
NTCRA Plans	QC will verify all project plans are approved by reviewing the approval page of each document and SOP.	PP	Once	Signatures are present for all project plans and SOPs.	Do not proceed with field work until criterion is passed.
Office Setup/Field Sanitation	SUXOS to verify the site office is functional with adequate sanitary facilities in place to support the work.	PP	Once	SUXOS has reviewed and approved by log notation that the field office and sanitary facilities are adequate to support the work.	Do not proceed with field activities until the SUXOS as approved of the facilities.
Donor Explosives Storage	QC will verify that the portable magazines are correctly sited with the correct security	PP/IP/FP	Once/weekly	QC verifies that the donor explosives are stored in accordance with the ESS and NAVSEA OP5 Volume 1 and corporate SOPs	Do not store donor explosives until the storage magazines are in compliance.
Personnel Qualifications	QC to verify that personnel are qualified for the positions they occupy by reviewing training certifications, resume of experience and licenses, as appropriate and documenting the qualifications for each individual on the Personnel Qualification Verification Form.	PP/IP	Once/Upon a personnel change	Personnel are qualified, by training and experience, for the position(s) they occupy. QC has conducted a review of each individual's qualifications and experience and documented same on the Personnel Qualification Verification Form.	Do not allow personnel to perform duties for which they are not qualified. Provide training and certification or replace personnel.
Coordinate with the City of Adak and other contractors as requested by the client	Contractor to contact Adak city leaders, conduct coordination meeting and document the discussion by log entry.	PP	Once	SUXOS has documented the coordination in the SUXOS log.	Do not proceed with field activities until the criterion is passed.
Site Communications (radios/phones/ internet)	QC to verify site communications and internet connectivity are in place and functioning by physically testing the individual systems (radio, repeater, cell phone, satellite phone) in the areas they will be used on the site.	PP/IP/FP	Once/Daily	QC will document that the equipment is functioning before work begins and document the test on a Daily QC Report form. Site workers will document the daily communications tests.	Field work will not begin or continue if communications to at least one field team can't be established. . Work may begin or continue if internet connectivity is lost.
Emergency Action Plan (EAP)	Exercise the EAP with all site staff and critique the exercise at the	PP/IP	Once	The staff executed the EAP in accordance with the SSHP and	Do not proceed with field work until the EAP exercise

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	conclusion. The UXOSO is responsible for conducting, evaluating and critiquing the exercise.			received a favorable critique by the UXOSO. The result of the EAP exercise is documented in the safety file.	is conducted and the results are critiqued and documented.
Install IVS in compliance with the GSV Plan	Exercise personnel and DGM/handheld detectors in the IVS and verify the functionality and utility of the IVS to meet the requirements as established in the GSV Plan.	PP/IP	Once	DGM equipment meets the detection and positioning metrics. Handheld detectors meet the analog detection requirements in SOP 2 (Digital Geophysical Mapping). The successful test results are submitted to QA and are filed in QC files.	Do not proceed with DGM nor use a handheld detector which does not meet requirements. Replace or repair and re-test any faulty equipment.
GPS Benchmark and Survey Control Points	QC to verify the accuracy of all GPS benchmarks or survey control points established by or used for the project by reacquiring the points with RTK DGPS and collecting static data for at least 5 minutes.	PP/IP	Once	Static data show that the points are within ± 0.328-ft (10-cm) of their documented locations.	Re-establish or re-test the benchmark(s) and control points until the required accuracy is achieved.
MEC/MDEH Storage Areas	UXOSO to verify the MEC/MDEH storage magazines are sited and prepared and personnel are qualified and trained to transport MEC/MDEH. Verify personnel are authorized in writing to transport MEC/MDEH	PP/IP	Once	QC to verify that all personnel involved in transportation and storage were trained and signed the training attendance form.	Do not proceed with intrusive activities until criterion is passed.
MDAS Storage Area	QC to verify the MDAS storage area is established, containers are marked and securable and personnel have been trained on its proper use.	PP/IP	Once	QC to inspect and document the MDAS storage area meets Federal and State requirements and verify that personnel have signed the training acknowledgement form.	Do not proceed with intrusive activities until criterion is passed.
Site Specific Orientation and Training and review and training on the NTCRA Work Plan and SOPs	QC to verify and document that required site-specific orientation and training identified in the NTCRA Work Plan is performed and acknowledged by reviewing all of the training forms and SOPs, verifying that all personnel working on the site have signed.	PP/IP	Once	Individuals must have received site-specific orientation and training identified in the NTCRA Work Plan and must acknowledge their understanding of the documents by signature.	Do not allow individuals on site to perform work until the NTCRA Work Plan has been read and acknowledged by signature.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DFW - Vegetation Removal					
Personnel qualifications	QC to verify personnel are qualified and trained by reviewing personnel files.	PP/IP	Once	Personnel are qualified and trained for positions filled and equipment used.	Replace personnel.
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by signature.	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by signature.	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is received and acknowledged by signature.
Environmental Controls (refueling stations/spill kits)	QC to verify environmental controls are satisfactory by conducting daily spot inspections.	PP/IP/FP	Daily, reported weekly	Environmental controls are in place and functioning.	Immediately stop work until appropriate environmental controls are in place prior to beginning or continuing with vegetation removal.
Personal Protective Equipment (PPE)	QC to verify that proper PPE is worn by conducting daily spot inspections.	PP/IP/FP	Daily, reported weekly	Proper PPE for equipment used is worn correctly.	Stop vegetation removal activities until full compliance with PPE requirements are met.
Vegetation Cutting	QC to verify vegetation was cut according to the approved NTCRA work plan (within 6 inches of ground surface or tundra mat).	PP/IP	Daily and as sections are reported complete	Vegetation was cut within 6 in of ground surface or tundra mat.	Removals not performed or within specification are re-worked and re-evaluated until correct.
Vegetation Re-growth	QC to monitor vegetation growth following removal.	PP/FP	Weekly	Vegetation re-growth remains within working criteria.	Re-cut vegetation to working criteria, as required.
DFW- Incidental Road, Access Path and Drainage Construction					
Personnel qualifications	QC to verify subcontractor personnel are qualified and trained by reviewing personnel files.	PP/IP	Once	Subcontractor personnel are qualified and trained for positions filled and equipment used.	Report to Site and Construction Superintendent.
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by signature.	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by signature.	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is received and acknowledged by signature.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Environmental Controls (refueling stations/spill kits)	QC to verify environmental controls are satisfactory by conducting daily spot inspections.	PP/IP/FP	Daily, reported weekly	Environmental controls are in place and functioning.	Immediately stop activity until appropriate environmental controls are in place prior to beginning or continuing with construction.
Intrusive Investigation of Construction Areas	QC will conduct a 10% random sampling (by area) with an analog instrument to check the effectiveness of the intrusive investigation.	IP/FP	Upon notification from SUXOS that intrusive investigation completed	No anomalies found during 10% sampling	If anomaly is found, report to the SUXOS for re-work of the affected area
Construction	QC, SUXOS and/or UXOSO will check the completed construction to ensure it meets the project requirements	IP/FP	Daily when construction occurs	Road and trail construction is adequate and safe for travel. Drainage construction meets project needs for water redirection.	Report findings to Site and Construction Superintendents
DFW - Digital Geophysical Mapping					
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by signature.	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by signature.	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is received and acknowledged by signature.
DGM Equipment Inspections, Setup and Checks	QC to verify DGM equipment/crews collect data in the IVS in accordance with their SOP for this activity and the GSV plan. Verify that data pass the IVS metrics. QC to provide pass/fail notification and data to Navy QA per GSV plan and record the check on the QC Inspection Check sheet.	PP/IP	Twice Daily (minimum). Prior to DGM data collection in morning, and at the end of the collection day.	Down-line interpreted position of installed targets will not exceed ±9.8-in (25-cm). Repeat target amplitude measured by DGM equipment will not exceed the larger of ±20% or 2x the standard deviation of the previous week's average.	If failure occurs in the morning, do not proceed with DGM field activities until failure is resolved and criterion is passed. If failure occurs at the end of the collection day, notify QA.
DGM production work	QC to verify that DGM teams follow data collection procedures as outlined in their approved SOP	PP/IP/FP	Daily for each DGM team.	Per contractor SOP.	Do not proceed with DGM production work until failure is resolved.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	for this activity. Record the check on the QC Inspection Check sheet.				
DGM data processing and target selection	QC to verify, record and approve the following (with submittal to Navy QA): 1. Data were processed in accordance with approved contractor SOP. 2. All blind seeds and grid corners were detected in DGM data and selected in target lists. 3. DGM data coverage. 4. QC reprocessing of DGM data, and independent selection of targets.	PP/IP/FP	1-Daily 2-Daily 3-Daily 4-Daily	1. Data must be processed according to approved contractor SOP 2. Blind Seeds and grid corners must lie within an Rcrit (2.5-ft (0.762-m)) of known location. The DGM BSI amplitude should be equal to or greater than 3mV 3. The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether recollection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks. 4. 98% DGM data density (along line) will be <= 0.5-ft (15-cm).. 5. Initial and QC target lists should agree within ±10%.	• Reprocess Data • Data are withheld, report failure to QA and root cause analysis performed. • Data are withheld, report failure to QA and root cause analysis performed. • Data are withheld, report failure to QA and root cause analysis performed.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DFW - DGM Target Reacquisition (survey location stakeout and measurement)					
Equipment Inspections, Setup and Checks	QC to verify equipment is serviceable and calibrated, as required by recording the check on the QC Inspection Check sheet.	PP/IP	Once	Equipment is serviceable and calibrated.	Do not proceed with reacquisition field activities until criterion is passed.
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by signature.	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by signature.	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is received and acknowledged by signature.
Reacquisition RTK DGPS	QC to document accuracy of a known location on the preparatory inspection form. One Team Leader to document accuracy of a known location in the logbook.	PP/IP/FP	Daily	RTK DGPS is accurate within ± 0.328-ft (10-cm) of a known location.	Do not proceed with field activities until the RTK DGPS accuracy is verified and documented. Troubleshoot and correct the unit if the daily accuracy reading is out of specification.
Handheld Metal Detector Daily Checks	Team Leader to verify personnel conduct daily run-through at the IVS and the detector is serviceable by visually observing the checks by team members and documenting the checks in the logbook.	PP/IP/FP	Daily	Personnel did conduct daily run-through at the IVS, the detector is serviceable, detector functioning is acceptable and the team leader has made the logbook entry.	Repair or replace a malfunctioning instrument. Make the logbook entries.
Reacquire DGM target (survey location stakeout and measurement)	UXO Technician to verify that the reacquired position is within 0.5-ft (15-cm) of the reported position by measuring the distance.	PP/IP/FP	Daily, reported weekly.	Reacquired anomalies are within 0.5-ft (15-cm)	Report the out-of-specification target number and reacquired position to QC
Mark interpreted DGM target Location	Team leader to verify that the DGM target was marked with a correctly numbered pin flag by performing spot checks. QC will spot check compliance daily.	PP/IP/FP	Daily, reported weekly.	The DGM target was marked using a pin flag with the correct unique number. QC has documented the daily spot check in his logbook.	Do not proceed with intrusive field activities until the team is retrained how to number pin flags. Review 'already installed' pin flags to verify that the numbers match the numbers from the DGM data.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DFW - Intrusive Investigations					
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by signature	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by signature.	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is received and acknowledged by signature.
Handheld Metal Detector Daily Checks	Team Leader to verify personnel conduct daily run-through at the IVS and the detector is serviceable by visually observing the checks by team members and documenting the checks in the logbook.	PP/IP/FP	Daily	Personnel did conduct daily run-through at the IVS, the detector is serviceable, detection was acceptable and the team leader has made the logbook entry.	Repair or replace a malfunctioning instrument. Make the logbook entries.
Exclusion Zone Boundaries	UXOSO to verify that barricades are in place to identify the work site exclusion zone and proper contact information is attached. QC to perform daily spot checks.	PP/IP/FP	Daily	Barricades are in place to identify the work site exclusion zone and proper contact information is attached.	Stop intrusive operations until barricades are put in place or repaired, if damaged.
Personnel are wearing proper PPE for the task to be performed	Team Leader to confirm personnel are wearing appropriate PPE for the assigned task. QC or the UXOSO to perform daily spot checks.	PP/IP/FP	Daily, report weekly	Personnel are wearing appropriate PPE for the assigned task. QC has filled out the QC Inspection Check sheet documenting the spot check(s).	Stop the activities until personnel are wearing the proper PPE. Make the logbook entries. Notify the UXOSO of the violation.
MC and Metals Sampling	UXO Technician will check each breached munition for discolored soil or unusual odors at the DGM target excavation site. If detected, the UXO Technician will notify the Team Leader so that soil samples can be taken.	PP/IP/FP	Daily	Team Leader was not notified or failed to report to SUXOS, excavations with breached munitions, discolored soil or unusual odors or soil stained by an external source	Stop activities, brief the error and retrain personnel in the correct procedure, verify that the target is correctly identified and sampling is initiated in accordance with the MC QAPP.
Manual Digging Techniques	Team Leader to monitor that personnel are following proper manual digging techniques. QC to perform daily spot checks.	PP/IP/FP	Daily, report weekly	Manual digging techniques follow SOP 08 (Intrusive Investigation). QC has documented the spot checks in logbook. Notify the UXOSO when violations are identified.	Stop activities, brief the error and retrain personnel in the correct procedure. UXOSO to initiate a near miss report.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Intrusive Investigation using Heavy Equipment	Team Leader to monitor operator to ensure proper digging techniques. QC to perform daily spot checks.	PP/IP/FP	When heavy equipment is used for excavations	Heavy equipment digging techniques follow SOP 12 (Earth moving Machinery Operations). QC has documented the spot checks in logbook. Notify the UXOSO when violations are identified.	Stop activities, brief the error and retrain personnel in the correct procedure. UXOSO to initiate a near miss report. If applicable
QC check of RAA-01 crater spoils	QC will conduct visual check of bottom of exaction to asses if the water recharge rate exceeds 0.25-in per minute. QC will conduct a technology-assisted check of 5% of the broadcast crater spoils prior to returning the spoils to the crater bottom.	IP/FP	Daily when craters are excavated	Water recharge rate exceeds 0.25-in per minute. No MPPEH or metallic debris found during the 5% sampling	The UXOSO and UXOQCS will make the decision whether to continue with the excavation or if the dig should be abandoned the dig. The UXOQCS will notify the Navy QA and offer the opportunity for verification in real-time. If MPPEH or metallic debris is found, report to the SUXOS for re-work of the affected spoils
DGM Target Investigation Criteria	Team Leader to verify that the source of the DGM target was located. Check that each DGM target location has been searched to a maximum Rcrit (2.5-ft (0.762-m)) and • 2-ft (0.6-m) (RAA-01, RAA-02 and RAA-03) or • 4-ft (1.2-m) depth below the mineral surface (RAA-04) of the pin flag position or to the confirmed DGM target source. Either there is • no remnant analog response with a handheld detector or • the excavation has been identified and verified by QC as saturated with fragmentation and no metal	PP/IP/FP	Daily, report weekly	Each DGM target location was verified as a no-find or was resolved according to the criteria. QC has documented the daily observations on the QC Inspection Check sheet. QC will conduct detailed inspections of completed grids and report the results to QA. All failures (observations or completed grids) are reported to QA.	Failures during daily QC observations: Stop intrusive investigations, brief and retrain personnel and document how much work the team has done up to the point of the inspection. QA will conduct an analysis and determine the need for rework. For failed grids, QA will conduct a root cause analysis and recommend a corrective action.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	larger than 3-in (7.6-cm) in any dimension remains or • it is identified and verified by QC as cultural or construction material which cannot reasonably be removed or • the target is verified by QC as deeper than the excavation requirement for that RAA, or • the excavation fills with water and cannot be dewatered sufficiently for safe investigation, verified by UXOSO and QC. • the excavation is backfilled and leveled to grade.			QC verified the intrusive teams backfilled holes if DGM targets were resolved. If conditions exist that precluded DGM target resolution (e.g. fragment pits, cultural debris), QC checked the hole, with a large coil Vallon to verify condition prior to backfilling.	The QC will report holes left open to the SUXOS
No-Find Procedures (A no-find is defined as when no detection response is generated in the metal detector during intrusive investigation. Any response from the detector indicates a valid anomaly source and the site must be investigated as a valid target.)	If an anomaly is not discovered within an Rcrit (2.5-ft (0.762-m)) of the original target coordinate, document the target as a no find and report the incident to QC. All no-finds are verified by QC, with a large coil Vallon, to depth and radius.	PP/IP/FP	Daily, reported weekly	A no find rate >8% per grid triggers a report to QC and QA for analysis. QA will check a percent of the no finds as defined per the QASP. An anomaly source is found by field QC or during geophysical data back check.	QA will conduct an analysis on any no-find rate exceeding 8% identified in that grid during intrusive investigation and will recommend a corrective action, as necessary. If anomaly source is found, the failure will be reported to the SUXOS for rework of the no-find location.
Intrusive Investigation Documentation	Team Leaders to verify dig sheets on PDAs are filled out correctly, are complete, correct, standardized nomenclature is used, and no-finds are listed. MEC/MDEH items require positive identification on the dig sheet. MDAS is documented by an assigned number (Worksheet	PP/IP/FP	Daily, report weekly	Dig sheets are filled out correctly, are complete, standardized nomenclature was used, no-finds and blind seeds listed and they were given to the data base transcriber daily. QC has documented the checks on the QC Inspection Check sheet.	Stop intrusive investigations, brief and retrain personnel. Fill out the DGM target dig sheets correctly. Make the QC logbook entries.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	#17). Gross weight of MDAS per grid is documented separately. Location and depth of item is recorded. QC will perform a daily spot check of the DGM target dig sheets. Blind seed items must be recovered and correctly identified/documented.				
QC audit of DGM target identification data	QC geophysicist, or their designee, reviews intrusive investigation documentation results to evaluate consistency with the selected anomaly characteristics.	PP/IP/FP	Daily, report weekly	DGM target identification (e.g., depth, length, weight, and type) is congruous with the original anomaly amplitude and size.	Investigation results not consistent with anomaly characteristics will cause review of geophysical data and possible re-check of the DGM target by the field QC team to verify DGM target source was correctly identified.
Photographs	Team Leader to verify that all MEC/MDEH were photographed using the Contractor MEC photo card. The photo number is annotated on the DGM target dig sheet. QC will perform a daily spot check of the DGM target dig sheets.		As required	All MEC/MDEH were photographed and the photo number is annotated on the DGM target dig sheet. QC has documented the checks on the QC Inspection Check sheet.	Stop intrusive investigations, brief and retrain personnel. Fill out the DGM target dig sheets correctly. Make the QC logbook entries.
Data base entries	QC to verify that the paper copy dig sheets (if used) were accurately transcribed into the data base and correctly filed. QC to verify the accuracy of digital data collected and entered. QC will compare the paper copy to the electronic copy for accuracy.	PP/IP/FP	Weekly	Dig information, regardless of source (digital or paper) were accurately entered into the data base and were properly filed. QC has documented the checks on the QC Inspection Check sheet.	Brief and retrain personnel and correct any errors. Make the QC logbook entries.
DFW – Surface Sweep of Andrew Lake Seawall					
Daily UXO Safety Briefing	Confirm that the UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged by	PP/IP/FP	Daily	The UXOSO or his representative conducted a daily safety briefing and all field personnel acknowledged it by	Those personnel not receiving a safety briefing are not authorized in the exclusion zone until it is

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	signature			signature.	received and acknowledged by signature.
Handheld Metal Detector Daily Checks	Team Leader to verify personnel conduct daily run-through at the IVS and the detector is serviceable by visually observing the checks by team members and documenting the checks in the logbook.	PP/IP/FP	Daily	Personnel did conduct daily run-through at the IVS, the detector is serviceable, detection was acceptable and the team leader has made the logbook entry.	Repair or replace a malfunctioning instrument. Make the logbook entries.
Exclusion Zone Boundaries	UXOSO to verify that barricades are in place to identify the work site exclusion zone and proper contact information is attached. QC to perform daily spot checks.	PP/IP/FP	Daily	Barricades are in place to identify the work site exclusion zone and proper contact information is attached.	Stop intrusive operations until barricades are put in place or repaired, if damaged.
Personnel are wearing proper PPE for the task to be performed	Team Leader to confirm personnel are wearing appropriate PPE for the assigned task. QC or the UXOSO to perform daily spot checks.	PP/IP/FP	Daily, report weekly	Personnel are wearing appropriate PPE for the assigned task. QC has filled out the QC Inspection Check sheet documenting the spot check(s).	Stop the activities until personnel are wearing the proper PPE. Make the logbook entries. Notify the UXOSO of the violation.
QC check of completed surface sweep	QC will conduct a Technology-assisted, 10% random sampling (by area) to check the effectiveness of the surface sweep.	IP/FP	Upon notification from SUXOS that monthly sweep has been completed	No MPPEH or metallic debris found during 10% sampling	If MPPEH or metallic debris is found, report to the SUXOS for re-work of the affected area
DFW - Manage and Dispose of MDAS					
Tier one and tier two material inspections	QC to verify that items discovered are inspected initially by the UXO Tech that found it and secondly by the Team Leader and that the items are correctly identified and categorized as MEC/MDEH or MDAS by conducting a daily comparison of the items to the DGM target dig sheet.	PP/IP/FP	Daily	Materials recovered from intrusive investigations are properly identified and categorized as MEC/MDEH or MDAS. The DGM target dig sheet reflects the material inspection from the UXO Technician II and the tier two inspections by the UXO Team Leader. 100% of MDAS must be inspected and certified by	Stop intrusive investigations, brief and retrain personnel. Re-inspect the materials and make the appropriate dig sheet entries.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
				personnel authorized by CO NAVFAC NW in writing prior to flashing.	
Three Tier Materials Inspection	SUXOS to inspect 100% of MEC/MDEH and document safe-to-move status in writing. The SUXOS, UXOSO, or UXOQCS to inspect a minimum of 10% of MDAS prior to placement into storage in secured containers Document the inspections in their respective logbooks. QC to verify inspections and documentation.	PP/IP/FP	Daily	The SUXOS inspected a 100% of MEC/MDEH and documented the safe to move status. SUXOS, UXOSO, or UXOQCS a minimum 10% of MDAS prior to placement into storage or secured containers. Inspection is documented in logbook.	Stop intrusive investigations, brief and retrain personnel and re-inspect the material. Sign the material inventory form.
MDAS Materials Security	QC to verify the materials storage containers have lockable lids to prevent theft or inadvertent placement of MEC/MDEH or other unwanted items inside. QC to document the inspections using a logbook entry.	PP/IP/FP	Daily	MDAS materials storage containers have lockable lids to prevent theft or inadvertent placement of MEC/MDEH or other unwanted items inside. QC has documented the checks in logbook.	Re-inspect contents of the container found open/unlocked. Re-train personnel. Make the QC logbook entries.
DFW - Dispose of MEC and MDEH					
Remote Firing Device (RFD)	QC will verify demo personnel are trained and proficient in the use of the RFD by observing operations. QC will document the observations on the Demolition Operations Form.	PP/IP	Per demo event	Demo team has trained on the RFD and demonstrated proficiency during the initial training and orientation period. QC notes no serious operational defects in either personnel or equipment.	Halt operations, retrain or replace personnel.
MEC Transportation	SUXOS to verify personnel that transport MEC/explosives are trained and qualified to transport explosives over public roads (NAVSEA SW 020-AF-HBK-010). SUXOS will document qualified personnel by assigning them by letter.	PP/IP	Once	Personnel assigned to transport MEC/MDEH for disposal are trained and qualified to transport explosives over public roads. Personnel have been assigned by letter from the SUXOS.	Do not schedule demolition operations. Train and qualify or hire qualified individuals. Assign qualified persons in writing.
MEC/MDEH Disposal	Demolition Supervisor to verify MEC/MDEH is disposed (charge placement, priming techniques) according to the NTCRA Work	PP/IP/FP	Once per demo event	Disposal (charge placement and priming techniques) was conducted according to the NTCRA Work Plan, SOPs and	Stop activity until full compliance is assured. Brief and retrain personnel, or replace personnel.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	Plan, SOPs and NAVSEA OP 5. QC to document the operational audit in the logbook.			OP 5. SUXOS has made the logbook entries reflecting the observation of the operation.	Make the logbook entries.
Demolition Safety	UXOSO to verify that all personnel are accounted for, verify that road guards with communications are placed at the exclusion zone safety limits to stop unauthorized traffic and that the contractor has control over the site. UXOSO will report a satisfactory condition to the SUXOS who will log the report into the Demolition Operations Form.	PP/IP/FP	Once per demo event	Personnel are/are not accounted for, road guards and other safety and engineering controls are/are not in place. The UXOSO has/has not reported a satisfactory condition to the SUXOS prior to beginning demolition operations.	Stop demolition activities until full compliance is achieved. Make the entries on the Demolition Operations Form.
Local community, contractors and emergency services notification	SUXOS to verify local community contacts, contractors and emergency services were notified prior to disposal operations and document the notifications on the Demolition Operations Form.	PP/IP/FP	Once per demo event	The local community contacts, contractors and emergency services were notified prior to disposal operations. SUXOS has documented the notification on the Demolition Operations Form.	Stop demolition activities until full compliance is achieved. Make the entries on the Demolition Operations Form.
Demilitarization of MDAS	SUXOS to verify that demilitarization operations are performed according to DoD requirement and the NTCRA Work Plan and SOPs. QC will audit the proper demilitarization of material and document the results in the logbook.	PP/IP/FP	Each occurrence	Demilitarization is performed according to DoD requirement and the NTCRA Work Plan and SOP. The SUXOS has reviewed the demil procedures and is satisfied that they comply with DoD. QC has audited the demilitarized material and documents that it meets DoD requirements.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-done if necessary.
Post-demolition site clean-up	SUXOS to verify the demolition site was checked, all of the explosive items were destroyed and any munitions debris remaining was collected, inspected, removed and recycled and the disposal site was backfilled and leveled to grade. The SUXOS will document the post-demolition check and cleanup as a logbook entry.	PP/IP/FP	Each event	The demolition site was checked, all explosive items were destroyed. Munitions debris remaining was inspected, removed and recycled. The disposal site was backfilled and leveled to grade. The post-demolition activities were documented in the logbook.	Retrain personnel. Recheck the disposal site. Verify that the MEC was destroyed and remove remaining munitions debris, inspect it and recycle. Backfill and restore the site. Make the data entry in the logbook.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DFW - Site Restoration					
Backfilling Holes	QC to verify that all excavations are backfilled, leveled to grade and tundra replaced or re-seeded and no metal of a size 3-in (7.6-cm) or larger in any dimension remains on the surface. QC to document checks during Follow-on inspections and completion during final grid certification.	PP/IP/FP	Daily, after QC grid certification	Intrusive teams will backfill holes if DGM target is resolved. If conditions exist that preclude DGM target resolution (e.g. fragment pits, cultural debris), the hole will be check by QC to verify condition prior to backfilling. All holes backfilled and leveled to grade, tundra is replaced or the excavation is re-seeded (where required). No metal of a size larger than 3-in (7.6-cm) in any dimension remains on the surface. QC will document completion during final grid certification.	QC will issue a deficiency notice .
Temporary Road and UV Trail Maintenance and Restoration	QC will inspect temporary roads and UV trails used to support the work during each visit to the RAA. Roads and trails which exhibit excessive wear will be earmarked for immediate maintenance and repair. QC will inspect temporary roads and the entire grid for UV damage and will require restoration in accordance with the Environmental Protection Plan (EPP) prior to certifying the grids completed.	PP/IP/FP	Daily, after QC RAA certification	Temporary roads are removed and restored and UV damage is repaired throughout the grid to the specifications stated in the EPP.	QC will require re-work until the site(s) meet the specification. QC will not certify the grid complete until the restoration work meets specifications.
DFW - Demobilization					
General site condition	The field season (interim or final) will not be terminated until all MEC/MDEH are disposed of and the disposal area is restored, all MDAS is inspected, flashed and secured in locked and sealed containers, the explosives storage magazines are emptied, all open excavations are backfilled, all temporary roads are restored and all UV trails are restored.	FP	Each field season	All MEC/MDEH is destroyed. All MDAS is inspected, flashed and secured in locked and sealed containers, the explosives storage magazines are empty, all open excavations are backfilled, all temporary roads and UV trails are restored in accordance with the EPP.	Contractor personnel will be called back to the island to complete the work.

DFW / Task	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Data Management	PM to verify all required data are collected, no additional data are needed and any inaccuracies have been corrected. PM to verify with RPM which personnel continue to requires access to the SharePoint or ftp site. PM to document these activities via e-mail.	FP	Once	Review of project data show all required data have been collected, no additional data are needed and data are accurate or have been corrected. PM has email correspondence with team and RPM verifying who still needs access to the SharePoint site.	Collect additional data or correct data, as needed. Terminate unnecessary accesses to SharePoint or ftp.
Remove the IVS (upon completion of the RAA and at Project Completion)	QC to verify that the IVS was removed, all holes are backfilled to grade and seed items properly managed. QC to document the verification in the logbook.	FP	Once	The IVS was removed, all holes are backfilled to grade and the seed items are properly managed. QC has made the logbook entries.	Complete the action as required.
Demobilize personnel	SUXOS to ensure all personnel depart site and terminate site access. SUXOS to document the activities in the logbook.	FP	Once	All personnel departed site. SUXOS has made the logbook entry.	Arrange for personnel departures. Make the logbook entries.

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13.0 MEC QAPP WORKSHEET #13 – SECONDARY USE OF DATA CRITERIA AND LIMITATIONS

(UFP-QAPP Manual Section 2.7)

Secondary Use Data	Data Source (originating organization, report title and date)	Data Generator(s) (originating organization, data types, data generation / collection dates)	How Data Will Be Used	Limitations on Data Use
Remedial Investigation (RI) Report for OU B-2 This report presents the RI and risk assessment findings for 24 areas of concern located in OU B-2. These investigations and risk evaluations were conducted in accordance with the Final Remedial Investigation Work Plan for OU B-2, Adak Island (TetraTech), dated June 6, 2008.	*Final Remedial Investigation Report for OU B-2 Sites, Former Naval Air Facility Adak, Adak Island, AK (USA 2012a) May 2012*	USA**,** narrative description of the findings of RI activities conducted at OU B-2 at the former NAF on Adak Island, Alaska. The purpose of the RI was to collect and analyze data at sites potentially contaminated with MEC and munitions constituents at 24 sites located in OU B-2. Data used to develop the OU B-2 RI were collected in 1999, 2000, and 2008.	Data will be used as reference for the site histories, types of munitions, geographical features and general site information for each RAA during the NTCRA.	The descriptive information is accurate in this report as are the locations and conditions of the munitions recovered; therefore, there should be very few limitations on how the data might be used.
Final FS Report for OU B-2 Sites (USA 2012b). This FS report presents this process for reasonably expected future land uses for OU B-2 This FS follows the RI and the resulting RI report, the Final RI Report for OU B-2 Sites (USA, 2012a). The RI makes up the first volume of this Final RI/FS Report.	*Final Feasibility Study for OU B-2, Former Naval Air Facility Adak, Adak Island, AK (USA 2012b).March 2012*	USA, The FS assembles technologies and process options into alternatives, screens and evaluates these alternatives to determine practical, cost-effective actions to reduce the potential hazard associated with MEC contamination to an acceptable level. Data used to develop the FS come from the RI (USA 2011).	Data will be used to identify the boundaries of the RAAs and to support the work elements and cleanup levels used in the NTCRA.	The report is very detailed in presenting and summarizing the information for each RAA and therefore, there should be very few limitations on how the data might be used.

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14.0 WORKSHEET #14 – SUMMARY OF PROJECT TASKS

(UFP-QAPP Manual Section 2.8.1)

The implementation of the NTCRA investigation is divided into definable features of work (DFWs) and the tasks required for completing each DFW. They are identified in Table 14-1. Additional discussion about implementing these tasks is provided in QAPP Worksheet #17. Specific instructions are provided in the project SOPs indexed in Worksheet #21. DFW not noted as administrative are subject to Preparatory, Initial and Follow-on QC inspections. Activities of a strictly administrative nature are noted in the table and are not subject to these inspections.

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Table 14-1: Definable Features of Work

DFW	Tasks
Mobilize and Prepare the Site (administrative)	• Mobilize personnel and equipment to the site • Set up office facilities/utilities/internet/site communications/sanitary facilities, etc. • Set up, test and manage the project data exchange activity in accordance with corporate policies • Authorize access to data as required in the MEC QAPP and supporting documentation • Inventory equipment and verify serviceability, calibration and accuracy • Verify all personnel are qualified and trained for the positions filled • Exercise the emergency action plan and coordinate with local emergency services (hospital, fire department, Emergency Medical Technician (EMT) support, etc.) • Procure sufficient ISOs to install the IVSs following the procedures in the GSV Plan • Select and clear the area and install the IVSs following the procedures in the GSV Plan • Set up the spreadsheets to document, plot, track and archive the results of the daily IVS testing to be conducted during DGM activities • Set up and test the data transfer process • Locate an established survey control benchmark or establish a local GPS control point network. Based on the National Geodetic Survey's data sheet, the Adak Tidal Bench Mark 18 is identified as the survey control benchmark for this project. This is a second order horizontal and a third order vertical control point. • Survey and stakeout the grids in the work areas. (Appendix I) • Conduct a surface clearance in RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01. • Prepare the portable explosives storage magazines for use (e.g., siting, security, locks, signage, etc.) • Prepare the MDAS storage and flashing site (thermal flashing unit [TFU]) for use in accordance with SOP 10 (MDAS Management and Disposal). • Conduct site orientation and training on the NTCRA Work Plan and SOPs. Personnel to review all project plans and SOPs, attend the training and acknowledge by signature. • Conduct Preparatory Inspections on all non-administrative DFWs in accordance with the NTCRA Work Plan. • Prepare the Exclusion Zone (EZ) Entry Authorization Letter authorizing Navy (NTR, RPM) and QA personnel unrestricted access to the EZ (Pre-Mobilization) • Prepare the MPPEH Inspection and Certification Letter for signature by the Commanding Officer NAVFAC (Pre-Mobilization)
Remove Vegetation	• Attend a daily safety briefing and sign attendance roster • Establish environmental controls for refueling and fuel spill prevention and cleanup • Don the approved PPE for the task assigned • Cut grass to within 6-in (15-cm) of the ground surface or tundra mat
Conduct Digital Geophysical Mapping	• Attend a daily safety briefing and sign the attendance roster • Assemble and warm up the DGM equipment in accordance with SOP 2 (Digital Geophysical Mapping) and collect data from the IVS following the procedures in the GSV Plan. Review the data on-site to verify and then document that the equipment is operating within specification. IVS data are to be collected, reviewed and then documented at the beginning and at the end of data collection for each work day DGM is conducted. Each DGM team must execute this task. • Collect geophysical data at the assigned area following the procedures in SOP 2.

DFW	Tasks
	• Process the geophysics data following the procedures in SOP 3 (Geophysical Data Processing and Interpretation) and generate a target list in the required format. • Log the required DGM QC-check data (SOP 2) and transfer those data daily using the approved project data management processes (e.g., server, website, etc.) • Conduct QC inspections on the DGM data and submit the data to QA for target list concurrence. Reconcile QA target picks with the production target lists. • Generate issue and archive the approved target lists.
Reacquire Target Anomalies	• Attend a daily safety briefing and sign attendance roster • Conduct daily instrument inspections and function checks for serviceability and accuracy (GPS base station and rover units and metal detectors) following the procedures in SOP 07 (Target Reacquisition). • Navigate to the interpreted DGM target location using the RTK DGPS system to within ± 0.5-ft (15-cm) of the target coordinates obtained from the DGM survey data. Confirm by measuring point and mark with pin flag labeled with unique target number. • Download the reacquired coordinates daily. QC will track the accuracy of the reacquired locations compared to the locations from the data against the 0.5-ft (15-cm) stakeout metric.
Conduct Intrusive Investigations of Anomalies	• Attend a daily safety briefing and sign the attendance roster • Conduct daily instrument checks of the hand-held detectors at the IVS and document the results • Set up exclusion zone barricades with signs at all access roads and mark appropriately: Danger, UXO Remediation Project in Progress, DO NOT ENTER and list contact information on the barricade sign • Monitor re-growth of vegetation and cut as necessary • Use dig techniques for manual and heavy equipment as specified in SOP 8 (Intrusive Investigation) and SOP 12 (EMM Operations). • Investigate each DGM target to a maximum Rcrit (2.5-ft (0.762-m)) of the pin flag position and either the 2-ft (0.6-m) (for RAA-01, RAA-02 and RAA-03) or 4-ft (1.2-m) depth (for RAA-04). For RAA-01, RAA-02, RAA-03, and RAA-04, stop excavations when the DGM target source is removed or the 2-ft (0.6m) or 4-ft (1.2-m) depth is reached. If required by the Navy, further investigation to their depth will be performed for the deeper than 2-ft/4-ft (0.6/1.2-m) targets to achieve target resolution. • Investigate all analog anomaly signatures identified from the White's DFX-300 at RAA-05/ALDA-01, down to the depth of 2-ft. In areas indicative of garbage pits, the MEC team extends the screening to a 4-ft depth. • Investigate bottom of RAA-01 craters using shielded excavator. The excavator will be used to scoop 1.5-ft (0.5-m) of the crater bottom and broadcast the excavated soil at a designated processing area (clean areas near the excavation). The MEC team will search through the excavated soil for MPPEH and metallic debris (3" or greater) using White's DFX-300. • If required by the Navy, further investigation to depth will be performed for the deeper anomalies. • Implement a three tier DGM target inspection process to positively identify the MPPEH item. The first inspection is performed by the UXO Tech discovering the item, the second inspection is performed by the UXO Team Leader and the third inspection, by the SUXOS or UXOSO • Record all intrusive investigation results on the DGM target dig sheet • Monitor DGM target data accuracy and report to QC immediately if the number of no-finds exceeds 8% of the total targets per grid. • Record all MDAS and general scrap using the relative-weights system found in SOP 10 (MDAS Management and Disposal), for each individual item and by daily total weights (not individual item weights).

DFW	Tasks
	• Photograph all MEC/MDEH using the MEC photo card in the background IAW SOP 9 (MEC Management and Disposal). • Positively identify MEC/MDEH by its nomenclature and fuzing, determine its condition and whether it is safe-to-move for storage or requires BIP. Document all 'safe to move' MEC/MDEH in writing. • Backfill excavations • Transcribe or transfer daily field activity results into the project database
Dispose of MEC and MDEH	• Conduct specific training on demolition procedures including the use of the RFD • Station road guards with communications at exclusion zone safety limits to stop unauthorized traffic as needed • Coordinate with the local community, other contractors and emergency services prior to operations • Conduct MEC/MDEH disposal in accordance with SOP 9 (MEC Management and Disposal), the ESS and NAVSEA OP5 • Verify the site is clean after demolition operations. Inspect for kick-outs and collect MDAS and inspect for storage, flashing and for recycling. • Restore the demolition site by backfilling and re-seeding, as required by the EPP (Appendix E) and the CWP (Appendix C).
Manage and Dispose of MDAS	• Attend a daily safety briefing and sign the attendance roster • Store MDAS in the approved storage area in accordance with SOP 11 • NAVFAC NW CO approved inspectors must inspect and certify MDAS prior to storage, flashing and off island recycling • Flash MDAS in the TFU in accordance with SOP 10 • Package and ship MDAS to an authorized recycling facility in accordance with SOP 10 • Provide verification of destruction of MDAS from the authorized recycling facility • Verify all MDAS that required demilitarization was processed or separated and shipped to an authorized demilitarization contractor.
Restore the Site	• Backfill all excavations to grade • Repair all UV tracks and other site related damage in accordance with the EPP/Waste Management Plan (WMP) • Reseed areas where tundra and grasses could not be replaced using an approved seed formula for the area
Perform Incidental Road, Access Path and Drainage Construction	• Attend a daily safety briefing and sign the attendance roster • Install the temporary roads and drainage improvements in accordance with the Construction Work Plan (CWP) (Appendix C) • New temporary access roads/paths or drainage improvements within RAA boundaries will be MEC cleared prior to construction or use to facilitate the NTCRA activities at OU B-2. • Improve the existing roads in accordance with the CWP (Appendix C)
Perform Monthly Surface Sweeps at the Andrew Lake Seawall	• Attend a daily safety briefing and sign the attendance roster • Conduct the monthly surface sweeps • Log the location of all MEC/MDEH using hand-held GPS • Photograph all MEC/MDEH items • Dispose of MEC/MDEH using approved procedures in accordance with the project plans • Remove and manage MPPEH in accordance with the project plans
Perform Quality Control (administrative)	• Perform the required inspections (Preparatory, Initial and Follow-up) according to the auditing procedures in Table 12-2 and the schedule in Worksheets 34, 35 and 37

DFW	Tasks
	• Perform grid inspections in accordance with Worksheets 34 and 35 and provide final grid certification of completion • Set up, test and maintain a data exchange process with QA and determine what deliverables are required by QA
Demobilize (administrative)	• Review project data requirements (data, completeness and archiving) • Verify accuracy of the project database • Remove office facilities, shut off utilities, disconnect internet and site communications and remove field sanitary facilities, etc from site • Remove the IVSs, unless the contractor is returning for another field season • Verify the project objectives were met • Inspect MEC/MDEH and MDAS operating and storage areas and verify they are empty and clean • Demobilize personnel

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15.0 MEC QAPP WORKSHEET #15 – REFERENCE LIMITS AND EVALUATION TABLE

(UFP-QAPP Manual Section 2.8.1)

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16.0 MEC QAPP WORKSHEET #16 – PROJECT SCHEDULE/TIMELINE

(UFP-QAPP Manual Section 2.8.2)

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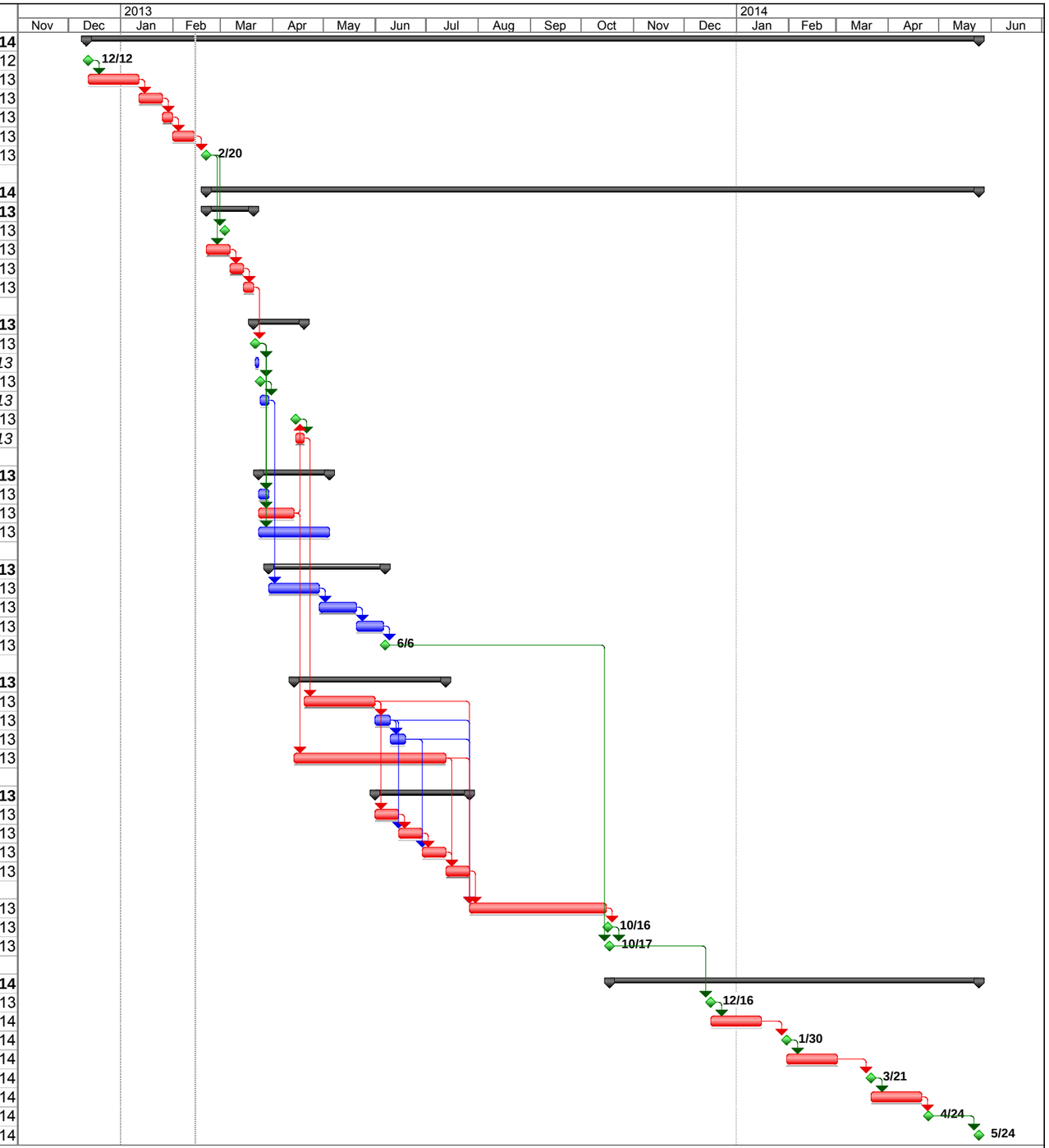
ID	Task Name	Duration	Start	Finish
1	**Non-Time Critical Removal Action - Adak Operable Unit B-2**	**529 days**	**Wed 12/12/12**	**Sat 5/24/14**
2	USA/Navy submits Draft Final Project Plans to Regulators and Stakeholders	1 day	Wed 12/12/12	Wed 12/12/12
3	Regulators and Stakeholders Review/Comment Period (30 days)	30 days	Thu 12/13/12	Fri 1/11/13
4	USA Submits RTC to Navy	14 days	Sat 1/12/13	Fri 1/25/13
5	Teleconference Resolution/Finalize Project Plans	6 days	Sat 1/26/13	Thu 1/31/13
6	Coordination and Submittal of Draft Final Project Plans	13 days	Fri 2/1/13	Wed 2/13/13
7	Received Final Plans Approval and Fieldwork NTP from Navy	7 days	Thu 2/14/13	Wed 2/20/13
8				
9	**FIELD SEASON 1 - 2013**	**458 days**	**Thu 2/21/13**	**Sat 5/24/14**
10	**MOBILIZATOIN - PHASE I**	**28 days**	**Thu 2/21/13**	**Wed 3/20/13**
11	Site Superintendent Mobilization	11 days	Thu 2/21/13	Sun 3/3/13
12	Barge Arrive at Adak, Offload Cargos, and Receive/Store Explosives	14 days	Thu 2/21/13	Wed 3/6/13
13	Partial Field Management Team Mobilization	8 days	Thu 3/7/13	Thu 3/14/13
14	Site Infrastructure Setup	6 days	Fri 3/15/13	Wed 3/20/13
15				
16	**MOBILIZATION PHASE II**	**30 days**	**Thu 3/21/13**	**Fri 4/19/13**
17	Mobilize in USA's Site Prep Field Personnel	1 day	Thu 3/21/13	Thu 3/21/13
18	*Safety Orientation & Training*	*2 days*	*Fri 3/22/13*	*Sat 3/23/13*
19	Mobilize in Parsons' DGM Teams	1 day	Sun 3/24/13	Sun 3/24/13
20	*Safety Orientation & Training*	*5 days*	*Mon 3/25/13*	*Fri 3/29/13*
21	Mobilize in Remaining Reacq/Intrusive Teams	1 day	Sun 4/14/13	Sun 4/14/13
22	*Safety Orientation & Training*	*5 days*	*Mon 4/15/13*	*Fri 4/19/13*
23				
24	**Site Preparation**	**42 days**	**Sun 3/24/13**	**Sat 5/4/13**
25	Grid Stakeout (RAAs 03/05/04/02)	6 days	Sun 3/24/13	Fri 3/29/13
26	Surface Sweeps/Vegetation Removal (RAAs 03/05/04/02)	21 days	Sun 3/24/13	Sat 4/13/13
27	Road/Access Paths/Drainage Work (RAAs 03/05/04/02)	42 days	Sun 3/24/13	Sat 5/4/13
28				
29	**DGM Surveys**	**69 days**	**Sat 3/30/13**	**Thu 6/6/13**
30	RAA-03 (6 DGM Teams Parsons/USA)	30 days	Sat 3/30/13	Sun 4/28/13
31	RAA-04 (6 DGM Teams Parsons/USA)	22 days	Mon 4/29/13	Mon 5/20/13
32	RAA-02 (6 DGM Teams Parsons/USA)	16 days	Tue 5/21/13	Wed 6/5/13
33	Demobilize Parsons DGM Teams (5 DGM Teams)	1 day	Thu 6/6/13	Thu 6/6/13
34				
35	**Reacquisition, Intrusive Investigation, & MPPEH Management/Disposal**	**90 days**	**Sun 4/14/13**	**Fri 7/12/13**
36	RAA-03 (144 acres, 28,168 Targets, 4 Reacq & 4 Intrusive Teams)	42 days	Sat 4/20/13	Fri 5/31/13
37	RAA-04 (104 acres, 6,565 Targets, 4 Reacq & 4 Intrusive Teams)	9 days	Sat 6/1/13	Sun 6/9/13
38	RAA-02 (72 acres, 6,641 Targets, 4 Reacq & 4 Intrusive Teams)	9 days	Mon 6/10/13	Tue 6/18/13
39	RAA-05/ALDA-01 (Mechanized/Broadcast MPPEH Clearance)	90 days	Sun 4/14/13	Fri 7/12/13
40				
41	**Restoration - Road/Access Paths/Drainage**	**56 days**	**Sat 6/1/13**	**Fri 7/26/13**
42	RAA-03 (AGVIQ)	14 days	Sat 6/1/13	Fri 6/14/13
43	RAA-04 (AGVIQ)	14 days	Sat 6/15/13	Fri 6/28/13
44	RAA-02 (AGVIQ)	14 days	Sat 6/29/13	Fri 7/12/13
45	RAA-05 (AGVIQ - including Fence/Gate Installation)	14 days	Sat 7/13/13	Fri 7/26/13
46				
47	Contingency Days	81 days	Sat 7/27/13	Tue 10/15/13
48	Navy/Battelle Approval	1 day	Wed 10/16/13	Wed 10/16/13
49	Commence Full Demobilization (Personnel and Equipment Barge)	1 day	Thu 10/17/13	Thu 10/17/13
50				
51	**Interim Report - Field Season 2013**	**219 days**	**Fri 10/18/13**	**Sat 5/24/14**
52	Internal-Draft (Development and Submittal)	60 days	Fri 10/18/13	Mon 12/16/13
53	Review/Comment Period on Internal-Draft Version	30 days	Tue 12/17/13	Wed 1/15/14
54	Draft Version (Respond to Comments, Development, & Submit)	15 days	Thu 1/16/14	Thu 1/30/14
55	Review/Comment Period on Draft Version	30 days	Fri 1/31/14	Sat 3/1/14
56	Draft-Final Version (Respond to Comments, Development, & Submit)	20 days	Sun 3/2/14	Fri 3/21/14
57	Review/Comment Period on Draft Version	30 days	Sat 3/22/14	Sun 4/20/14
58	**On-Board Review Meeting (Seattle, WA)**	4 days	Mon 4/21/14	Thu 4/24/14
59	Final Version (Post OBR Implementation & Submit)	30 days	Fri 4/25/14	Sat 5/24/14



Project Schedule
Non-Time Critical Removal Action at OU B-2
Former Adak Naval Air Facility, Adak , AK

Task | Critical Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Critical Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary | Group By Summary | Deadline

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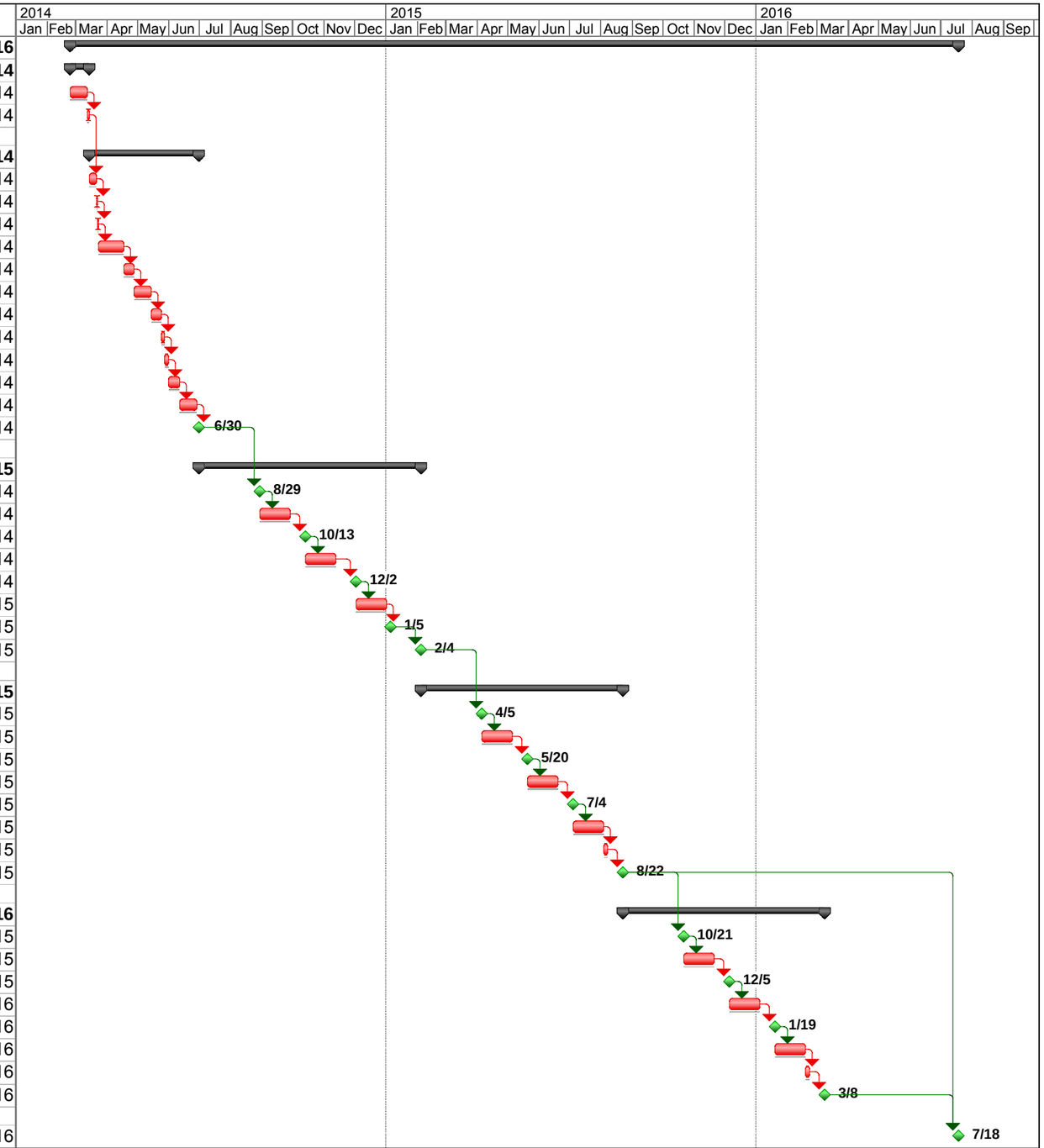
ID	Task Name	Duration	Start	Finish
1	**FIELD SEASON 2 - 2014**	**876 days**	**Mon 2/24/14**	**Mon 7/18/16**
2	**Mobilization**	**19 days**	**Mon 2/24/14**	**Fri 3/14/14**
3	Coordinate and Shipment of Field Equipment (Via Samson Barge)	17 days	Mon 2/24/14	Wed 3/12/14
4	Personnel Mobilization, Orientation, and Training	2 days	Thu 3/13/14	Fri 3/14/14
5				
6	**Removal Action at RAA-01 (OB/OD Area - 19 acres)**	**108 days**	**Sat 3/15/14**	**Mon 6/30/14**
7	Vegetation Removal & Surface Clearance	7 days	Sat 3/15/14	Fri 3/21/14
8	Grid Survey and Boundary Installation	1 day	Sat 3/22/14	Sat 3/22/14
9	Install BSIs	1 day	Sun 3/23/14	Sun 3/23/14
10	MEC Clearance (Mag-&-Dig/Excavation-pits)	25 days	Mon 3/24/14	Thu 4/17/14
11	DGM/Processing/Analysis/Target Selection	10 days	Fri 4/18/14	Sun 4/27/14
12	Target Reacquisition	17 days	Mon 4/28/14	Wed 5/14/14
13	Intrusive Investigation of Targets	10 days	Thu 5/15/14	Sat 5/24/14
14	MEC/MDEH Disposal	3 days	Sun 5/25/14	Tue 5/27/14
15	MDAS Flashing & Disposal	4 days	Wed 5/28/14	Sat 5/31/14
16	Restoration	11 days	Sun 6/1/14	Wed 6/11/14
17	Shipment of Field Equipment (Via Samson Barge)	17 days	Thu 6/12/14	Sat 6/28/14
18	Personnel DeMobilization	2 days	Sun 6/29/14	Mon 6/30/14
19				
20	**Interim Report - Field Season 2013**	**219 days**	**Tue 7/1/14**	**Wed 2/4/15**
21	Internal-Draft (Development and Submittal)	60 days	Tue 7/1/14	Fri 8/29/14
22	Review/Comment Period on Internal-Draft Version	30 days	Sat 8/30/14	Sun 9/28/14
23	Draft Version (Respond to Comments, Development, & Submit)	15 days	Mon 9/29/14	Mon 10/13/14
24	Review/Comment Period on Draft Version	30 days	Tue 10/14/14	Wed 11/12/14
25	Draft-Final Version (Respond to Comments, Development, & Submit)	20 days	Thu 11/13/14	Tue 12/2/14
26	Review/Comment Period on Draft Version	30 days	Wed 12/3/14	Thu 1/1/15
27	**On-Board Review Meeting (Seattle, WA)**	4 days	Fri 1/2/15	Mon 1/5/15
28	Final Version (Post OBR Implementation & Submit)	30 days	Tue 1/6/15	Wed 2/4/15
29				
30	**After Action Report**	**199 days**	**Thu 2/5/15**	**Sat 8/22/15**
31	Internal-Draft (Development and Submittal)	60 days	Thu 2/5/15	Sun 4/5/15
32	Review/Comment Period on Internal-Draft Version	30 days	Mon 4/6/15	Tue 5/5/15
33	Draft Version (Respond to Comments, Development, & Submit)	15 days	Wed 5/6/15	Wed 5/20/15
34	Review/Comment Period on Draft Version	30 days	Thu 5/21/15	Fri 6/19/15
35	Draft-Final Version (Respond to Comments, Development, & Submit)	15 days	Sat 6/20/15	Sat 7/4/15
36	Review/Comment Period on Draft Version	30 days	Sun 7/5/15	Mon 8/3/15
37	**On-Board Review Meeting (Seattle, WA)**	4 days	Tue 8/4/15	Fri 8/7/15
38	Final Version (Post OBR Implementation & Submit)	15 days	Sat 8/8/15	Sat 8/22/15
39				
40	**Closure Report**	**199 days**	**Sun 8/23/15**	**Tue 3/8/16**
41	Internal-Draft (Development and Submittal)	60 days	Sun 8/23/15	Wed 10/21/15
42	Draft Version (Respond to Comments, Development, & Submit)	30 days	Thu 10/22/15	Fri 11/20/15
43	Draft Version (Respond to Comments, Development, & Submit)	15 days	Sat 11/21/15	Sat 12/5/15
44	Review/Comment Period on Draft Version	30 days	Sun 12/6/15	Mon 1/4/16
45	Draft-Final Version (Respond to Comments, Development, & Submit)	15 days	Tue 1/5/16	Tue 1/19/16
46	Review/Comment Period on Draft Version	30 days	Wed 1/20/16	Thu 2/18/16
47	**On-Board Review Meeting (Seattle, WA)**	4 days	Fri 2/19/16	Mon 2/22/16
48	Final Version (Post OBR Implementation & Submit)	15 days	Tue 2/23/16	Tue 3/8/16
49				
50	Administrative Record and Project Close-Out	132 days	Wed 3/9/16	Mon 7/18/16



Project Schedule
Non-Time Critical Removal Action at OU B-2
Former Adak Naval Air Facility, Adak , AK

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

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17.0 MEC QAPP WORKSHEET #17 – SAMPLING DESIGN AND RATIONALE

(UFP-QAPP Manual Section 3.1.1)

This worksheet describes the project's DFWs and related tasks that are performed in conjunction with them to meet requirements and objectives. The Remedial Action Objective (RAO) for the NTCRA at OU B-2 RAAs is to detect, locate, investigate, identify, remove and dispose of MEC/MDEH and MDAS from the selected RAAs in accordance with the performance metrics specified in this MEC QAPP and its supporting documents.

17.1 General

The NTCRA at OU B-2 comprises the following RAAs: RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01. The typical sequence of the NTCRA field activities will be; site preparation, visual surface sweeps (in light vegetation areas) and/or technology-aided surface clearance (in heavy vegetation areas) to remove MPPEH and metallic debris 3-in and greater, limited vegetation removal (where required), DGM, reacquisition of target locations (survey location stakeout and measurement), intrusive investigation, and site restoration. During the NTCRA activities at the four RAAs and the seawall sweeps, USA will document the GPS location and take photograph of all MEC/MDEH items encountered. In addition, during field operations within these four RAAs, our field team will conduct the monthly seawall MEC surface clearance within the 21 acres RAA-05/ALSW-01 (also known as the Andrew Lake Seawall or ALSW-01). Table 17-1 provides summary information about each of the RAAs. Figure 17-1 shows the site configurations and RAA boundaries.

Table 17-1: Summary of RAA Information

Remedial Action Areas	RAA Activities and Sequence	RAA Area (acre)
RAA-01	• Instrument assisted surface clearance down to 6-in bgs, • Mechanically assisted intrusive investigation of the bottom of large craters a depth of 1.5-ft (0.5-m) and restore to holes grade, • Vegetation removal, • DGM; including data analysis and target selection, • Target reacquisition (survey location stakeout and measurement), and • Intrusive investigation of targets to a depth of 2-ft (0.6-m) with the option to further investigate deeper targets if required by the Navy.	19.30
RAA-02	• Visual surface sweeps to remove MPPEH and metal debris 3-in or greater, • Vegetation removal, • DGM; including data analysis and target selection, • Target reacquisition (survey location stakeout and measurement), and • Intrusive investigation of targets to a depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	73.70
RAA-03	• Visual surface sweeps to remove MPPEH and metal debris 3-in or greater, • Vegetation removal, • DGM; including data analysis and target selection, • Target reacquisition (survey location stakeout and measurement), and	146.85

	• Intrusive investigation of targets to a depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy. RAA-03 also includes a mortar impact area, commonly referred to as the "Lunch Rocks", on the ridge to the north of RAA-03 proper that will also be investigated. The boundary of the "Lunch Rocks" impact area will be determined following initiation of the field work.	
RAA-04	• Visual surface sweeps to remove MPPEH and metal debris 3-in or greater, • Vegetation removal, • DGM; including data analysis and target selection, • Target reacquisition (survey location stakeout and measurement), and • Intrusive investigation of targets to a depth of 4-ft (1.2-m), with the option to further investigate deeper targets if required by the Navy.	109.97
RAA-05/ALDA-01	• Visual surface sweeps to remove MPPEH and metal debris 3-in or greater, • Vegetation removal, • Mechanically assisted intrusive investigation of targets to a depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	4.70
RAA-05/ ALSW-01 *	• Monthly visual surface sweeps to remove MPPEH items from the cobble beach portion of the defined boundary of RAA-05/ALDA-01. The cobble beach area is defined as the seawall surf zone to the edge of the grassy area on the seawall). • Document the GPS location and take photograph of all MEC/MDEH items.	21.38

Notes:

* RAA-05/ALSW-01 is not part of this NTCRA. However, monthly surface sweeps will be conducted on the seawall portions of RAA-05.

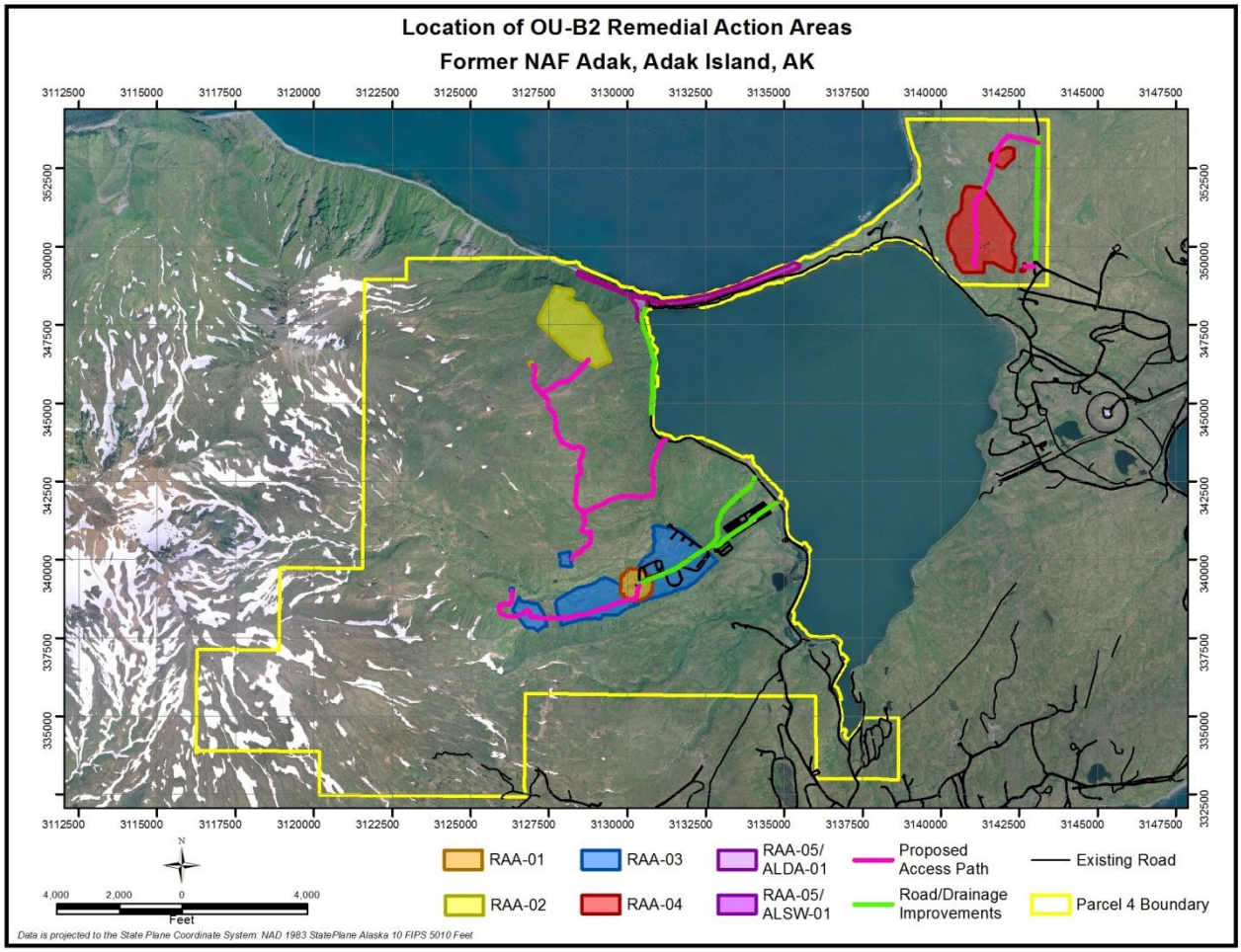

Figure 17-1: General Location of RAAs

The DFW and supporting documents are listed in Table 17-2. The QC sampling approach and inspection timelines for each DFW and how task completion is verified are listed in Worksheets #12, #34 and #35.

Table 17-2: Definable Features of Work Supporting Documents

Definable Features of Work	SOP	Supporting Document(s)
Mobilize and Prepare the Site	SOP 1, 2 and 3	MEC QAPP, APP/SSHP, EPP/WMP
Remove Vegetation	SOP 5	MEC QAPP, APP/SSHP, EPP/WMP
Perform Surface Clearance and Seawall Surface Sweeps	SOP 5	MEC QAPP, APP/SSHP, EPP/WMP
Conduct Digital Geophysical Mapping	SOP 2 and SOP 3	MEC QAPP, APP/SSHP, EPP/WMP
Reacquire Target Anomalies	SOP 7	MEC QAPP, APP/SSHP
Conduct Intrusive Investigations of Target Anomalies	SOP 8	MEC QAPP, APP/SSHP, EPP/WMP
Conduct Soil Sampling	SOP 14	MEC QAPP (Appendix B – MC QAPP), APP/SSHP, EPP/WMP
Dispose of MEC and MDEH	SOP 9	MEC QAPP, APP/SSHP, EPP/WMP

Definable Features of Work	SOP	Supporting Document(s)
Manage and Dispose of MDAS	SOP 10	MEC QAPP, APP/SSHP, EPP/WMP
Perform Incidental Road and Drainage Construction	None	MEC QAPP (Appendix C – Construction Work Plan), APP/SSHP, EPP/WMP
Site Restoration	None	MEC QAPP (Appendix C – Construction Work Plan), APP/SSHP, EPP/WMP
Manage the Project Data	SOP 13	SharePoint (http://websps1.battelle.org/sites/ADAK2008QA/default.aspx)
Perform Quality Control	None	MEC QAPP, APP/SSHP, EPP/WMP
Demobilize	None	MEC QAPP, APP/SSHP, EPP/WMP

17.2 Site Background and Previous Investigations

The former NAF Adak was established in August 1942 in response to the Japanese occupation of Kiska and Attu Islands in the Aleutian Island Chain earlier that year. Originally designated Mitchell Field, by the summer of 1943, approximately 100,000 U.S. Army personnel and 100 ships were stationed on Adak. In 1950, the U.S. Air Force took control of the airfield, renaming it Davis Air Force Base. In 1959, Public Land Order 1949 designated the northern half of the island for use by the Navy for military purposes. The OU B-2 areas, like other MEC areas on Adak, were used primarily during and just after World War II for military training purposes (for example, as firing ranges and target areas). Some areas dedicated for small arms training and MEC disposal were used until the late 1980s; others became dormant soon after the war. Other areas of Adak were dedicated to infrastructure and support of military operations.

Previous investigations in OU B-2 included initial assessments and preliminary site evaluations conducted between 1986 and 1996, which identified areas potentially contaminated with MEC. In 1997, a MEC survey was conducted by Explosive Ordnance Disposal Mobile Unit Eleven (MU11) Detachment Northwest, stationed at Naval Air Station Whidbey Island, Washington, as part of the RI for OU A. As a result of the 1997 OU A RI, a detailed archive search was begun in 1997 and completed in 1998. The results of this archival search identified 184 areas of potential concern (AOPC) which were used in a site investigation conducted in 1999.

After the 1999 site inspection, the Navy and regulatory agencies developed a CERCLA-like process for MEC assessment and remediation on Adak as part of a dispute resolution. It was acknowledged that the equivalent of a very detailed site inspection had already been conducted in the form of the 1999 site inspection, and that by incorporating the data into a preliminary assessment, the initial requirements of the CERCLA process for a preliminary assessment/site inspection could be fulfilled without performing additional site inspection. The preliminary assessment was performed to identify the AOPCs that required further evaluation or action (Foster Wheeler Environmental, 2000). The first step in this process was the development of an MEC conceptual site model (CSM) for Adak. This CSM was developed based on a review of the existing data, release and physical transport processes, and potential human and ecological receptors associated with OU B. The CSM was intended to encompass all historical ordnance uses on OU B and the expected exposure pathways associated with those uses. In the CSM, the AOCs are the primary sources of contamination, but they differ by the way they were used (impact areas, storage areas, open burn/open detonation areas, etc.).

The Project Team developed an AOPC assessment approach (the Level 1 Screen) that built on four screening criteria to categorize an AOPC: Likelihood of UXO contamination, Density of UXO contamination, Ordnance hazard severity, and Strength of archival and field evidence.

The Project Team developed the framework, the interrelationship among the criteria, and the factors relevant to each criterion. Phase 1 of the Level 1 screening process integrated a qualitative evaluation of the assumed or demonstrated likelihood, density, and potential severity of MEC contamination. An analysis of the relative strength of evidence supporting those assumptions was made to determine whether or not each AOPC represented a sufficiently significant hazard to warrant consideration of further

action. Further actions included additional investigations, evaluation in the FS, and immediate actions. Those sites that were rated as not posing an unacceptable ordnance-related hazard, as supported by an acceptable level of evidence, were judged to be appropriate for no further action and were eliminated from additional screening or consideration for further action. Sites having a low likelihood and density of contamination, and that were known or suspected to contain relatively low-hazard ordnance, were screened as no further action if the assumed CSM was supported by acceptably strong data. Those sites not screened as no further action were advanced to Phase 2 of the Level 1 screening process, where the need for further action (such as investigation or remediation) was evaluated. These included sites known or suspected to have low quantities of low-hazard ordnance, but not having an acceptable strength of data to support the assumed CSM. Some level of additional data collection or visual observation was needed in order to complete the hazard screening for these sites. The further action sites also included sites known or suspected to have higher quantities of ordnance or higher hazard ordnance. These sites were prioritized for further action (either investigation or cleanup), and a determination of the most appropriate form of action was made. Phase 2 of the screening process evaluated AOPCs with respect to the ease of access for assessment and exposure to ordnance. Sites with very limited access not only would be very difficult to assess, but also would not pose the same level of hazard as an accessible site containing the same type and quantity of ordnance. Sites with lower accessibility were judged to have a lower priority for action than those freely accessible to the public. After this phase of screening, AOPCs having a sufficiently high ranking for further action were evaluated to determine the most appropriate level of activities. This determination was based on the perceived qualitative risk for the AOPC (ordnance hazard ranking) and the relative access for public exposure. These sites became AOPCs and were evaluated by using the criteria in the Level 2 Ordnance and Explosives Sampling Methodology for selection of appropriate assessment and/or analysis methodologies for that type of site.

After Phase 2 of the OU B screening process, 183 AOPCs were selected for preliminary assessment screening. Of this number, 78 were found to meet the requirements for no further action based on historical and physical evidence indicating that the site posed little or no qualitative risk to humans. Twenty-six AOPCs were selected for site inspection because of a lack of evidence with which to assess potential risk. Seventy-seven of the AOPCs screened were referred for RI based on the nature and strength of available field data and/or the documented historical land use. These AOPCs included most of the impact areas on Adak, as well as the range areas at Andrew Lake and most of the sites where ordnance was found during the 1999 site inspection. One site (RG-01) was advanced directly to the FS stage based on previous remediation or special circumstances that prevented investigation. Most of the 183 sites discussed above are Operable Unit B-1 (OU B-1) sites that have already been remediated and/or approved for no further action.

In 2000, an RI/FS was performed to collect and analyze data at sites potentially contaminated with MEC in selected locations of OU B at the former Adak Naval Complex. Specifically, sites were selected that were intended for inclusion in the transfer of more than 43,000 acres to TAC for civilian reuse. These sites were placed in a subgroup called OU B-1. The remaining AOCs were segregated into a second subgroup (OU B-2) for future evaluation and potential transfer. The data collected during this investigation, and from previous investigations, were used to provide input to an Adak-specific Explosives Safety Hazard Assessment (ESHA) designed by the Project Team. The ESHA tool analyzes the results of the MEC portion of the RI and determines the potential magnitude of the risk/hazard present.

During 2000–2001, frost heave, temperature, moisture, and surrogate ordnance displacement were measured at four sites on Adak to determine the influence of frost heave on buried surrogate munitions. Soil temperatures at the higher elevation test sites reached a low of -10 °C during the study; however, the soil in the test areas did not freeze deeper than 8-in (20.3-cm) bgs. Measurements before and after the winter season on Adak showed no trend of movement due to frost heave action on buried surrogate munitions. Test data indicated that 2000–2001 winter temperatures were typical of those recorded during the past 50 years.

In 2001, assessment and remedial actions for UXO-related contamination were conducted in 19 AOCs, including two AOCs under consideration in the OU B-2 FS. These two sites (C1-01 and RR-03) were sampled at three locations to determine whether ordnance-related chemicals were present in the soil. The sites were selected for sampling based on the discovery of munitions that were breached, allowing

the filler to contact the soil immediately surrounding the items. The soil samples collected in these two AOCs were analyzed for 14 ordnance-related constituents, but no detectable levels of the chemicals were found.

Historical records indicate that chemical warfare materials was managed on Adak, but extensive research and on-island field investigations have been conducted and no evidence of chemical warfare materials or residuals has been discovered to date.

In 2002, assessment and remedial actions for UXO-related contamination were conducted in 17 AOCs, including one AOC considered for inclusion in the OU B-2 FS [(the former Lake Jean Disposal Area (LJ-02A), which was identified in 2002 as a possible location for the former J.M. Candidate Chemical Weapons Disposal Area (JM-01)]. Previous reports for the general vicinity stated that items potentially have been buried to depths as great as 14-ft (4.3-m) bgs. An EM31 ground conductivity meter was used during the 2004 field season with line spacing of 11.5-ft (3.5-m) at the LJ-02A site. Although no anomalies indicative of trenches were visible in the data, three point source anomalies were identified. A UXO QC team intrusively investigated these targets on July 26, 2004, but no MEC or other items of concern were found.

As a result of past military use, the former Andrew Lake 40-mm Rifle Grenade Range (RG-01) part of OU B-2 was determined to be a potential safety risk to the public, site personnel, and biological receptors. Historical documentation indicated that seven dud-fired, high-explosive 40-mm grenades were present on the range, as well as one 60-mm mortar and one 81-mm mortar. These items were not removed from the range at the time of discovery because of their hazardous nature. On the basis of this anticipated hazard, the Navy began an NTCRA at RG-01 in 2006. Field work in 2006 indicated that the historical documentation significantly underestimated the number of MEC items present in RG-01. In 2006, USA performed the NTCRA on RG-01 and recovered and destroyed a total of 96 live MEC items. During the 2006 field season, one grid was expanded (stepped-out) because of the discovery of MEC near the eastern boundary of the range and the Adak requirement for a 15-m buffer around MEC. Five additional expansion areas were also identified on the eastern boundary, but because of time constraints, the decision was made to delay the investigation of these grids until the following season.

In 2008, USA performed an analog clearance on the five RG-01 expansion areas identified during the 2006 NTCRA prior to follow-on DGM surveys and encountered MEC within the 15-m buffer zone that required an additional analog step-out. A 100 percent DGM survey of accessible areas (slopes < 30 degrees, no obstacles or standing water) at RG-01 was performed after completion of the analog clearance and analog step-outs of grids. During the DGM clearance, MEC was encountered near boundaries of four grids and it was necessary to perform a step-out of the grids to maintain the 15-m buffer around MEC. The additional step-outs were first analog cleared and then DGM surveyed and cleared. MC sampling and testing were performed at the locations of the two breached munitions, in accordance with the approved MC QAPP (Appendix B). One of the locations showed cyclotrimethylene trinitramine (RDX) levels above project screening levels but below action levels, no additional sampling was performed at the location.

17.3 General Technical and Operational Approach

The technical approach to the NTCRA at the OU B-2 RAAs follows a standard MEC remedial approach of prepare-surface, clear-map-reacquire-investigate-dispose, and restore model including managing the resulting MPPEH in compliance with Federal, state and local requirements. Soil sampling of breached munitions or discolored soil is covered in the MC QAPP (Appendix B). In September of 2012, USA installed three IVSs to support the NTCRA operations at OU B-2 RAAs. Details of the IVS installations are included in Appendix G of this MEC-QAPP. Appendix I contains maps with the grid layout and numbering scheme and a data file containing the grid corner points to be used for stakeout. The general operational approach is illustrated in Figure 17-2. The activities comprising the operational approach are:

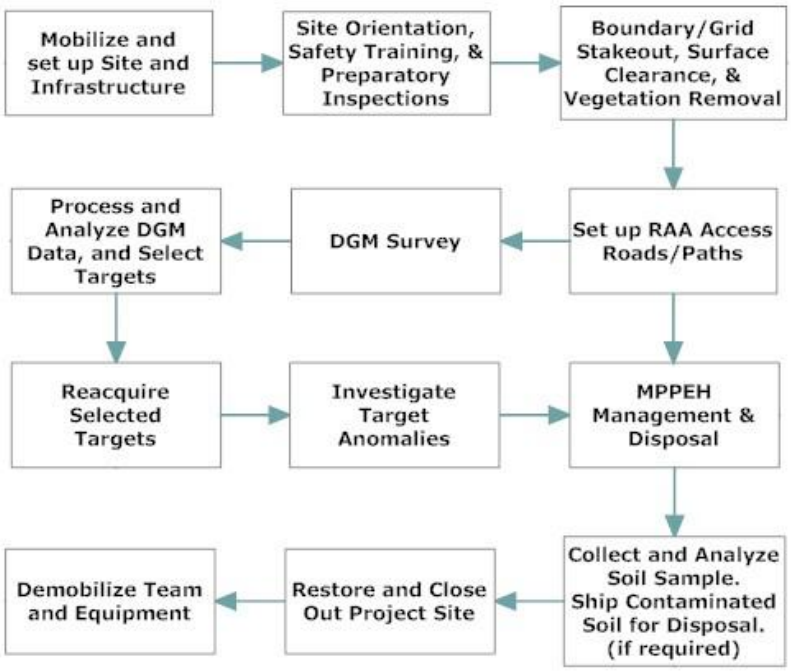

Figure 17-2: OU B-2 NTCRA Operational Approach (Excluding Seawall Sweeps)

- Mobilization, Site Setup and RAA Preparation
  - Mobilize personnel, facilities and equipment to the site.
  - Conduct site orientation and operations training.
  - Perform the preparatory phase inspections.
  - Establish the working infrastructure (e.g., communications, GPS network, explosives storage facilities, MDAS storage and processing facilities, grid stakeout, etc.)
  - Conduct a surface clearance in RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01.
  - Cut the overgrown vegetation.
  - Perform analog MEC subsurface clearance (inside RAA boundaries), to two feet below mineral soil surface, prior to installation of the temporary access paths/drainage improvements.
  - Perform the incidental drainage and establish temporary access paths.

- Collect DGM data and generate a DGM target list (where required)
  - No DGM data needs to be collected for RAA-05/ALDA-01 or RAA-05/ALSW-01.
  - Collect DGM data in RAA-01, RAA-02, RAA-03, and RAA-04 using the EM61-MK2.

- Reacquire DGM anomalies and mark the interpreted DGM target locations for intrusive investigation
  - Mark the location using a uniquely numbered pin flag and measure the stakeout location.
- Investigate all of the DGM targets from the DGM data to the required spatial requirements of Rcrit (2.5-ft (0.762-m)) and either 2-ft (0.6-m) (RAA-02 and RAA-03) or 4-ft (1.2-m) bgs (RAA-04) according to the following criteria.
  - An investigation is considered completed when:
    - Each interpreted DGM target location has been searched to a maximum Rcrit (2.5-ft (0.762-m)) and

        - 2-ft (0.6-m) (RAA-01, RAA-02 and RAA-03) or
        - 4-ft (1.2-m) depth (RAA-04)
    - Below the mineral surface of the pin flag position or to the confirmed DGM target source.
    - Either no signal remains with a handheld detector or
    - The excavation has been identified and verified by QC as saturated with fragmentation and no metal larger than 3-in (7.6-cm) in any dimension remains or
    - It is identified and verified by QC as cultural or construction material which cannot reasonably be removed or
    - The target is verified by QC as deeper than the excavation requirement for that RAA or
    - The excavation fills with water and cannot be sufficiently dewatered for safe investigation, verified by the UXOSO and QC. If dig will be abandoned, QA will be notified and offer the opportunity to verify real-time.
    - The excavation is backfilled and leveled to grade.
- Positively identify all DGM target source materials using a three-tiered inspection process to classify whether the MPPEH item is MEC/MDEH or MDAS and determine whether it is safe to move or requires treatment using the BIP method.
- If breached munitions, discolored soil or unusual odors are detected during intrusive investigations, take soil samples to determine if explosives are present. If explosives are detected, soil removal will be completed in accordance with the MC QAPP (Appendix B).
- Store safe-to-move MEC/MDEH for scheduled treatment weekly or at the end of each field season.
- Conduct BIP procedures for items that cannot be moved and the area can withstand a high order detonation.
- Inspect, segregate, store and recycle or demilitarize and recycle MDAS. MDAS must be inspected, certified and verified prior to transporting to storage or processing through the TFU and shipping off-island for final disposal.
- Schedule demolition operations to dispose of the MEC/MDEH stored in the storage magazine.
- Perform QC for each DFW using the three phases of control methods.
- Restore the site by removing pin flags, backfilling excavations, removing the temporary roads, repairing road surfaces and UV trails and re-seeding, as required by the EPP (Appendix E).
- Demobilize all personnel, equipment and facilities.
- Gather and manage project data.

In addition to the tasks mentioned above, a monthly surface sweeps of RAA-05/ALSW-01 will be conducted. Sweep tasks include:

- Establishing a sweep line of qualified personnel to walk the ocean-side of the seawall while visually looking for MPPEH.
- Positively identify suspected munitions-related materials using a three-tiered inspection process to classify the item and determine whether it is safe to move or requires BIP disposal.
- Document the GPS location and take photograph of all MEC/MDEH items.
- Store safe-to-move MEC/MDEH for scheduled disposal.
- Conduct BIP procedures for items that are deemed not safe to move and the area can withstand a high order detonation.
- Inspect, segregate, store and recycle or demilitarize and recycle MDAS. MDAS must be inspected, certified and verified prior to transporting to storage or processing through the TFU and shipping off-island

- Schedule demolition operations to dispose of the MEC/MDEH stored in the explosives magazine.
- Perform QC for each DFW using the three phases of control methods.
- Gather and manage project data.

Based on the previous work accomplished, the ordnance expected ranges in size from 20-mm through 81-mm mortar. USA is prepared for both scheduled disposal operations and BIP operations during the course of the NTCRA at OU B-2.

Individuals requesting entry into the EZ must demonstrate a legitimate need for access and obtain authorization from the responsible PM. If visitors submit their access request prior to the site visit, it will ensure access prior to arrival. If an individual arrives on site and requests entry to the EZ, depending on the phase of the operation, they may not be granted access although they have a legitimate reason. Authorized visitors must:

- Receive a site-specific safety briefing from the UXOSO prior to entry
- Acknowledge in writing receipt of the safety briefing
- Be escorted by a UXO qualified person at all times while in the EZ
- Wear required PPE if leaving the vehicle
- Not take any photographs unless authorized prior to entry.

The UXOSO will determine whether the risk is acceptable to allow visitors on site within the EZ, based on the planned operations for that day. The UXOSO will notify NOSSA whenever access to an EZ is granted.

17.4 Surface Clearance

Preceding vegetation removal, UXO teams will perform a visual surface sweep to locate and flag any surface MPPEH, and other metallic debris that would impede the vegetation removal or the DGM surveys. Any MPPEH located will be mark with flagging material that protrudes above the vegetation so the vegetation removal teams can avoid them. All large debris will be moved outside the RAA boundaries but is to remain inside Parcel 4. Surface clearance will be conducted in compliance with the documentation listed in Table 17-2.

Visual surface sweep will be conducted in RAA-01, RAA-02, RAA-03, and RAA-04 prior to DGM and at RAA-05/ALDA-01 prior to initial vegetation clearance. For RAA-01 only, technology-aided surface clearance will be conducted using the White's DFX-300 to remove MPPEH from the surface down to 6-in bgs. The purpose of the surface clearance is to locate and remove surface MPPEH and to locate and remove obstructions (e.g., metallic objects and large debris) that may interfere with the DGM surveys. These clearance activities will be performed IAW SOP 5.

In addition, USA will conduct a monthly visual surface sweeps to remove MPPEH items from the cobble beach portion of the defined boundary of RAA-05/ALDA-01. USA will document the GPS location and take photograph of all MEC/MDEH items. The cobble beach area is defined as the seawall surf zone to the edge of the grassy area on the seawall). RAA-05/ALSW-01 boundary is shown in Figure 17-3.

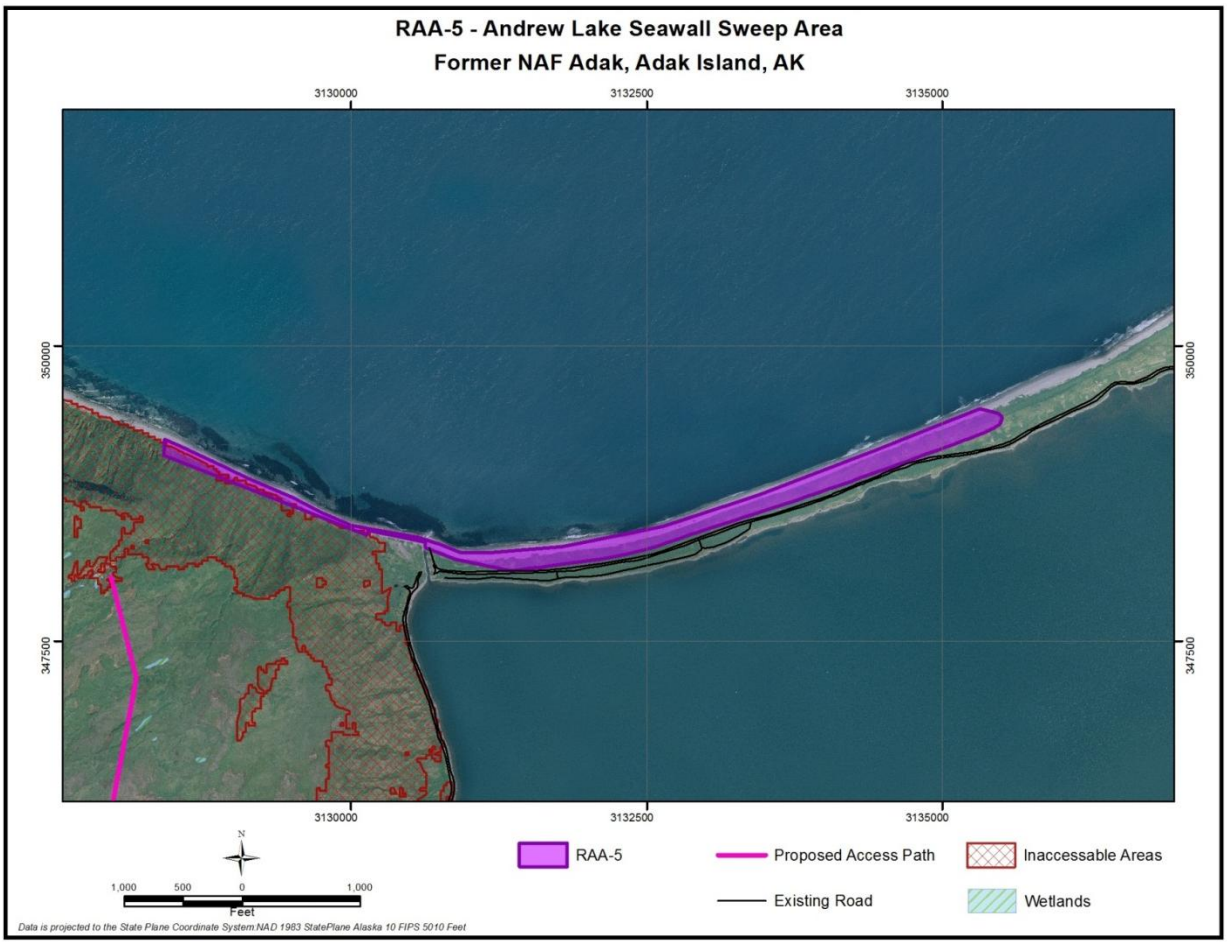

Figure 17-3: RAA-05/ALSW-01 Boundary

17.5 Vegetation Removal

The RAAs will require some level of brush clearance (grass cutting) before MPPEH-related activities can be performed. The primary reason for cutting the grass is to provide better visibility of any surface MEC and/or to prevent the high and often wet grass from impeding the progress of the DGM teams or causing malfunctions of the DGM sensors, thereby affecting the quality of the data. Both mechanized and manual methods will be used to cut the vegetation to facilitate the MPPEH clearance effort. Where appropriate for use, lightweight amphibious grass cutting machinery with mower deck (e.g., Marsh Master) and/or Argo towed-behind mowers will be used to cut the grass. For manual method, weed eaters with metal blades and/or self-propelled walk behind mowers will be used. Vegetation is cut as close to the ground or tundra surface as safely possible but not to exceed a maximum height of 6 in. Only grass will be cut. Tundra mat will not be removed.

17.6 Digital Geophysical Mapping

Digital Geophysical Mapping (DGM) teams will collect geophysical data in RAA-01, RAA-02, RAA-03, and RAA-04. No DGM will be conducted at RAA-05/ALDA-01 as only mag and dig/excavation procedure will be used to clear subsurface anomalies at this site. The objective is to collect DGM data over 100% of the accessible area within each RAA. DGM will be conducted in strict compliance with the documentation listed in Table 17-2 and in the general sequence shown in Figure 17-4.

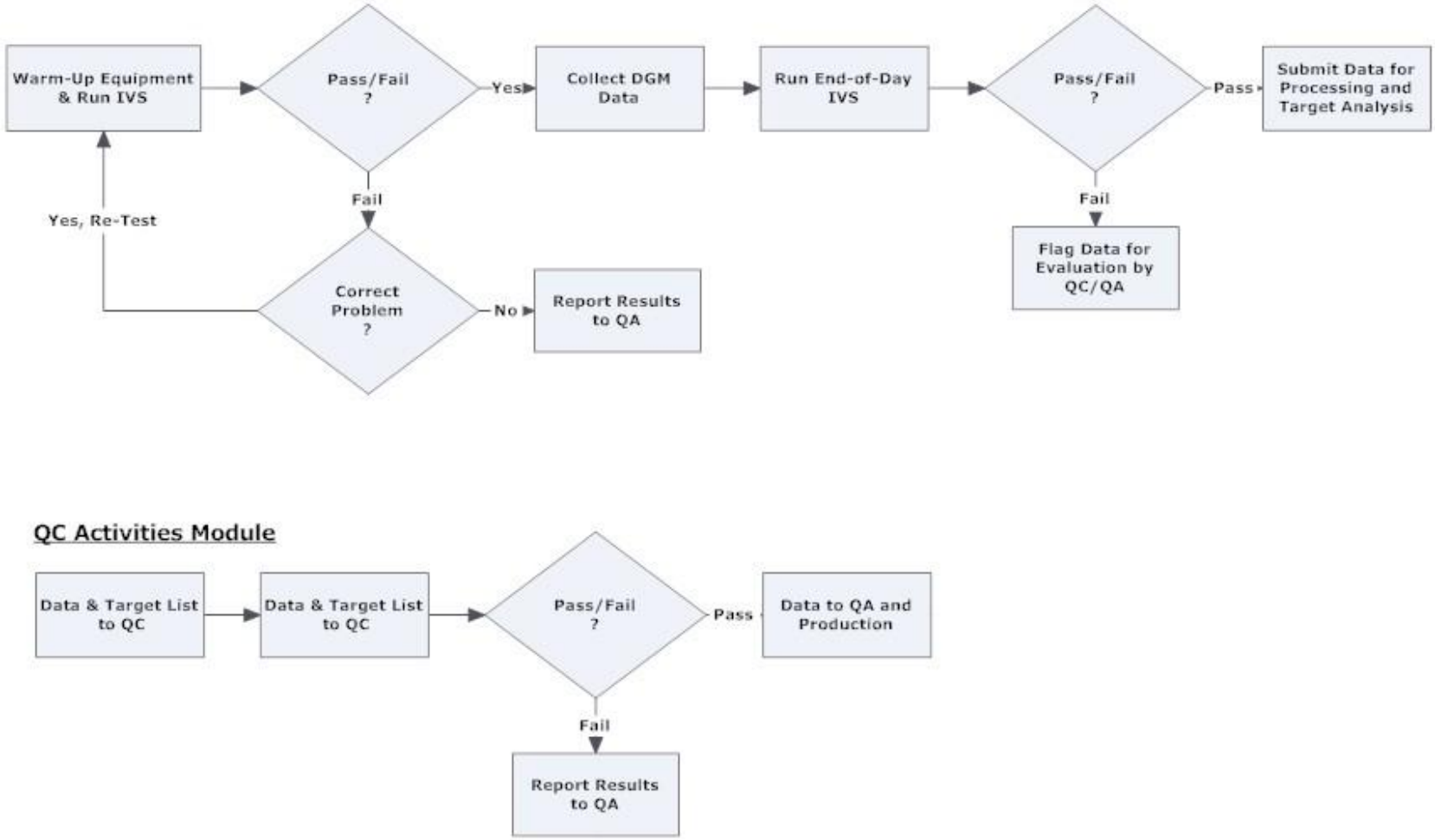

Figure 17-4: DGM Process Flow Diagram

- An IVS will be sampled twice daily; once before any data collection begins and once upon completion of data collection for the day. The results of the IVS testing along with the data will be sent to QA daily. Note that the contractor may also perform other DGM system tests as specified by SOP 2.
- DGM crews will utilize the Geonics EM61-MK2 as the geophysical detector, as the GSV relies on physics-based modeling and historical measurements of the response of this instrument. The EM61-MK2 system response has been modeled and proven to compare very well to measured data. Also, this detector has been proven through prior fieldwork experience on Adak.
- Recent (2008) investigations at the former NAF Adak used geophysical and positional instruments, equipment, platforms, personnel, and data processing techniques as shown below:
  - EM61-MK2 geophysical sensors
  - High-resolution RTK DGPS rigidly mounted on the EM61-MK2
  - "Litter Mode" (refer to Figure 17-5). Note, if an alternate deployment mode (e.g., towed array) is used, it must first pass the IVS.
  - UXO technicians, craft labor, and geosciences field operators
  - Digital data processing with automatic and manual anomaly selections.

The system will be used in a configuration determined during the IVS, with the lower coil approximately 15-in (±1 in) (0.38-m ± 2.54-cm) above the walking surface (or as established based on the IVS results). This distance will be measured and verified by field personnel prior to each data acquisition session. If terrain or vegetation characteristics prevent the lower coil from being used at the intended height, the actual coil height used must be documented by the field crew

Figure 17-5: Two-Man "Litter Mode" Configuration

The DGM teams will document inaccessible areas during data collection. In OU B-2, inaccessible areas are defined as:

- Areas with a slope greater than 30 degrees (verified with an inclinometer); or
- Areas with water (standing or running) which makes it either unsafe or impossible to collect DGM data; or Areas with debris (e.g., building foundations, concrete structures, target assemblies, etc.) which cannot be removed and which make it either unsafe or impossible to collect DGM data.

Figure 17-6 and Figure 17-7 are examples of the required documentation for an inaccessible area.

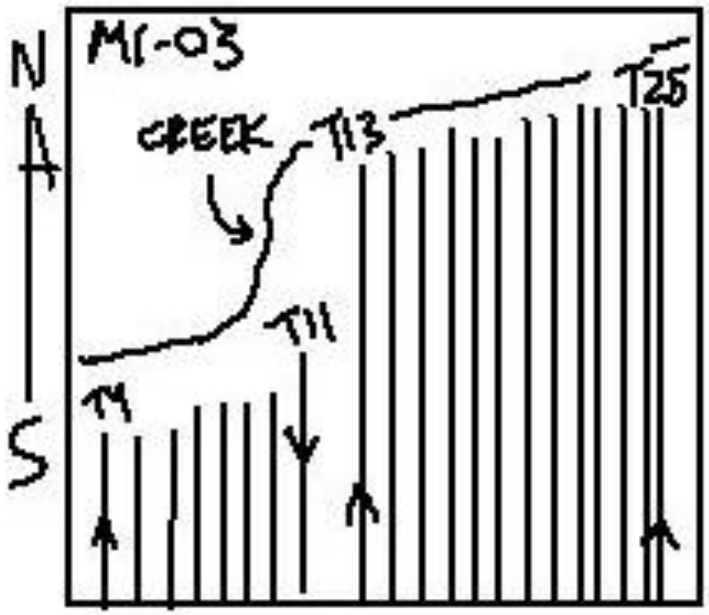

Figure 17-6: Documentation Example for an Inaccessible Area

Figure 17-7: Documentation Example of an Inaccessible Standing Water Area

In addition to the maps or forms, GPS track logs will be used to define the boundaries of inaccessible areas. The DGM data will be processed and targets selected per procedures in SOP 3. Target selection thresholds for the RAAs that require DGM are provided in Appendix F (DGM Anomaly Pick Thresholds).

17.7 Reacquire Target Anomalies

Reacquisition of target anomalies (survey location stakeout and measurement) from the DGM data set will be conducted in accordance with the documents cited in Table 17-2. Figure 17-8 shows the general work sequence to be followed.

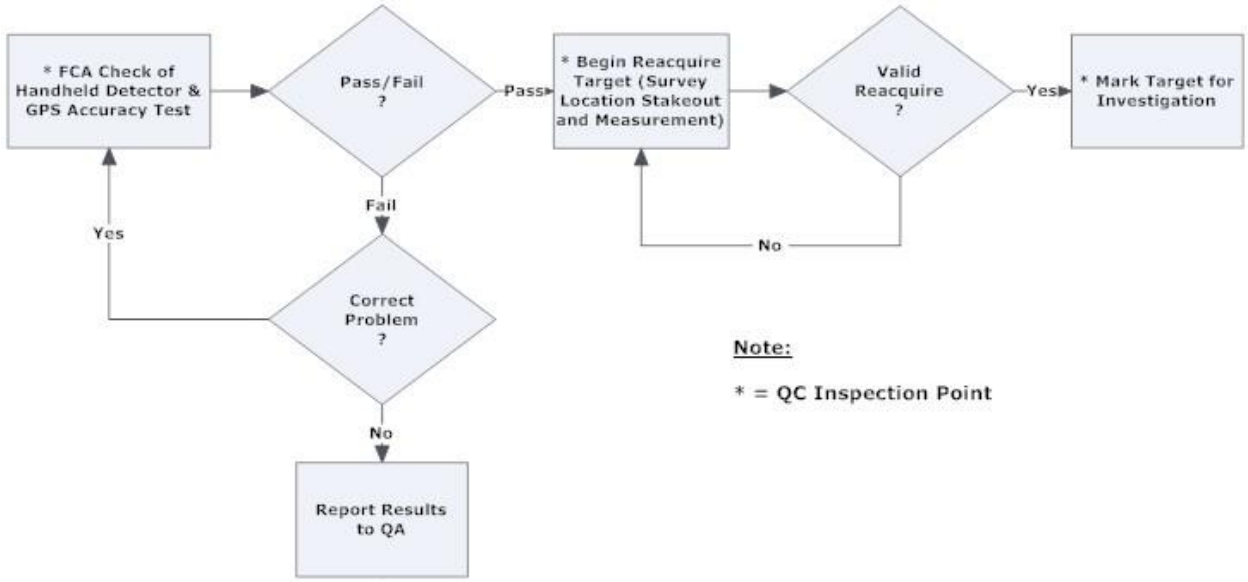

Figure 17-8: Target Reacquisition (survey location stakeout and measurement) and Marking Work Sequence

Using the GPS rover unit, the Reacquisition Team navigates to the selected DGM target location taken from the DGM data and marks the location with a pin flag containing the unique target number. The Team measures the point coordinate in the RTK DGPS data logger.

17.8 Intrusive Investigations of DGM Targets

The intrusive investigation team is typically comprised of a UXO Technician III (Team Leader) and up to three, 2-man dig teams. Each dig team has at least one UXO Technician II and may have a UXO Technician I. The teams may be staffed with an equipment operator and mini-excavator to assist in removing the overburden from single anomalies and to assist in excavating larger anomalies or burial pits when encountered. Final team configurations are flexible. The teams conduct the work following the procedures specified in the documents referenced in Table 17-2. All personnel involved undergo a preparatory phase inspection and review and sign the acceptance statements in the SOPs prior to beginning operations. The teams work on a “by the grid” basis for safety, accountability, data management, and QC.

When the team occupies the position, the target is checked using a White’s DFX-300 handheld metal detector to confirm its exact location. Each DGM target location is searched to a maximum Rcrit (2.5-ft (0.762-m)) and 2-ft (0.6-m) (for RAA-01, RAA-02 and RAA-03), or 4-ft (1.2-m) (RAA-04) depth below the mineral surface of the pin flag position or to the confirmed DGM target source. The investigation is complete when either:

- There is no remnant analog response with a handheld detector; or
- The excavation has been identified and verified by QC as saturated with fragmentation and no metal larger than 3-in (7.6-cm) in any dimension remains; or
- It is identified and verified by QC as cultural or construction material which cannot reasonably be removed; or
- The target is verified by QC (using large coil Vallon metal detector) as deeper than the excavation requirement for that RAA; or
- The excavation fills with water and cannot be dewatered; verified by UXOSO and QC that the water recharge rate is unsafe for investigation and,
- The excavation is backfilled and leveled to grade.

Note: A “no find” is defined as no analog response on the handheld metal detector above background within 2.5-ft (0.762-m) of the coordinate location from the DGM data. Any response on the handheld detector, regardless of perceived source (e.g., hot rocks, rust, etc.) constitutes a valid target and will not be recorded as a no find and will be investigated and documented.

Figure 17-9 illustrates the general sequence of actions for intrusive investigation of target anomalies. The QC team verifies 100% of reported no finds with a large coil Vallon.

Grass or tundra mat will be cut and rolled back away from the excavation site or cut into a “plug” and removed from the excavation site prior to any digging. Upon completion of the investigation and per the sequence in the SOP, the hole will be backfilled and the grass or tundra mat will be replaced and pressed down to make contact with the soil. All excavation depths will be measured from the top of the mineral surface layer.

All materials discovered during DGM target intrusive investigation are considered MPPEH. MPPEH is to be inspected, documented and segregated into two categories: MEC/MDEH or MDAS. MDAS is sub-categorized into “Demilitarization Required” or “No Demilitarization Required” and is inspected, segregated, stored and secured in appropriately marked containers within the RAA or sited storage facility awaiting thermal flashing.

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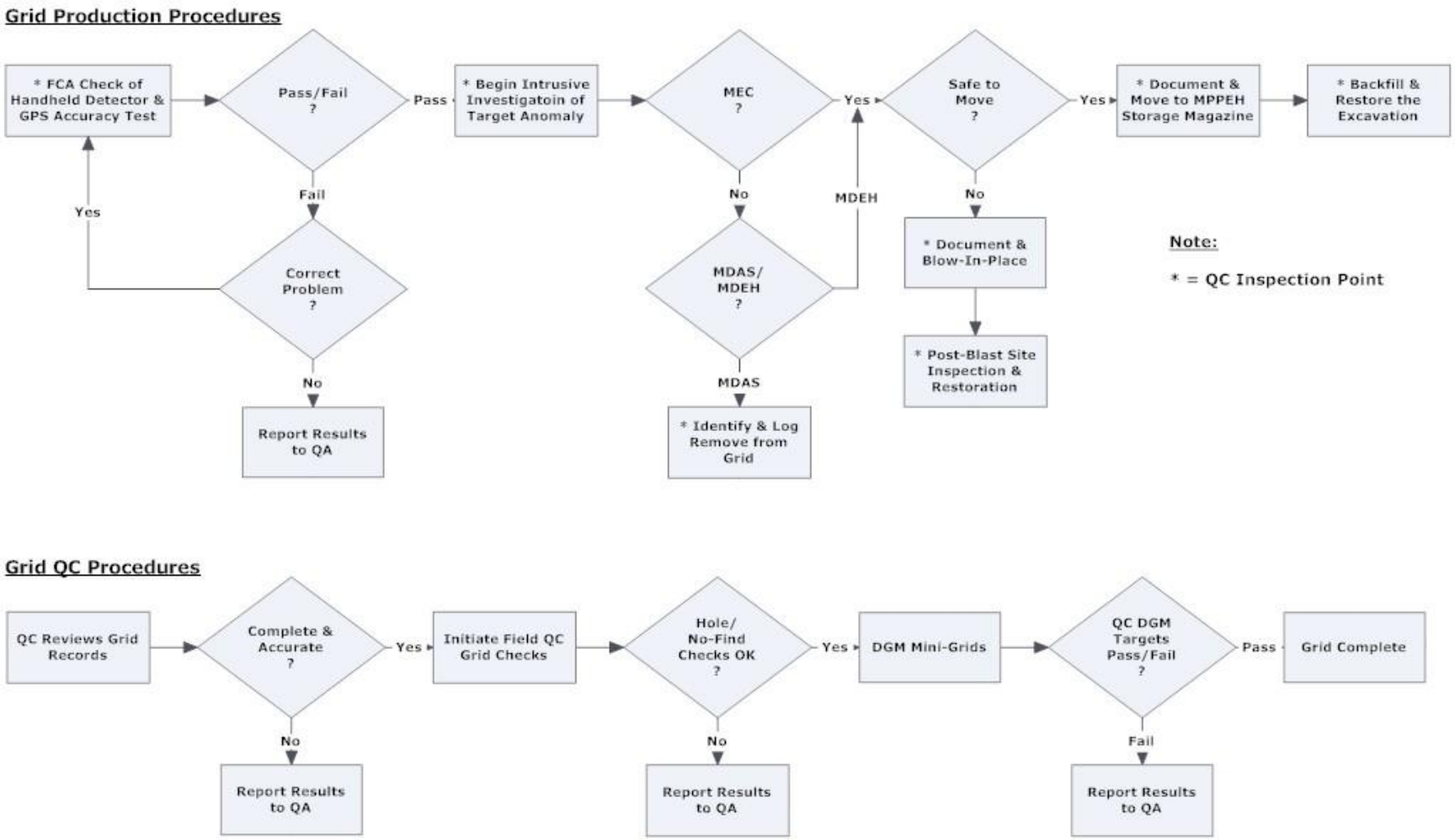

Figure 17-9: General Work Process for Intrusive Investigation of Target Anomalies

When MPPEH items are discovered, they are inspected and positively identified using a three-tiered inspection process: Inspected first by the UXO technician discovering it, second by the Team Leader and third by the SUXOS. MEC/MDEH is photographed and as much information as possible is recorded on the dig sheet and in the Team Leader's logbook. Recorded data include nomenclature (if known), type (projectile, mortar, rocket, mine, deck marker, etc.), size, physical condition, fuzed or unfuzed and fuze type by function (e.g., point detonating, mechanical time, etc.), condition (e.g., fired or unfired, armed or unarmed), filler if known, GPS coordinates (if different from the relocated position) and depth. One hundred percent of MEC/MDEH items are inspected using this three-tiered inspection process. Figure 17-10 illustrates the methodology used to identify and manage the DGM target source.

The SUXOS or UXOSO is required to inspect 10% of the MDAS prior to placing in storage. Prior to off island shipment, a NAVFAC NW CO-authorized inspector is required to inspect and certify 100% of MDAS. MDAS is recorded by the depth recovered and a brief description is documented in the Comments block of the dig sheet. Individual weights for MDAS are not required, however the numerical valuations shown in Table 17-3 are used to categorize the relative size/weight of the item(s) removed.

The total MDAS weight by area is documented by the Team Leader at the end of each workday. Hot rocks or hot soils are documented on the dig sheet as MDAS in the DGM target Type column with "geologic" noted in the DGM target Comments block. No finds are documented in the DGM target Type column as "No-find". When operations are finished at a target site, the team moves to the next closest target and repeats the process.

All MEC/MDEH items require a 15-m buffer. Therefore, whenever a MEC/MDEH item is found within 15-m of any border of an RAA, a step-out grid is required. Figure 17-11 illustrates two step-out grids that were mapped and investigated in 2008 as a result of MEC/MDEH being located in AOC HG-01. The step-out grid is a 30-m by 30-m grid which is centered on the MEC/MDEH item. The step-out grid requires 100% DGM mapping, processing and target selection the same as for any other grid within that RAA. The target anomalies are intrusively investigated and if additional MEC/MDEH is found, another step-out grid is centered and mapped. This procedure continues until the 15-m buffer is established.

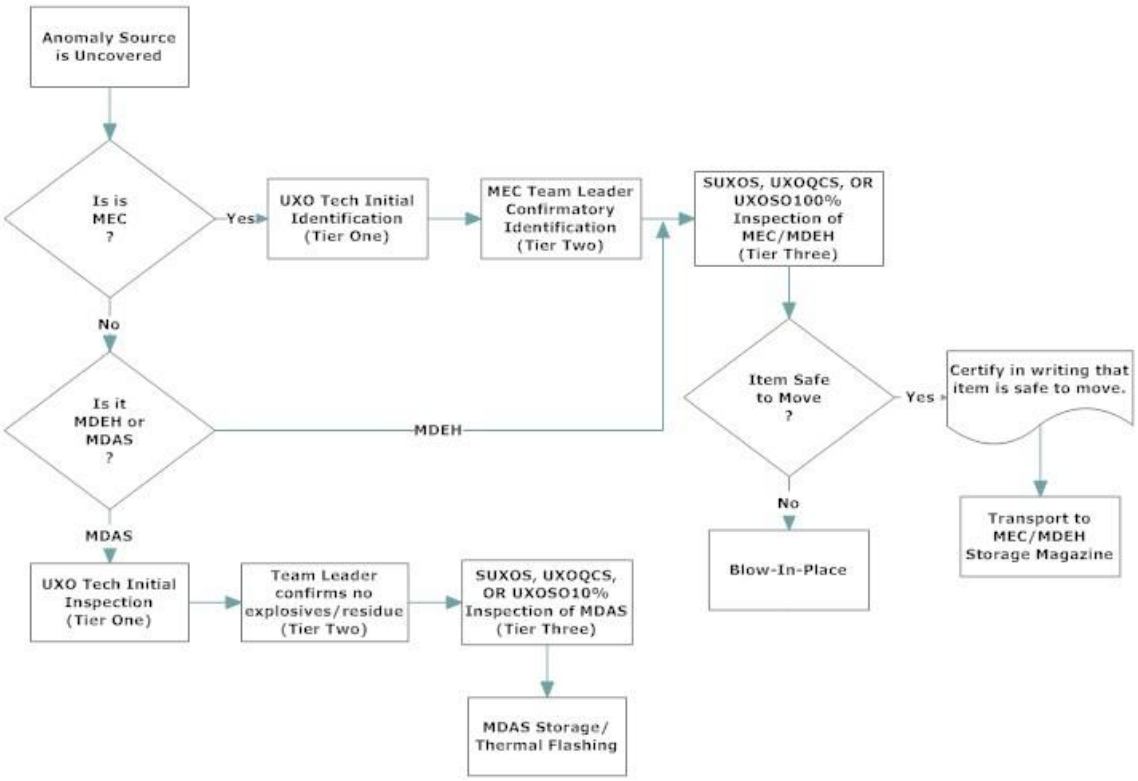

Figure 17-10: Detailed DGM target Identification and Management Process Diagram

Table 17-3: Numerical Values to Use for MDAS on the Dig Sheets

Number to Assign MDAS on the Dig Sheet	Relative Size/Weight
1	< 2-in (3-cm) in any dimension; < ¼ pound in weight
2	< 3-in (7.6-cm) in any dimension; ¼ to ½ pound in weight
3	> 3-in (7.6-cm) but < 5-in (12.7-cm) in any dimension; ½ to 1 pound in weight
4	> 1 pound but < 5 pounds in weight; any dimension
5	> 5 pounds in weight; any dimension

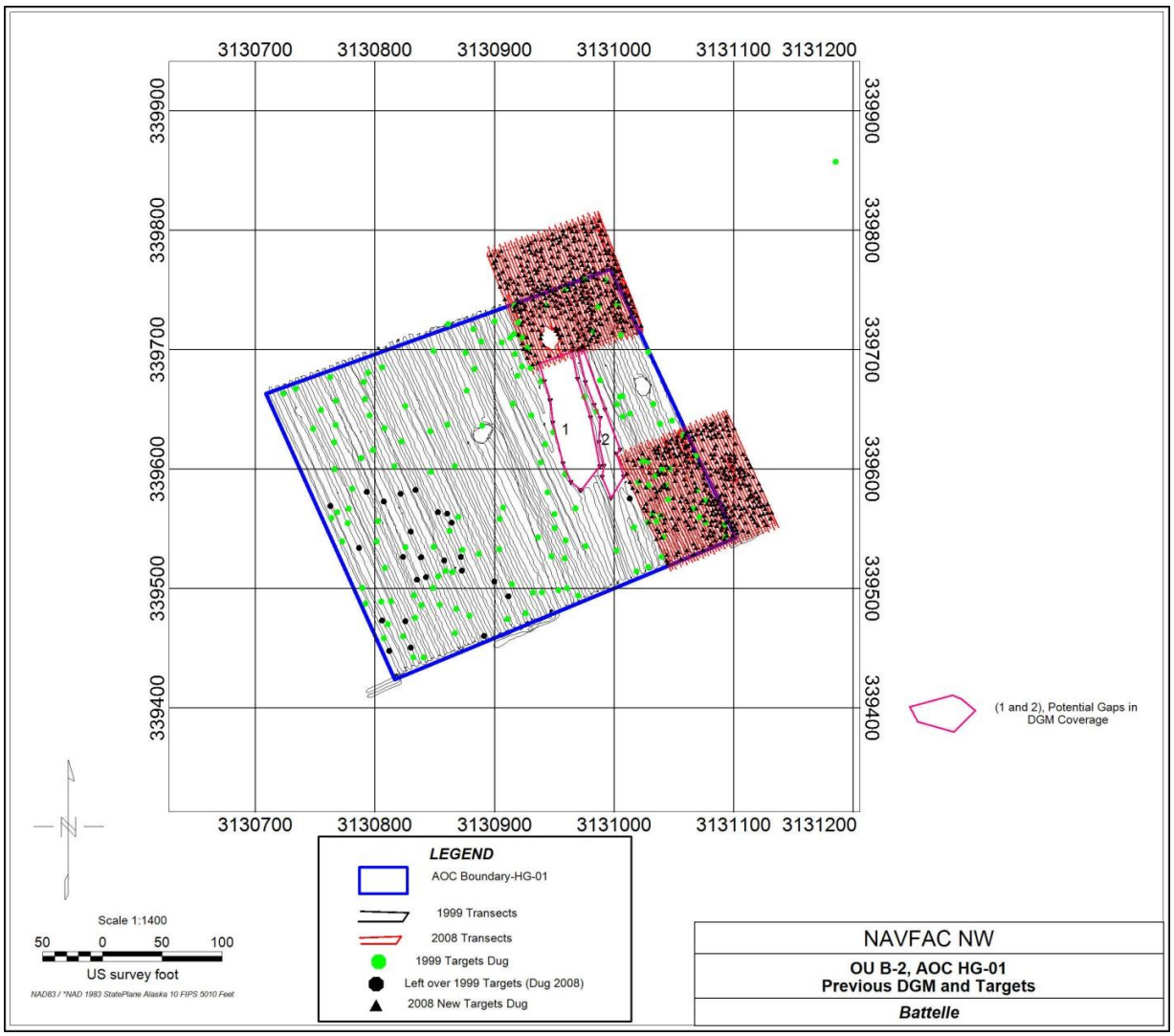

Figure 17-11: Illustration of Two 30-m x 30-m Step-out Grids

17.9 Mechanically Assisted Intrusive Investigation

Areas of saturated anomalies have been identified in RAA-01 and RAA-05. In these areas discrete anomaly investigation is not feasible and mechanical excavation of these saturated areas is required. For mechanized excavation, USA will use a tracked excavator armored with a 3.5-in plexi-glass blast-shield to assist the intrusive investigation through the trash, debris, soil, and cobbles at these RAA's. A wheeled front end loader will assist in backfill and maintaining contours at the site.

For RAA-01 only, technology-aided surface clearance will be conducted using the White's DFX-300 to remove MPPEH from the surface down to 6-in bgs. The purpose of the surface clearance is to locate and remove surface MPPEH and to locate and remove obstructions (e.g., metallic objects and large debris) that may interfere with the DGM surveys.

The surface of RAA-01 is covered by tundra with shallow ground water and saturated soils interspersed by multiple large craters associated with the areas previous use as an OB/OD area. See Figure 17-12 below. The Removal Action at this RAA will include investigation of the bottom of the existing demo holes (craters) located within RAA-01. This mechanically assisted investigation is necessary to ensure no MEC hazards remain at this site and to prepare a clear accessible site for the follow on DGM survey.

Prior to starting the investigation of the craters, large-capacity water pumps are used to drain the craters until the bottom is exposed. The armored excavator will reach down into the craters to remove the bottom 1.5-ft (0.5-m) of the hole and broadcast the excavated soil at a designated processing area (clean areas near the excavations). The MEC team will search through the excavated soil for MPPEH using White's DFX-300. The screened spoils will be placed back in the hole. Once the craters are cleared of MPPEH items and with concurrence from the Navy QA, USA will restore the holes to grade using clean fill.

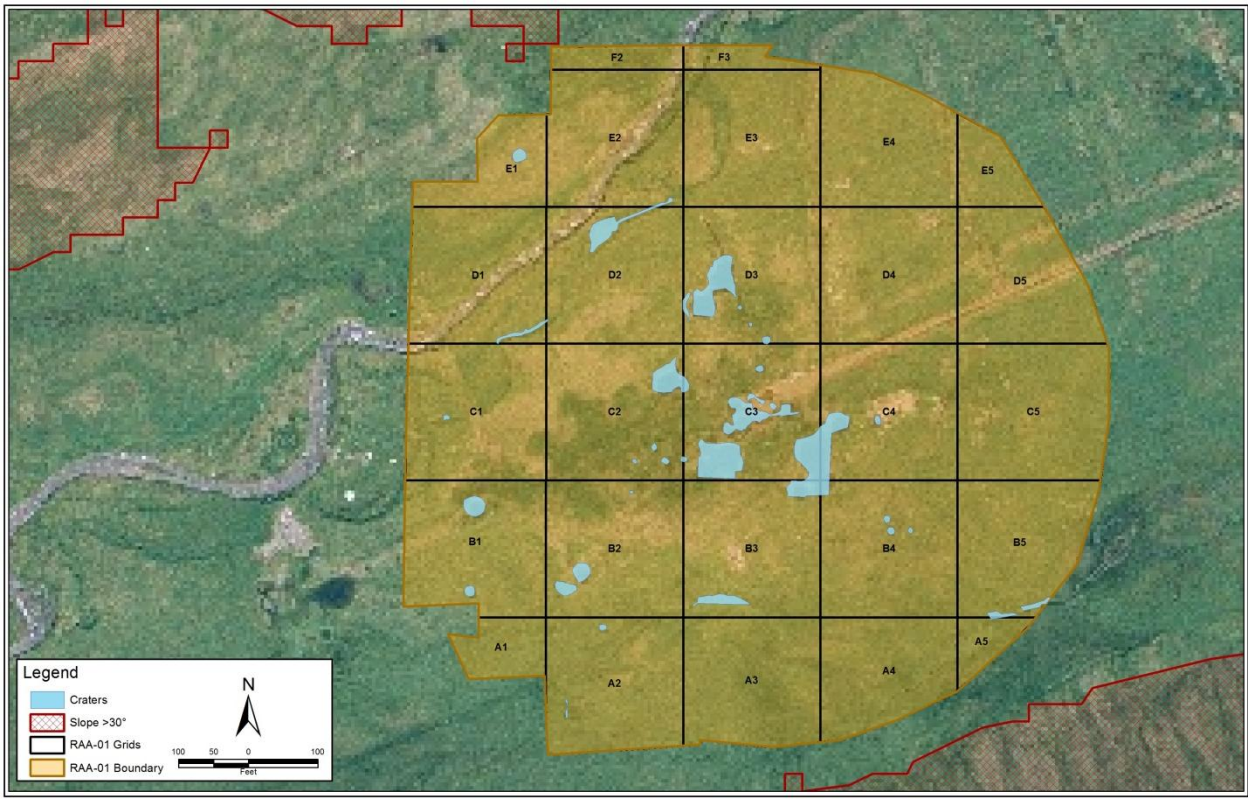

Figure 17-12: Craters (Yellow Outline) at RAA-01 (Former OB/OD Area)

RAA-05 is former dump area (RAA-05/ALDA-01) identified on historical site maps and visible on historical aerial photographs (see Figure 17-13 below). The surface of the site is composed of large cobbles with sparse vegetation. Exposed waste is visible along the north edge of the site where it is eroded by wave

action. The excavator will be used to scoop the investigation area and broadcast the excavated soil at a designated processing area (clean areas near the excavation). The MEC team will search through the excavated soil for MPPEH using White's DFX-300. The analog-detect and dig/excavation procedure will be conducted across the entire RAA to the required 2-ft (0.6-m) depth. However, in areas indicative of waste disposal (where MEC or evidence of MEC remains at the 2 ft excavation depth), the MEC team will extend the search to a 4-ft depth. The Navy has the option of pursuing the excavations to the depth of the filled materials if warranted based on site conditions observed during the field work. Of particular interest is the area extending 150-ft back from the beach to eliminate the potential for continued erosion of this material by the surf action. Cobbles and soil will be used to re-grade the site. Other waste material (metal debris, garbage, other non-MEC waste) will be reconsolidated in an area that will not be susceptible to beach erosion or removed from the site for recycling or other disposal alternatives. Any hazardous materials encountered during the investigation will be characterized and consolidated in accordance with applicable state and federal regulation.

Figure 17-13: RAA-05/ALDA-01 (Former Dump Area)

17.10 Soil Sampling

The MC QAPP is provided as Appendix B to this document and contains the specific guidance for collecting, shipping and analyzing soil samples. In general, soil samples must be collected when teams find breached munitions, identify staining adjacent to a munition or identify a strange odor coming from the ground around an excavation. If these conditions do not exist at an excavation, no sampling is required.

17.11 MEC and MDEH Disposal

MPPEH are managed in strict compliance with NAVSEA OP 5 Volume 1, NOSSA Instructions, the approved ESS, State of Alaska requirements and industry standard practices. All MEC/MDEH discovered undergoes a three-tiered inspection process. The SUXOS is the lead technical resource on the site and has the final approval authority whether MEC/MDEH is 'safe to move' or whether it is appropriate to perform BIP. MEC that is safe to move and documented in writing may be transported to the explosives

storage magazines for temporary storage at the discretion of the SUXOS. MEC/MDEH will be stored in compliance with the requirements of NAVSEA OP 5 Volume 1 awaiting the next scheduled disposal operation. The UXOQCS will inspect the magazine and storage accountability records and conduct inventories in compliance with the frequencies specified in Worksheet #35. MEC/MDEH items determined unsafe to move will be conspicuously marked, secured and scheduled for BIP disposal procedures by a demolition team using approved USACE's engineering controls or the Navy equivalent.

The SUXOS is responsible for monitoring the quantity of MEC/MDEH in storage, its net explosive weight, and for scheduling disposal operations. Donor and initiating explosives are procured and delivered to Adak and will be stored in a temporary explosives storage magazine. No explosives will remain on the island outside the field season.

The following personnel responsibilities are assigned:

- A minimum of two UXO technicians are required to conduct disposal operations: one UXO Tech III (Team Leader) and one UXO Tech II.
- The Team Leader (demolition supervisor [DS]), is responsible for planning, directing, and executing disposal operations.
- The SUXOS maintains direct communications with the DS at all times during the demolition operation.
- The UXOSO observes MEC/MDEH loading procedures and range activities to ensure procedures are in compliance with approved safely plans and SOPs.
- The UXOSO verifies the MEC/MDEH destroyed, establishes the safety zone, positions and briefs the road guards as needed.

NAVSEA OP5 Volume 1 and SOP 9, MEC Management and Explosive Demolition Operations provides the guidance to perform BIP and routine disposal of MEC/MDEH. All personnel involved will review and sign the acceptance statements in the SOP prior to beginning operations. The day prior to scheduled demolition operations, local area points of contact (shown on Worksheet #6) and emergency services will be notified. The UXOSO will review the inventory of MEC/MDEH and determine the safety distances required and the appropriate number and location of road guards needed to stop traffic and prevent unauthorized entry. The UXOSO will conduct a general safety briefing for the road guards to ensure responsibilities and radio procedures are known. The operation will be limited to the minimum essential personnel necessary to safely complete the work. The MEC/MDEH transportation vehicle will be inspected for serviceability (DD Form 626), before MEC/MDEH are inventoried and loaded into the vehicle. When the team arrives at the disposal area, the DS will give a detailed safety briefing and assign tasks. The procedures from SOP 9 will be implemented and the shot will be fired. If a misfire occurs, misfire procedures in SOP 9 will be followed. After a successful detonation, the DS and a team member will check the shot to determine if all is safe. If it is not safe, directions will be given to correct the situation. If all is safe, the detonation site will be cleared and additional disposal operations will be completed as necessary.

At the completion of disposal operations and following the inspection to verify the area is explosively safe, all of the demolition debris (e.g., fragmentation > 3-in in (7.6-cm) any dimension, cap wires, fuse lighters, etc.) will be collected, segregated and managed. The shot holes will be backfilled and leveled to grade. The site(s) will be re-seeded if necessary. Tundra mat removed will be replaced and tamped down. UV or other vehicle tracks will be repaired, as required to comply with the EPP.

17.12 Manage and Dispose of MDAS

During performance of field operations, USA will inspect, recover, and dispose of MEC/MDEH, and other range residue. MEC/MDEH will be stored in a separate explosive magazine sited adjacent to RAA-03. Accountability and security in this magazine will be documented the same as the procedures for the explosives magazine. USA will maintain a running inventory of items stored, the description(s), and date(s) of final disposition. MEC/MDEH will be processed using demolition procedures with other MEC/MDEH. MDAS will be removed from the sites for further processing by flashing. The MDAS will be flashed and, when cooled, undergoes a post-processing QC sampling inspection and is loaded into

locked and sealed containers. Each burn batch will be tested with the EXPRAY explosive test kit. MDAS that passes the EXPRAY test will be certified explosives free by the SUXOS and the burn batch recorded in the field log. Only processed material that has passed the test will be placed in the processed drums, sealed and labeled. The drums will be stored and secured in a locally leased building in the former Modified Advanced Underwater Weapons (MAUW) compound area pending shipment on the barge. No debris with energetic material other than small arms will be flashed and flashed material will be classified MDAS in accordance with NAVSEA OP-5. The scrap will be inspected packaged, sealed, and shipped to a scrap recycler/processor at the end of the project.

The containers are weighed and labeled, and a chain of custody document (DD Form 1348-1A) is generated and signed. USA will ship the MDAS items off-island to a qualified recycler under the chain of custody procedure. The chain of custody will be terminated when scrap recycler/processor will demilitarize the debris in accordance with DoD 4160.21-M-1 and provide documentation that the material will be crushed, shredded, and/or smelted prior to release for resale. USA will track and maintain the MDAS chain of custody documentation.

The DD Form 1348-1A will contain the following statement to be signed by the SUXOS and a Navy QA representative (Battelle):

> "The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard".

The contractor will manage MPPEH in accordance with the requirements in DoD 6055.09-M Volume 7, NAVSEA OP 5 Volume 1, the approved ESS and the documents referenced in Table 17-2. Contractor key personnel must be certified in writing by the Commanding Officer, NAVFAC Northwest as technically qualified to act as signatories in determining the material's explosives safety status and to document, in writing, the MDAS or MEC/MDEH.

MPPEH management does not require specific siting at Adak because the decision for the status of the material (i.e., MEC/MDEH or MDAS) is determined at the point of discovery. Since the Munitions Response Sites (MRSs) are already sited under the ESS, no special siting is required for MPPEH operations.

MPPEH undergoes a three-tiered inspection process as described in Section 17-7. Material that cannot be certified as MDAS will be certified as MDEH.

MDAS must remain in the RAAs until it can be fed directly into the TFU. MDAS will be weighed (e.g., per grid weight) and staged in the RAA pending flashing in the TFU. When MDAS is inspected and certified, it can be transported to the TFU facility for flashing. After flashing, MDAS will be shipped off-island for recycling. Temporary storage for the MDAS will be within lockable containers (e.g., 55-gallon drum with locking lids) which can be controlled to prevent other material being introduced or comingled. The MDAS, once inspected and certified is placed in the TFU (batch processing), flashed according to SOP 10 and when cooled, loaded into a sealed container which is then locked, weighed, labeled and a chain-of-custody, with numbered seals, is generated. The MDAS will be shipped off-island to a qualified recycler under the chain-of-custody procedure. The chain-of-custody will be terminated when the material is melted or demilitarized by the recycling facility and documentation is returned from the facility attesting to the process.

17.13 Restore the Site

The EPP (Appendix E) provides detailed guidance for site restoration. All DGM target excavations must be backfilled and leveled to grade prior to the grids being considered complete. Soil from the excavation must be backfilled and grass or tundra mat must be replaced. UV tracks must be smoothed and leveled.

If temporary culverts or other water runoff management tools are emplaced, those must be removed and the water runoff returned to its original path. Bare spots must be re-seeded.

17.14 Incidental RAA Access Paths and Drainage Construction

Figure 17-14 shows the general locations for the temporary access paths and existing roads to service the RAAs and the locations for drainage improvements. The locations shown are for reference and the final locations may vary. General road repair and maintenance are required on the road bordering RAA-04 and along the access road bordering Andrew Lake. The Construction Work Plan (Appendix C) contains the details on the temporary road and drainage construction. The APP/SSHP (Appendix B) contains the safety requirements.

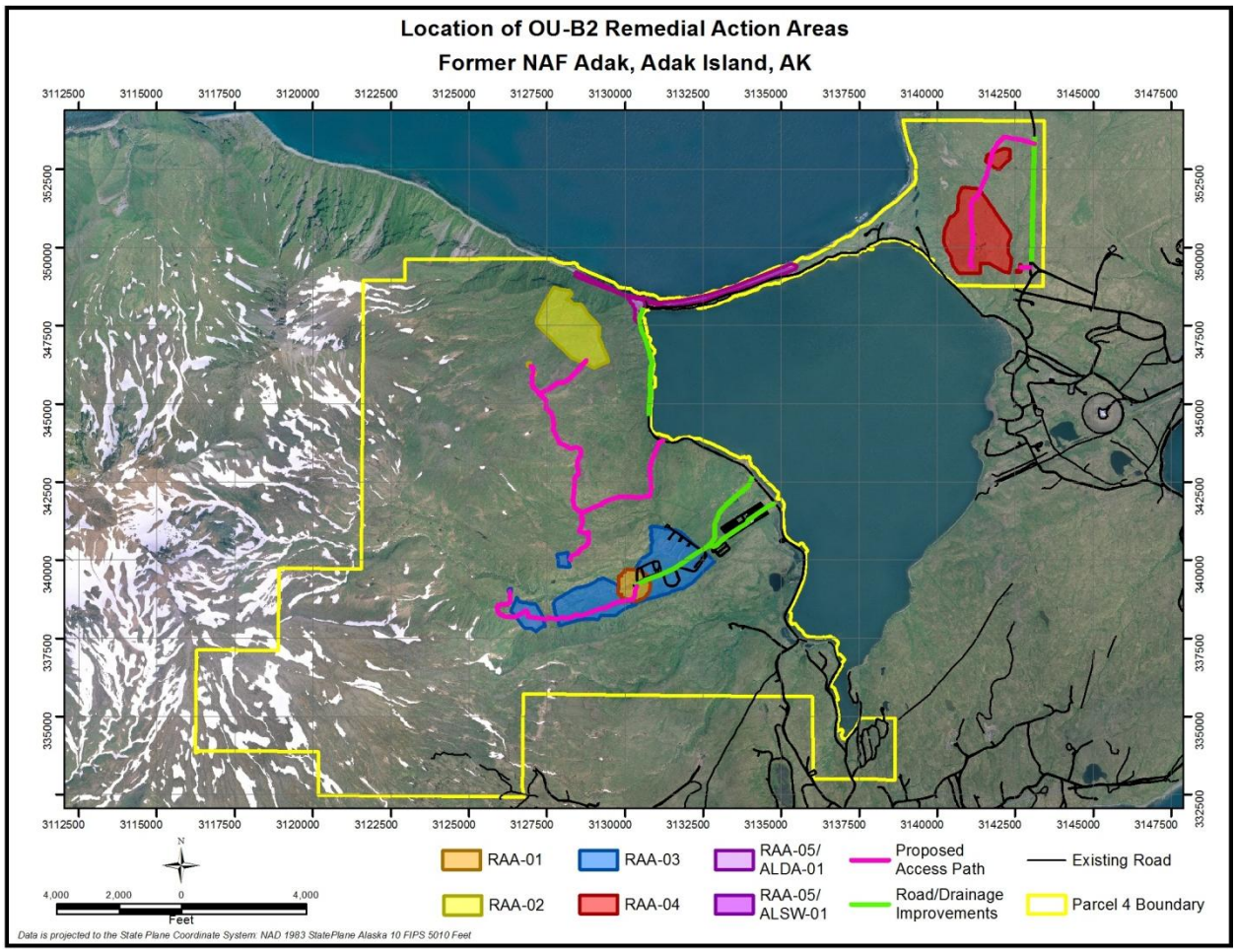

Figure 17-14: Locations of RAA Access Paths, Existing Roads, and Drainage Improvement Areas

17.15 Project Data Management

Project data will need to be:

- Shared across geographical and temporal boundaries
- On a secure site (password protected) where they are backed up and archived regularly with no inputs from the users required.
- Accessible by authorized users.
- Assigned permissions to permit only certain activities to be performed (e.g., a user may have read only access to a file but not be able to download or print the document).
- Set up with individual user notification rules so that an e-mail is sent when data have been posted or changed based on user preferences (e.g., immediate, once daily or once weekly).

These requirements can be met using any of a number of commercial web-based tools including SharePoint and several ftp applications.

Microsoft® Excel is typically used to store all data collected for the project including DGM information, reacquisition and intrusive results, QC findings, MEC/MDEH accountability and disposal history. The reacquisition team records information in electronic format in the GPS data logger and in logbooks. The intrusive teams record information in electronic format in the GPS data logger, on dig sheets, and in logbooks. The electronic and paper form data are merged and transcribed daily into a temporary data base. The logbook pages are photocopied daily in the event of loss or damage. Following a weekly database review by the UXOQCS to verify accuracy, consistency, standardization, completeness and compatibility, the temporary database is incorporated into the project master database file and posted to the main project SharePoint.

17.16 Perform Quality Control

This section describes general quality control inspection, documentation, and testing activities required to ensure that all work performed complies with the specified scope, schedule, budget, and level of quality anticipated by the Navy as well as the requirements of applicable regulations. Responsibility for the implementation and documentation of the QC program rests with the UXOQCS. USA will employ a minimum of QC staff as shown in Table 17-4. Duties and responsibilities are described in Worksheet #6.

Table 17-4: Quality Control Staffing, Roles and Responsibilities (Example)

Role	Responsibility
Project Quality Control Manager	The QCM is responsible for implementing the Project QC Plan as detailed in the MEC QAPP (including the three phases of control) in compliance with Federal, DOD, and Navy Requirements.
UXO Quality Control Specialist	Implement the MEC-specific sections of the QAPP; conduct and document quality control audits of all explosive operations for compliance with established procedures; identify, document, report and ensure completion of all corrective actions to ensure all explosive operations comply with requirements.
QC Geophysicist	Responsibility for quality control testing and reporting for all DGM activities
QC Geo-Technician	Assists the QC Geophysicist in data collection and processing and maintenance of the QC DGM equipment.
QC UXO Technician	Performs QC tasks – inspections and surveillances, final grid inspections, inspections of rework, etc.

Table 17-5 defines the overall QC and QA roles and provides explanation of how the two functions cooperate to ensure that the quality objectives have been achieved.

Table 17-5: Definitions for QC and QA Roles

QC Role	QA Role	Remarks/Explanation
• Verifies the knowledge, skills, experience and qualifications for all the staff • Conducts Preparatory, Initial and Follow-on Inspections of the process (teams) • Conducts inspections of the final product (grids) for compliance with the quality	• Prepares the metrics for each DFW • Prepares the process discussions for each DFW that are presented at the Preparatory Inspection • Attends the Preparatory Inspection • Prepares the Inspection Check sheets for Initial and Follow-on Inspections and for final product (grid) inspections.	• QC does the 3-phase inspections and hands off a copy of the inspection results to QA daily. • QC does the post-clearance verification (hole checks, mini-grids, etc.) to inspect the work product and provides the inspection results that it does or does not meet the quality standards.

QC Role	QA Role	Remarks/Explanation
requirements • Notifies QA when either the teams or the final product fail inspection • Re-inspects the team(s) and product to determine whether the corrective action is working to resolve the failure	• Reviews the results of all Inspections (1-to audit that the inspections are conducted at the frequencies required; 2-to review the inspection results) • Conducts root cause analysis when a team or the product (grid) fails an inspection. Develops the corrective action • Conducts independent audits on the process and product for compliance	• QC reports all failures (process or grid) to QA • QA does the root cause analysis and develops the corrective action for the contractor to implement • QA does independent audits of the work process and of completed grids to verify the QC results

17.16.1 Three Phases of Control

The primary tool used by QC is the three phases of control inspection methodology. The three phases of control methodology comprises the following activities:

- Preparatory Inspection – performed prior to the beginning of each DFW. The purpose of this inspection is to review the work scope and applicable specifications and verify that the necessary resources, conditions, and controls are in place and compliant before the start of work activities. This inspection is conducted using the QC Inspection Check Sheet attached to each individual SOP.
- Initial Inspection – performed for each DFW once a representative sample of the work has been executed. The purpose of the inspection is to check the preliminary work for compliance with procedures and contract specifications, verify inspection and testing, establish the acceptable level of workmanship, review the minutes of the preparatory phase, and check for omissions and resolve differences of interpretation. This inspection will be conducted using the QC Inspection Check Sheet found attached to each individual SOP.
- Follow-up Inspection – performed each day that work on a DFW is conducted. The purpose of the inspection is to ensure continuous compliance and level of workmanship. The QC team will observe the same activities as under the initial inspection and ensure that discrepancies between site practices and approved specifications are identified and resolved. Corrective actions for unsatisfactory conditions or practices will be verified by the QC team prior to continuing work on the affected feature. The QC team will observe field the performance of each DFW each day and document the findings using the QC Inspection Check Sheet. For items which do not have a QC Inspection Check Sheet, the QC team will use a QC Surveillance Report Form, provided in Appendix D (Forms).

The three phases of control inspection and reporting are defined in Table 17-6.

Table 17-6: Three Phases of Control Inspection and Reporting

Inspection Phase	Frequency of Inspection	Reporting
Preparatory Phase	Prior to beginning each DFW.	Once, using the QC Inspection Check Sheet
Initial Phase	For each DFW when the task is completed the first time.	Once, using the QC Inspection Check Sheet
Follow-up Phase	Daily for each DFW performed that day	Daily using the QC Inspection Check Sheet or QC Surveillance Report.

17.16.2 QC of DGM

QC will perform inspections (three phases of control) on DGM teams during data collection. In addition to these inspections, QC has the additional inspections shown in Table 17-7.

Table 17-7: DGM Data Collection

DGM Task or Product	QC Review or Inspection
Daily IVS Test (before and after data collection each day) Process the data and plot the amplitude and position for each ISO in accordance with the GSV Plan (Appendix G)	• Verify that the DGM equipment meets the performance requirements for each test.
Processed DGM Data and Target Lists	• Inspect the data to verify that there are no unexplained data gaps; • Inspect the site to verify that areas identified as inaccessible are true and are documented properly; • Inspect the data to verify that all QC seed items are detected in the data, are within the appropriate Rcrit, are picked as targets and the amplitudes are consistent with the IVS results (e.g., >3 mV); • Inspect the data to verify that all grid corners are detected in the data and are picked as targets, within the appropriate Rcrit, are commented as grid corner, and are not included on intrusive dig list. • Re-process 10% of the daily DGM data and compare target picks with the production data, • 100% DGM target selection review and addition of any QC picks
DGM QC Test Data (per contractor SOP, IVS, etc.)	• Verify the test results are within specification; • Log and track the test results for each instrument.

The quality metrics for all of these inspection points are listed in Worksheet #34 or #35 and/or the GSV Plan (Appendix G) and the respective SOPs (Appendix A). QC will provide a summary document that certifies that the reviews/inspections listed above have been completed and the quality metrics have been met, prior to submitting the DGM data and target lists to Navy QA.

17.16.3 Blind Seed Program

In addition to the routine three phases of control inspections, QC for the project will initiate and manage a blind seed program. The QC blind seed program is independent of any blind seed program managed by QA. The blind seed program is a critical component of the GSV. Blind seeds allow for continuous monitoring of the quality of the production DGM data, target selection and intrusive activities. In addition, the amplitudes of the seeds should be consistent with IVS results.

Blind seeds will be installed according to Section 5.0 of the GSV Plan (Appendix G). QC will maintain the final coordinate locations for the blind seeds as restricted distribution information. QC will furnish a copy of the coordinates for the blind seeds to QA. QC will evaluate and report the results of the blind seeds per the metrics provided in Section 6.0 in the GSV Plan (Appendix G).

17.16.4 Change Management Plan

This Change Management Plan (CMP) describes procedures for determining the need for either a FCR or a Design Change Notice (DCN) and Deficiency Management (e.g., Deficiency Notices [DN] or non-

conformance reports). This CMP describes the preparation of the documents and the internal approval/routing procedures.

17.16.4.1 Field Change Request and Design Change Notice

Field Change Request (FCR) is used to request and document changes identified as a result of unanticipated field conditions and to facilitate minor changes in the Work Plan documents. Changes to plans or procedures will be documented using an FCR Form. The FCR forms are reviewed by QA and the change is approved by the RPM.

Design Change Notice (DCN) is initiated to document changes to the scope of work or to reflect significant changes to the work process, changes in major equipment or equipment configurations or other major changes to the remedial action design. Design changes are documented using the DCN form. The DCN forms are reviewed by QA and the change is approved by the RPM. Figure 17-15 illustrates the review process for FCRs or DCNs.

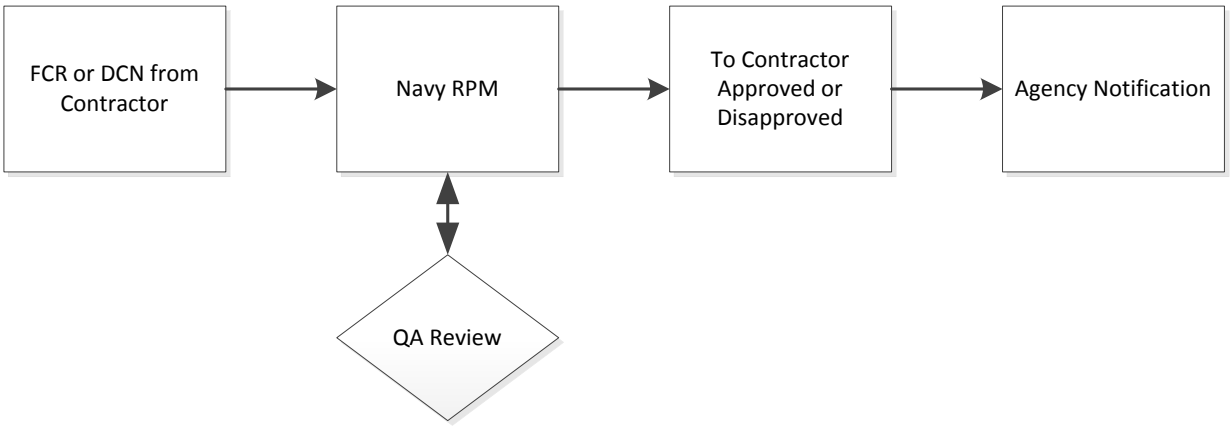

Figure 17-15: FCR and DCN Review Process

17.16.4.2 Deficiencies and Nonconformance

All deficiencies or nonconforming conditions discovered during inspections or other QC functions will be noted on either a DN or a Non-Conformance Report (NCR). A DN will be used for all conditions which do not affect the final work product. An NCR will be used for conditions which do affect the final product. Figure 17-16 illustrates the deficiency management information flow. All deficiencies and non-conformances will be resolved according to the following schedule:

- Deficiency or nonconformance can be identified by either QC or QA. If the problem cannot be resolved immediately, a DN or NCR will be prepared, with a copy immediately to QA.
- QA will conduct an analysis of the cause for the deficiency or nonconformance and will prepare a response which will be submitted to the NTR within 48 hours. Accepted quality techniques such as root cause analysis, failure mode and effects analysis, cause and effects diagrams and others may be used to determine the reason(s) for the substandard performance or product and to identify remedies.
- The contractor will have 24 hours to disagree with the QA analysis or to initiate the corrective action. The SUXOS is responsible for implementing the selected remedy.
- In no case will a DN or NCR remain unresolved for more than 72 hours.

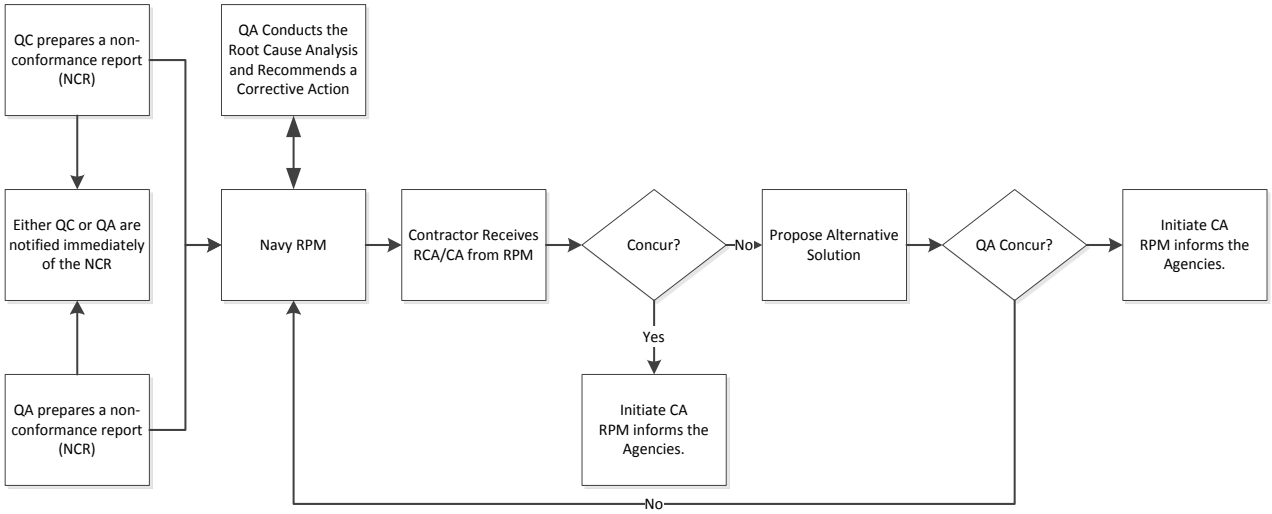

Figure 17-16: Flow of Deficiency Management Information

The UXOQCS will maintain a DN and an NCR log to document and track corrective actions to closure. The DN and NCR logs will be included in the After Action Report. The UXOQCS is responsible for tracking deficiencies to closure and reporting their status on daily reports. DN and NCR forms are provided in Appendix D.

17.16.5 Final Grid Inspection and Approval

QC will conduct a final check and approval of all completed grids. The final grid inspection process includes the tasks shown in Table 17-8. The final grid approval is reported on the QC Grid Final Inspection Form which can be found in Appendix D.

Table 17-8: Final Grid Inspection and Approval Requirements

QC Task	Remarks
Review of all dig sheets for targets within the grid.	• No blank cells. • Data are consistent with the requirements (e.g., proper nomenclature for munitions, target depth, length, and weight values are consistent with the DGM anomaly amplitudes, teams who performed the work are identified, etc.)
Assemble and review the QC documentation for work performed in the grid.	• QC inspection forms and surveillance reports for the teams which worked in that grid. • DNs or NCRs for work performed in that grid. • DGM documentation for that grid (e.g., IVS test results, other DGM QC data, blind seed results, etc.)
Recheck of 100% of the targets identified as no finds.	• QC verification, with a large coil Vallon, that the target was an actual no find by the definition. • Results documented on the QC Grid Inspection Form.
Recheck of 10% of target DGM target excavations to verify resolution to the contractual standard.	• QC verification, with a large coil Vallon, the target was resolved. • Results documented on the QC Grid Inspection Form. • Results include a description of what came out of any QC excavations of recheck holes.
Recheck of 100% of targets identified as deeper than the required removal depth.	• Results documented on the QC Grid Inspection Form.

QC Task	Remarks
Recheck of all abandoned targets or debris left in place, i.e.: construction debris not removed/hole filled with water	• Verify the target is construction debris and is not practical to remove prior to backfill. • Verify all attempts to remove water or re-channel runoff were made before team abandoned the target.
Detection and Removal/Identification of Blind Seeds	• Verify detection of blind seeds in the DGM data. • Verify identification and removal of the blind seeds on the dig sheets.
Backfill and restoration of all excavations and roads/trail repairs	• Verify intrusive teams backfilled holes if DGM targets were resolved. If conditions exist that preclude DGM target resolution (e.g. fragment pits, cultural debris), QC will check the hole, with a lager coil Vallon to verify condition prior to backfilling. • Verify, road and trail repairs have been backfilled and restored as close to their original condition as possible
DGM mini-grids for each production grid.	• Collect two mini-grids 20-ft x 20-ft (6-m x 6-m) in each production grid. Locations semi-randomly selected. • The field QC team follows the same procedures and metrics as the production teams (DGM, reacquisition (survey location stakeout and measurement), and intrusive investigation) (Figure 17-17). • Process the data and pick targets above the threshold for that RAA. • Dig any targets picked from the data unless the target was previously identified and verified by QC as a cultural feature or inaccessible/non-removable object or as a frag pit on the production dig sheet. • Document the results of the additional investigation on the PDA.

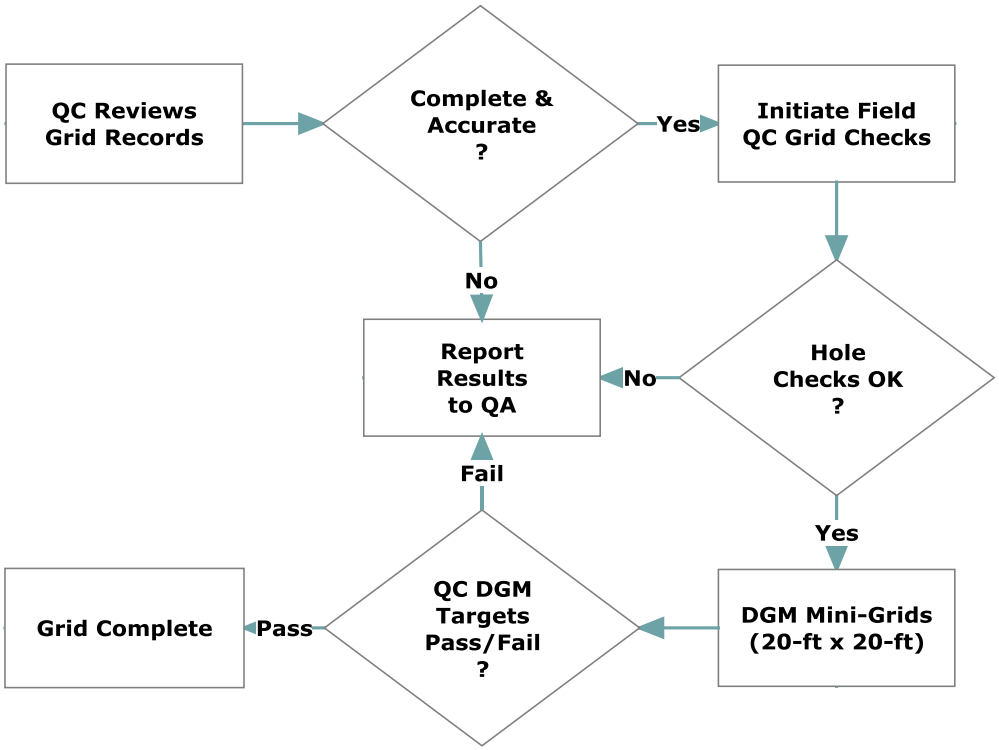

Figure 17-17: Grid QC Procedures

17.16.6 Quality Reporting

The UXOQCS is responsible for preparing and submitting a Daily Quality Control Report (DQCR) to the RPM. An original and one copy of the DQCR with attachments will be submitted to the RPM or designated representative, with a copy to QA, on the first work day following the date covered in the report. All calendar days, including weekends, holidays and non-working days, will be accounted for. As a minimum, one report will be prepared and submitted for every continuous seven days of no work. The DQCR will provide an overview of QC activities performed each day, including those performed on subcontractor and supplier activities. The DQCRs will present an accurate and complete picture of QC activities. They will report both conforming and deficient conditions, and will be precise, factual, legible, and objective. Copies of the supporting documentation, such as checklists and surveillance reports, will be attached. Other reports generated relating to site work are presented in Worksheet #29. Reports prepared and submitted by QA are discussed in the QA Surveillance Plan.

The Project Superintendent will host a weekly QC meeting. Attendees will include the SUXOS, UXOQCS, the RPM, and the NTR. At a minimum, USA's PM and Project QC Manager will teleconference into the meeting.

17.17 Public Relations Support

USA will not disclose any data resulting from actions in this contract to the news media, the public, regulatory agencies, or any other non-project-involved personnel. USA will refer all press or public contacts to the Navy RPM. USA will not distribute reports or data to any other source, unless specifically authorized in writing by the Public Affairs Officer in accordance with NAVFAC Instruction 5720.10A. All project related materials become permanent property of the United States Government.

Public involvement activities planned are consistent with those applied in the past and include presentations at Restoration Advisory Board (RAB) meetings, Town Meetings, and Notices. The Navy maintains a web site, www.adakupdate.com, for information on plans, reports, scheduled projects, etc. There is no known public opposition to the work performed or planned.

17.18 NTCRA Reports

The results of the removal shall be documented in NTCRA Interim and Closure Reports. An Interim Report will be delivered at the end of each field season. An After Action Report (AAR) and a Closure Report will be delivered upon completion of the work. One Interim Report will be submitted for each field season completed. Interim reports shall present information to support completion of individual grids or RAAs and include the results of the Monthly Andrew Lake Seawall Sweeps.

17.18.1 Interim Reports

An Interim report is required at the close of each field season. The Interim Reports will be submitted to the Navy as Internal Draft, Draft, Draft Final, and Final documents. Each report shall include comments and comment responses. Payment will be made when the Navy approves and the stakeholders concur with the Interim Report and the responses to comments.

Each interim report will contain the following minimum information:

1. Executive Summary;
2. A description of the RAAs /Andrew Lake Seawall sweeps where work was performed, which work was performed (e.g., site preparation, surface clearance, DGM, Intrusive Investigation, etc.) and which grids were impacted. The Interim Report will clearly identify which, if any, RAAs were completed. In RAAs not completed, the Interim Report will clearly identify which grids, if any, were completed;
3. A description of the MEC/MDEH found in each grid/seawall surface to include a photograph, nomenclature, coordinate location, depth below the mineral surface layer and disposition (i.e., destroyed by detonation, etc.)

4. The weight of the MPPEH removed from each grid and a description of the disposition (e.g., inspected, certified, verified, flashed and shipped to the approved recycler, etc.);
5. The weight of non-munitions debris removed from each grid, as applicable;
6. A discussion of the removal action methods and technology, including relative effectiveness, limitations of technologies used during the munitions response and the effects on residual hazard/risk relative to that which was originally projected;
7. Discussion of archaeological sites or environmentally sensitive areas that were encountered and a description of any mitigation or protective measures taken;
8. Discussion of the results of site restoration activities including before and after photographs of temporary road installation and removal, backfilling results, UV rut repair, and other incidental site damage and restoration;
9. Discussion of explosives management (e.g., donor explosives management and inventory, MEC/MDEH management and disposal, etc.);
10. Discussion of and rationale for any variations from the approved work plans and SOPs;
11. Discussion of the QC program to include tabular data showing the numbers and types of inspections conducted and the results, deficiency notices issued and their resolution, non-conformance reports issued and their resolution, field change requests processed, outside audits (e.g., NOSSA, ADEC, etc.) and all other quality related activities conducted;
12. Discussion of MC sampling and analysis including the results and associated waste characterization and disposition;
13. RAA Certification in accordance with MEC QAPP Worksheet #37 for all completed RAAs;
14. At a minimum, the following supporting documentation shall be provided:
    a) Maps showing the areas where work occurred (e.g., site preparation, DGM, intrusive investigation, demolition of MEC/MDEH, MC sampling, temporary access path installation/removal, drainage repair work, restorations, etc.);
    b) Maps showing DGM data coverage. These maps may also be used to show areas within the RAAs which were verified to be inaccessible;
    c) DGM target maps for areas with DGM data coverage;
    d) Maps showing any archaeological sites or environmentally sensitive areas;
    e) Dig sheets for all excavations;
    f) All raw and processed DGM data, DGM target maps and target lists;
    g) Documentation and receipts for final disposition of MEC/MDEH, MDAS, or non-munitions related metallic debris. Included are all explosives accountability records, to include initial receipt documentation, issue and destruct documentation, inventories, etc;
    h) Digital color photographs of major activities and MEC/MDEH discoveries. Photos of MEC/MDEH items shall be taken utilizing a contrasting background which indicates size, coloration and any unique characteristics of the item found;
    i) Description and results of MC sampling and laboratory analyses;
    j) All routine daily reports (Daily Safety and Quality Report, Daily Production Report, etc.) which will describe the locations and activities of UXO teams, discoveries and/or demolition of MEC/MDEH items, and any other reports documenting work stoppages or interruptions, visitors to the site, unusual site conditions, substantive telephone calls or conversations, accidents, incidents, special training or safety issues, or other unusual happenings; and
    k) All QC reports including daily IVS results, DGM QC reports, 3-phase inspection reports, QC surveillances, final QC Grid Certifications, DNs and supporting documentation, NCRs and supporting documentation and any other QC documentation for the reporting period.

17.18.2 Final Report

Upon completion of the project, USA will prepare and submit an AAR and a Closure Report. The After Action and Closure Reports will be submitted to the Navy as an Internal Draft, Draft, Draft Final and Final document. Each report shall include comment and comment responses.

- The AAR shall be prepared in accordance with NOSSA Instruction 8020.15C, Enclosure (5) and will be submitted, by the Navy, to NOSSA for approval. The NOSSA acceptance letter and AAR will be included as an appendix to the Closure Report. The Navy will provide the NOSSA Acceptance Letter for inclusion in the Agency Closure Report.
- The Closure Report will consist of the information required for an Interim Report, summarized for all field seasons, with all Interim Reports attached as separate appendices. This Closure Report will contain all the supporting information for this project, with the goal of achieving no further action (NOFA) from the stakeholders for RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01.

All of the reports will be submitted in Internal Draft for Navy review, Draft for full regulatory review, Draft Final, and Final after comments are addressed. The Navy will require 30 days for review and comment on the Internal Draft. The regulatory agencies will be provided 30 days for review of Draft, Draft Final and Final documents. The agencies may request an extension of the comment period to 50 days. USA will provide a written response to all Navy and agency comments within two weeks of the receipt of comments. USA will participate in comment resolution meetings with the Navy.

USA will update the existing Munitions and Explosives of Concern Hazard Assessment (MEC HA) and the Adak ESHA upon completion of the NTCRA and the updates will be included in the Closure Report for the OUB-2 RAAs. The MEC HA update will be conducted in accordance with the MEC HA Methodology (EPA/DOD/DOI, February 2010). ESHA update will be conducted following the guidance described in the Draft Adak Island Operable Unit B Explosives Safety Hazard Assessment Methodology, Draft Version 11, dated 26 January 2001.

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18.0 MEC QAPP WORKSHEET #18 – SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS (MEC/MPPEH)

(UFP-QAPP Manual Section 3.1.1)

Sampling Location (Area, Sector or Building) /Identification Number	Exclusion Areas	Matrix	Depth relative to Ground Surface (units)	Analytical Group (NA for MEC EHP Site) Alternative Field Name – Survey Methodology	Degree of Investigation or Coverage	Sampling SOP Reference
RAA-01	Inaccessible areas (1)	Surface Layer and subsurface soil	2-ft (0.6-m) (2)	DGM/Hand held metal detector	19.3 acres	
RAA-02	Inaccessible areas (1)	Surface Layer and subsurface soil	2-ft (0.6-m) (2)	DGM/Hand held metal detector	73.70 acres	
RAA-03	Inaccessible areas (1)	Surface Layer and subsurface soil	2-ft (0.6-m) (2)	DGM/Hand held metal detector	146.85 acres	
RAA-04	Inaccessible areas (1)	Surface Layer and subsurface soil	4-ft (1.2-m)(2)	DGM/Hand held metal detector	109.97 acres	
RAA-01/ALDA-01	Inaccessible areas (1)	Surface Layer and subsurface soil	2-ft (0.6-m) (3)	Hand held metal detector	4.70 acres	
RAA-05/ALSW-01	n/a	Surface Layer only	n/a	Visual Surface Sweep	21.38 acres	

Notes:

(1) *Inaccessible areas defined as areas with > 30 degree slope, standing or running water which prevents DGM or intrusive investigation or areas with cultural or industrial material which prevents work activities from occurring.*

(2) *If required by the Navy, further investigation of deeper targets will be performed to achieve DGM target resolution.*

(3) *If required by the Navy, further investigation of deeper targets will be performed to achieve DGM target resolution. In areas indicative of garbage pits, the MEC team extends the screening to a 4-ft depth.*

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19.0 MEC QAPP WORKSHEET #19 – ANALYTICAL SOP REQUIREMENTS

(UFP-QAPP Manual Section 3.1.1)

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20.0 MEC QAPP WORKSHEET #20 – FIELD QUALITY CONTROL SAMPLE SUMMARY

(UFP-QAPP Manual Section 3.1.1)

Matrix	Removal Procedure	Number of units applicable to QC Survey	Number of seed items per grid	Total Number or Area for 3rd Party QA Sampling
Subsurface Soils	Intrusive investigation of selected anomalies	10% of all removed DGM target locations to be randomly selected for independent QC verification of removal	A minimum of one QC identifiable (painted, marked or numbered) seed item will be placed in each full grid and equivalent full grid of partial grids	5% of all DGM target locations to be randomly selected for independent removal verification by Navy 3rd Party QA. Total number dependent on number of anomalies.

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21.0 MEC QAPP WORKSHEET #21 – PROJECT SAMPLING SOP REFERENCES

(UFP-QAPP Manual Section 3.1.2)

SOP Number	Project Phase	Task	Responsible Party	Title of SOP	Equipment Type or Instrument	Comments
SOP 1	All	UXO Escort/Anomaly Avoidance	Contractor	MEC Avoidance	GPS, handheld all-metal detectors	
SOP 2	Geophysical Mapping	Digital Geophysical Mapping	Contractor	Digital Geophysical Surveying	Geonics EM61-MK2 sensor, RTK DGPS Rover unit, data logger	
SOP 3	Geophysical Mapping	DGM Data Processing and development of target lists	Contractor	Digital Geophysical Data Processing and Interpretation	GeoSoft Oasis Montaj, UX-Detect,	
SOP 4	All	Utility Vehicle Operations	Contractor	Utility Vehicle Operations	UV/ARGO vehicles	
SOP 5	Site Preparation	Remove brush and grass from open areas to within 6 inches of ground level or tundra mat Technology-aided Surface Removal of MPPEH and metallic debris from areas subject to DGM	Contractor	Vegetation Removal Surface Clearance	Weed eaters, PPE GPS, handheld all-metal detectors	
SOP 6	Site Preparation	RAA Boundary and Grid Stakeout	Contractor	Boundary and Grid Stakeout	RTK DGPS, handheld all-metal detectors	
SOP 7	Target Reacquisition (survey location stakeout and measurement)	Reacquire target anomalies, and mark with pin flags or characterize as a no-find	Contractor	Target Reacquisition	RTK DGPS, handheld all- metals detector	
SOP 8	Intrusive Investigation	Excavate selected targets to identify DGM target type (MPPEH or debris), categorize and manage	Contractor	Intrusive Investigation	Handheld all-metals detectors, Geonics EM61-MK2	

SOP Number	Project Phase	Task	Responsible Party	Title of SOP	Equipment Type or Instrument	Comments
SOP 9	Intrusive Investigation	Management and routine disposal of MEC/MDEH	Contractor	MEC/MDEH Management and Disposal	Demolition equipment	
SOP 10	Intrusive Investigation	Management and disposal of MDAS	Contractor	MDAS Management, Thermal Flashing, and Disposal	Administrative Thermal Flashing Unit	
SOP-11	Intrusive Investigation	Storage of MEC/MDEH and storage of donor explosives	Contractor	Ammunition Storage and Transportation	Explosives storage magazines, Transport Vehicle	
SOP 12	Intrusive Investigation	Excavate selected targets to identify DGM target type (MPPEH or debris), categorize and manage	Contractor	Earth Moving Machinery Operations	Backhoe/Excavator	
SOP 13	All	Data Management	Contractor	Data Management	Administrative	

22.0 MEC QAPP WORKSHEET #22 – FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION

(UFP-QAPP Manual Section 3.1.2.4)

Field Equipment	Activity[1]	Frequency	Acceptance Criteria	Corrective Action	Resp. Person	SOP Reference[2]	Comments
Handheld Metal Detector	Field Operation Verification	Daily	Detection of all metallic items in the IVS	Troubleshoot or maintain as recommended by manufacturer – re-verify performance	UXO and Reacquisi-tion Team Leader, UXOQCS Verification	SOP 7 and SOP 8	
RTK DGPS	Data positioning and navigation	Daily	Functionality in compliance with the GSV Plan (data positioning); ± 0.328-ft (±10-cm)	Troubleshoot and repair or replace	Geoscientist; UXO Team Leader	SOP 2	
EM61-MK2	Field Operation Verification	Before and After Data Collection	Functionality in compliance with the GSV Plan and IVS testing criteria	Troubleshoot and repair or replace	Geoscientist	SOP 2 and GSV Plan	Failure of the end of day IVS will require all the data be turned over to QA for analysis.
Remote Firing Device	Field Operation Verification	Before Use	Function check correct according to manufacturer's instructions	Troubleshoot or maintain as recommended by manufacturer – re-verify performance	UXO Demolition Team Leader, UXOQCS Verification	SOP 9	
Earth Moving Machinery (EMM)	Field Operation Verification	Daily or Before Use	Manufacturer's daily check requirements	Troubleshoot or maintain as recommended by manufacturer – re-verify performance	EMM Operator	SOP 12	

Notes:

[1] Activities may include: calibration, verification, testing, and maintenance.
[2] Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21).

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23.0 MEC QAPP WORKSHEET #23 – ANALYTICAL SOP REFERENCES

(UFP-QAPP Manual Section 3.2.1)

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24.0 MEC QAPP WORKSHEET #24 – ANALYTICAL INSTRUMENT CALIBRATION

(UFP-QAPP Manual Section 3.2.2)

Not in Use

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25.0 MEC QAPP WORKSHEET #25 – ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION

Not in Use

26.0 MEC QAPP WORKSHEET #26 – SAMPLE HANDLING

(UFP-QAPP Manual Appendix A)

Not in Use

27.0 MEC QAPP WORKSHEET #27 – SAMPLE CUSTODY INFORMATION

(UFP-QAPP Manual Section 3.3.3)

Not in Use

28.0 MEC QAPP WORKSHEET #28 – QUALITY CONTROL SAMPLES

(UFP-QAPP Manual Section 3.4)

Not in Use

29.0 MEC QAPP WORKSHEET #29 – PROJECT DOCUMENTS AND RECORDS

(UFP-QAPP Manual Section 3.5.1)

The documents, forms and records listed in Table 29-1 were developed for the OU B-2 NTCRA project. A project-specific SharePoint site (http://websps1.battelle.org/sites/ADAK2008QA/default.aspx) has been established to manage, track, retrieve and store all documents pertinent to the project.

Table 29-1: Project Documents, Forms and Records

Report/Form	Generator	Work Element	Frequency	Location/Storage
Site approval request	Project Manager	Site Preparation, Mobilization	Once	ESS
Equipment Inspection/function tests: handheld metal detectors , DGPS, , RFD, excavator and hand tools	SUXOS/Team Leaders	Mobilization/Site Preparation, DGM, Reacquisition/intrusive Ops	Once/Daily when equipment is used.	MEC QAPP, SOP
Personnel medical, OSHA and experience qualification form	UXOSO	Site Preparation, Mobilization	Once	MEC QAPP
Site specific training/attendance roster	SUXOS	Site Preparation, Mobilization	Once	MEC QAPP, SOP
Minutes – coordination meeting with contractors	SUXOS	Site set-up Site Preparation, Mobilization	1 week after meeting	MEC QAPP, SOP, Admin Record
Daily safety report/briefing (included on daily production/QC report)	UXOSO	All	Daily	APP, SSHP
Material Safety Data Sheets	UXOSO	All	As required	APP, SSHP
Onsite training	UXOSO	All	1-time	APP, SSHP
Safety inspections	UXOSO	All	Daily	APP, SSHP
Hours worked record (included on daily production report)	SUXOS	All	Daily/Weekly cumulative	MEC QAPP, SOP
Employee/visitor Log	UXOSO	All	Daily/as needed	APP, SSHP, Admin Record
Accident reporting – CSIR	UXOSO	All	As required	APP, SSHP, Admin Record
Daily production report	SUXOS	All	Daily	MEC QAPP, SOP, Admin Record
MEC/MDEH accountability inventory	SUXOS and Team Leaders	MEC/MDEH Inspection, Handling and Storage	As required	MEC QAPP, SOP, Admin Record

Report/Form	Generator	Work Element	Frequency	Location/Storage
Site mobilization QC checklist	QCS/PM	Site Preparation, Mobilization	Within two weeks of mobilization	MEC QAPP, SOP
MEC/MDEH magazine storage inspection checklist	SUXOS	MEC/MDEH Handling and Storage	Prior to use/weekly	MEC QAPP, SOP
MEC/MDEH storage magazine inventory	SUXOS	MEC/MDEH Handling and Storage	Weekly, when MEC/MDEH is stored	MEC QAPP, SOP
MEC/MDEH accountability log	SUXOS	MEC/MDEH Disposal	As required	ESS/SOP, Admin Record
MPPEH chain of custody explosive disposal log	Demolition Supervisor	MEC/MDEH Disposal	Daily when demo ops are occurring	MEC QAPP, SOP
Donor explosives storage inspection form	SUXOS	MEC/MDEH Disposal	Weekly when explosives are stored	MEC QAPP, SOP
Demolition equipment checklist	Demolition Supervisor	MEC/MDEH Disposal	Daily when demo ops are occurring	MEC QAPP, SOP
Disposal operations checklist	Demolition Supervisor	MEC/MDEH Disposal	During each demo operation	MEC QAPP, SOP
Field logbooks	Management/ Team Leaders	All	As required	MEC QAPP, SOP
Non-hazardous MDAS demilitarization chain of custody, DD 1348-1A	SUXOS	MDAS Verification Inspection (Certification performed by QA)	With each shipment of MDAS for demil/recycle	MEC QAPP, SOP, Admin Record
Vehicle inspection form	Team Leaders	All	Daily/Weekly	APP, SSHP
Utility Vehicle inspection form	Team Leaders	All	Daily/Weekly	APP, SSHP
EMM inspection form	Equipment Operator	Road Construction and Intrusive Investigation	Daily or before use	MEC QAPP, SOP, APP, SSHP, ESS
Data base Excel form	Data Manager	All	Daily	MEC QAPP, SOP
Area/target reacquisition data sheet	Data Manager	Reacquisition (survey location stakeout and measurement)	Daily	MEC QAPP, SOP
DGM target dig sheet	Data Manager	Intrusive Investigation	Daily	MEC QAPP, SOP
Daily QC report (included on Daily Production Report)	UXOQCS	All	Daily	ESS, MEC QAPP,SOP

Report/Form	Generator	Work Element	Frequency	Location/Storage
QC Area certification form	UXOQCS	All	As required	ESS, MEC QAPP,SOP
QC meeting minutes	UXOQCS	All	2 work days following meeting	MEC QAPP, SOP, Admin Record
Preparatory phase QC inspection checklist	UXOQCS	All	Before work begins on DFW	MEC QAPP, SOP
Initial phase QC inspection check sheet	UXOQCS	All	First time a team performs the DFW	MEC QAPP, SOP
Follow-up phase QC inspection check sheet	UXOQCS	All	Daily observation of each DFW/weekly report	MEC QAPP, SOP
Daily IVS Test Results	Geoscientist	DGM	Twice Daily	MEC QAPP
Photo Log	Team Leaders, Data Manager	All	As required	MEC QAPP
Flashing Operations Log/Form	Team Leader or Supervisor	MDAS Flashing	Per Event	MEC QAPP
Non-Conformance log	UXOQCS	All	As needed	MEC QAPP, SOP
Non-Conformance Report (NCR)	UXOQCS	All	As needed	MEC QAPP, SOP, Admin Record
Deficiency Notice Log	UXOQCS	All	Non-Conformance Discovered	MEC QAPP, SOP
Deficiency Notice Report	UXOQCS	All	Deficiency Discovered	MEC QAPP, SOP, Admin Record
Field Change Request Log	UXOQCS	All	As needed	MEC QAPP, SOP
FCR form	SUXOS, UXOQCS	All	As needed	MEC QAPP, SOP, Admin Record
DCN request form	SUXOS, UXOQCS	All	As needed	MEC QAPP, SOP
DCN log	UXOQCS	All	As needed	MEC QAPP, SOP

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30.0 MEC QAPP WORKSHEET #30 – ANALYTICAL SERVICES

(UFP-QAPP Manual Section 3.5.2.3)

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31.0 MEC QAPP WORKSHEET #31 – PLANNED PROJECT ASSESSMENTS

(UFP-QAPP Manual Section 4.1.1)

The planned audits and assessments are designed around the three phase QC inspection system. This system is discussed and outlined thoroughly in MEC QAPP Worksheets #34 and #35. QA will conduct independent audits as specified in the QA Surveillance Plan. Most field audits are the responsibility of the UXOQCS. Field teams are observed daily during operations with results documented in field logbooks. A formal QC Surveillance Report is completed each week for each DFW. The SUXOS will conduct daily observations of the teams, monitor activities and record the findings in his logbook. Table 31-1 lists the task, frequency, responsible organization and personnel.

Table 31-1: Task, Frequency, Responsible Organization and Personnel

Assessment Type (Task)	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Site Preparation and Mobilization	Once, within two weeks of mobilization	Internal	USA	UXOQCS, UXOSO, SUXOS	SUXOS /PM	UXOQCS, UXOSO, SUXOS	UXOQCS/PM
Personnel Qualifications and Training	Initial, change in personnel, change in assignment	Internal	USA	UXOSO/ SUXOS	SUXOS/PM	SUXOS/PM	UXOQCS/ PM
Site Specific Orientation and Training	As Required by NTCRA Work Plan	Internal	USA	SUXOS, UXOQCS, UXOSO	UXOQCS	UXOQCS, UXOSO, SUXOS	UXOQCS/PM
Physical Security, Office and Equipment Storage	Daily	Internal	USA	SUXOS	SUXOS	SUXOS, UXOQCS, UXOSO	SUXOS, UXOQCS, PM
Fire Prevention, Extinguisher Inspections	Once/Monthly	Internal	USA	UXOSO	UXOSO	UXOSO	UXOSO
Donor explosives inventory	Once/Weekly	Internal	USA	SUXOS	SUXOS	SUXOS	UXOQCS
MEC/MDEH Inventory	Weekly	Internal	USA	SUXOS	SUXOS	SUXOS	UXOQCS
Inventory and Management of Project Property	Once/Monthly	Internal	USA	UXOQCS	SUXOS	SUXOS	UXOQCS

Assessment Type (Task)	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Equipment Inspection/Check	Daily	Internal	USA	UXO Team Leader	UXO Team Leader, SUXOS	SUXOS/ UXOQCS	UXOQCS/PM
Establish Instrument Verification Strip (IVS), Monitor and verify removal	Once/Daily, end of project	Internal	USA	UXO Team Leader	UXO Team Leader, SUXOS	SUXOS/UXOQCS	UXOQCS/PM
Install Blind Seeds	Once during site setup	Internal	USA	UXOQCS	UXOQCS	UXOQCS	UXOQCS/PM
Data Base set-up/Management	Once/Weekly	Internal	USA	UXOQCS/ SUXOS	SUXOS	SUXOS/ UXOQCS	SUXOS, UXOQCS, PM
Data Base Transcription Audit	Weekly, 10% of data	Internal	USA	UXOQCS	SUXOS/Data Base Monitor	SUXOS/Data Base Monitor	SUXOS, UXOQCS, PM
Daily Safety Briefing/Inspections	Daily	Internal	USA	UXOQCS	SUXOS	SUXOS, UXOQCS, UXOSO, PM	UXOSO, HSM, PM
Vehicle/UV Inspections	Daily, weekly report	Internal	USA	UXOQCS/ SUXOS	SUXOS	SUXOS/UXOQCS	SUXOS, UXOQCS, PM
Vegetation Removal/Monitoring	Daily during removal/ weekly during work	Internal	USA	SUXOS, UXO Team Leader, Reacquisition Team Leader, UXOQCS	SUXOS	SUXOS/Team Leader	SUXOS, UXOQCS, PM
Surface Clearance	Daily during clearance	Internal	USA	UXOQCS UXOSO	SUXOS	SUXOS/Team Leader	SUXOS, UXOQCS, PM
IVS Testing Results	Daily	Internal	USA	Site Geophysicist, UXOQCS	Site Geophysicist	QA Identifies, Site Geophysicist Implements	UXOQCS
Target Reacquisition (survey location stakeout and measurement)	Daily during Reacquisition/ weekly report	Internal	USA	UXOQCS	SUXOS	QA/Reacquisition Team Leader	SUXOS, UXOQCS, PM

Assessment Type (Task)	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Intrusive investigation Activities	Daily during investigations/ weekly report	Internal	USA	SUXOS, UXOQCS, UXOSO,	UXO Team Leaders	SUXOS, UXOQCS, UXOSO	SUXOS, UXOQCS, PM
Post Intrusive Hole Checks	As Grids are completed; 10%of targets and all no finds	Internal	USA	UXOQCS	SUXOS/Intrusive Team Leader	SUXOS/ Intrusive	UXOQCS
MEC/MDEH Inspection	When Discovered	Internal	USA	UXO-Tech II/Team Leader/ SUXOS, UXOQCS	SUXOS, UXOQCS, UXOSO	SUXOS, UXOQCS, UXOSO, Team Leader	UXOQCS/PM
Munitions Debris/Scrap Inspection	When Discovered	Internal	USA	UXO-Tech II/ Team Leader SUXOS, UXOQCS	SUXOS/UXOQCS	SUXOS/ UXOQCS	UXOQCS/PM
QC MDAS/Scrap Inspection	Weekly random 10%of finds	Internal	USA	UXOQCS	SUXOS/Intrusive Team Leader	SUXOS/Intrusive	SUXOS, UXOQCS, PM
MDAS inspection and certification	As Necessary	Internal	USA	Personnel approved by NAVFAC NW CO	SUXOS	SUXOS	UXOSO/ UXOQCS
MEC/MDEH Accountability	Weekly QC observation	Internal	USA	UXOSO/ UXOQCS	SUXOS	SUXOS UXOSO/ UXOQCS	UXOSO, SUXOS, UXOQCS
MEC/MDEH Storage & Accountability	Weekly	Internal	USA	UXOQCS/ UXOSO	SUXOS	SUXOS, UXOQCS, UXOSO	UXOSO, UXOQCS, PM
MEC/MDEH Transportation	As Necessary	Internal	USA	UXOSO	SUXOS	SUXOS/ UXOQCS	UXOSO, UXOQCS, PM

Assessment Type (Task)	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
MEC/MDEH Final Demolition/Disposal	As Necessary	Internal	USA	UXOSO , UXOQCS	SUXOS	SUXOS	UXOSO/ UXOQCS
MDAS/Scrap Shipment Inspection and Documentation	When Shipped	Internal	USA	Personnel approved by NAVFAC NW CO	SUXOS	SUXOS, UXOQCS, UXOSO	SUXOS, UXOQCS, PM
Site Restoration Inspection	Daily during task/ weekly report	Internal	USA	SUXOS, UXOQCS, UXOSO,	UXO Team Leader	SUXOS, UXOQCS, UXOSO	SUXOS, UXOQCS, PM
Accident/Incident Reporting (CSIR)	As necessary	Internal	USA	UXOSO	UXOSO, Corporate HSM, PM	UXOSO, SUXOS, Corporate HSM, PM	UXOSO, PM, Corporate HSM
Activity Hazard Analysis/Risk Assessments	Once/As Required	Internal	USA	UXOSO/Corporate HSM	UXOSO	UXOSO, SUXOS, PM	Corporate HSM/PM
Visitor Briefing/Log	As necessary	Internal	USA	UXOSO	SUXOS	UXOSO	SUXOS
NOSSA Audit of NTCRA Project	NOSSA discretion	External	NOSSA	NOSSA POC	SUXOS/PM	SUXOS/ UXOQCS	UXOQCS/PM
State/EPA Quality Assessment Site Visit (discretionary)	State/EPA discretion	External	State/EPA	State or EPA POC	SUXOS/PM/ Navy RPM	SUXOS, UXOQCS, PM	PM/Navy RPM

32.0 MEC QAPP WORKSHEET #32 – ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES

(UFP-QAPP Manual Section 4.1.2)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (name, title, organization)	Timeframe for Response
Surveillance, Inspection or Audit	NCR	USA PM and SUXOS, QA	24 hours	NCR (QA)	RPM, NTR, USA PM and SUXOS	48 hours
Surveillance, Inspection or Audit	DN	USA PM and SUXOS, QA	24 hours	DN	RPM, NTR	48 hours

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33.0 MEC QAPP WORKSHEET #33 – QUALITY CONTROL MANAGEMENT REPORTS

(UFP QAPP Manual Section 4.2)

The QC management reports that will be generated for the project are listed below. All QC management reports will be included as attachments to the final project report, when appropriate.

Type of Report	Frequency (daily, weekly, monthly, etc.)	Projected Delivery Dates	Responsible Person(s)	Report Recipient(s)
Daily Production Report (includes Daily QC/Safety Report)	Daily	By noon the following day	SUXOS, UXOQCS	RPM
Preparatory Phase (PP) QC Inspection Report	Prior to start of each DFW	Close of business (COB) two days following briefing	UXOQCS	RPM
Initial Phase QC Inspection Report	The first day of each specific task start	COB two days following inspection	UXOQCS	RPM
Follow-up QC Inspection Report	Daily (each operational DFW)	COB two days following inspection	UXOQCS	RPM
Final Grid Inspection Report	Upon completion of the final grid inspection	COB two days following inspection	UXOQCS	RPM/QA
Monthly Status Report	Monthly	Per contract schedule	PM	RPM
QC Meeting Minutes	Weekly	COB two days after weekly QC meeting	UXOQCS	RPM
FCR	As required	As required	SUXOS, Team Leader or identifying person	RPM/QA
DCN	As required	As required	PM and PQCM	RPM
DN Report	As required	Within 24 hrs, following identification of deficiency	UXOQCS, PM, SUXOS	RPM/QA
NCR	As required	Within 24 hrs, following identification of nonconformance	UXOQCS, PM, SUXOS	RPM/QA

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34.0 MEC QAPP WORKSHEET #34 – VERIFICATION PROCESS (STEP I)

(UFP-QAPP Manual Section 5.2.1)

QC uses the three phase inspection method to assess and document project quality. Specific inspection timelines, references, forms, inspection procedures and corrective action criteria for each DFW are listed in Worksheet #35.

Table 34-1: Three Phase QC Surveillance Summary Table

Three Phase QC Surveillance Program	Description of QC Surveillance Program	Responsible Individuals to Verify Compliance
Phase 1: Preparatory Inspection	A **Preparatory Inspection** is a compliance inspection performed prior to beginning each DFW. The purpose of this inspection is to review applicable job specifications and verify the necessary equipment, personnel and controls are in place before work activities start. It is attended by all personnel involved in implementation of the specific DFW. QA will develop the briefing and the QCS will facilitate the briefing. The SUXOS will identify equipment available, verify plans are in place, equipment is available and describe in detail the work specifics outlined in the NTCRA Work Plan and SOPs. The UXOSO will brief all activity hazard analyses pertinent to the job. The QCS will discuss pass/fail criteria and provide a copy of the specific QC check sheet used to observe/grade the task to the SUXOS, Team Leader and RPM. The team leader and all team members will attend. This is where any questions concerning the task, safety equipment, quality standards, SOP, etc are discussed and agreed upon. The inspection is documented on a QC Preparatory Inspection Check sheet for that DFW.	UXOQCS
Phase 2: Initial Inspection	An **Initial Inspection** is performed the first time a parcel of work is started under a DFW. The purpose of the inspection is to check the preliminary work for compliance with procedures and contract specifications, to establish an acceptable level of workmanship, check safety compliance, review the preparatory phase inspection/briefing findings, check for any omissions, and resolve differences of interpretation before the task progresses too far. Additionally the following are checked: • Verify deficiencies identified during the preparatory phase were corrected and implemented. • Verify all equipment is used properly. • Verify quality workmanship is performed and acceptable. • The Initial Inspection is documented on the respective QC Initial Inspection Check sheet for that DFW.	UXOQCS
Phase 3: Follow Up Inspection	**Follow Up Inspections** start immediately after the initial phase QC inspection. They address the routine day-to-day activities of the project. During this phase, the items of concern observed are: • Daily inspection of active DFW to ensure the work remains in compliance with contract requirements, the NTCRA Work Plan, SOPs, and all other supporting documents. • Evaluate that the quality of workmanship is maintained at or above the levels established during the preparatory/initial phases. • Verify required equipment testing/checks/procedures are performed correctly and in accordance with procedures established at the preparatory phase and confirmed during the initial phase inspections.	UXOQCS

Three Phase QC Surveillance Program	Description of QC Surveillance Program	Responsible Individuals to Verify Compliance
	• Verify deficient items identified on QC punch lists were corrected/implemented in accordance with a corrective actions plan. All active DFWs are observed daily with the observation documented on a QC Follow up Inspection Check sheet for that DFW (Appendix D).	

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35.0 MEC QAPP WORKSHEET #35 – VALIDATION PROCESS (STEPS IIA AND IIB)

(UFP-QAPP Manual Section 5.2.2) (Figure 37 UFP-QAPP Manual) (Table 9 UFP-QAPP Manual)

Specific QC inspection points are listed for each DFW of the project. These points outline the QC procedure and corrective action criteria. This QC function is an integral part of each task and will be managed by the UXOQCS, who works closely with the PM and field managers to measure project and quality objectives. Identified quality criteria for the inputs and outputs of each process are identified and used as a basis to assess each task. The UXOQCS completes the three phase QC process listed in Worksheet #34 to ensure that tasks are satisfactorily completed; opportunities for improvement are identified and incorporated into the project. Those tasks that are deficient or unacceptable will be identified and documented as non-compliant (deficiency notice or non-conformance reports). QA will conduct a root cause analysis and recommend a corrective action.

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DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
Mobilize and Prepare the Site	Once	MEC QAPP, SOPs, Administrative Documents	Administrative Documents and SOPs, PP Inspection Check sheets, DN	• Set up office facilities/utilities/internet/site communications/sanitary facilities, etc. • Inventory equipment and verify serviceability, calibration and accuracy • Verify all personnel are qualified and trained for the positions filled • Exercise the emergency action plan and coordinate with local emergency services (medical clinic, fire department, EMT support, etc.) • Set up an IVS for the hand held metal detectors. Determine and document the instrument settings for no-finds verification and validation. • Locate an established survey control benchmark or establish a local GPS control point network. • Survey and stakeout the grids in the work areas. • Survey and stakeout temporary road locations. • Survey and stakeout the drainage improvement locations. • Conduct UXO surface clearance prior to DGM activities • Prepare the portable explosives storage magazines for use (e.g., siting, security, locks, signage, etc.) • Prepare the MDAS flashing site (TFU) for use in accordance with SOP 10	• Any of these tasks are not completed, are incorrect or not in compliance with the administrative requirements or SOP metrics.

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• Conduct site orientation and training on the NTCRA Work Plan and SOPs. Personnel to review all project plans and SOPs, attend the training and acknowledge by signature. • Conduct Preparatory Inspections on all non-administrative DFWs in accordance with the NTCRA Work Plan. • Prepare the Exclusion Zone Entry Authorization Letter authorizing Navy (NTR, RPM) and QA personnel unrestricted access to the EZ (Pre-Mobilization) • Prepare the MPPEH Inspection and Certification Letter for signature by the Commanding Officer NAVFAC (Pre-Mobilization)	
Surface Clearance	Daily	SOP 5	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign attendance roster • Establish environmental controls for refueling and fuel spill prevention and cleanup • Don the approved PPE for the task assigned • Cut grass to not less than 6 inches of the ground surface or tundra mat	• Safety briefing not held or not documented • Refueling stations not established or incorrectly used • Improper PPE • Grass not cut to the proper height
Remove Vegetation	Daily	SOP 5	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign attendance roster • Establish environmental controls for refueling and fuel spill prevention and cleanup • Don the approved PPE for the task assigned • Cut grass to within 6 inches of the ground surface or tundra mat	• Safety briefing not held or not documented • Refueling stations not established or incorrectly used • Improper PPE • Grass not cut to the proper height

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
Install the Instrument Verification Strip(s) (administrative)	Once, upon installation	GSV Plan	N/A	• Verify that the location for the IVS has been cleared. • Procure sufficient ISOs to install the IVSs following the procedures in the GSV Plan • Procure sufficient ISOs to support the blind seeding program • Select the area and install the IVSs following the procedures in the GSV Plan • Select the locations and install the blind seeds (nominally one per grid) and log the information for each seed as required by the GSV Plan • Set up the spreadsheets to document, plot, track and archive the results of the daily IVS testing to be conducted during DGM activities • Set up and test the data transfer process	• IVS not installed according to the GSV Plan • Initial IVS test results do not match the expected results • Blind seed ISOs not installed according to the GSV Plan
Conduct DGM	Daily	SOP 2, SOP 3, and GSV Plan	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign the attendance roster • Assemble and warm-up the DGM equipment in accordance with SOP 2 and collect data from the IVS following the procedures in the GSV Plan. Review the data on-site to verify and then document that the equipment is operating within specification. IVS data are to be collected, reviewed and then documented at the beginning and at the end of data collection for each work day DGM is conducted. Each DGM team must execute this task.	• IVS testing results do not match the expected results • Data collection procedures not in compliance with SOP 2 • Data processing produces a target list which is inconsistent with a list generated by QC or QA • DGM QC-check data show QC checks which do not meet project metrics

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• Collect geophysical data at the assigned area following the procedures in SOP 2. • Process the geophysics data following the procedures in SOP 2 and generate a target list in the required format. • Log the required DGM QC-check data (SOP 2) and transfer those data daily using the approved project data management processes (e.g., server, website, etc.) • Conduct QC inspections on the DGM data and submit the data to QA for target list concurrence. Reconcile QA target picks with the production target lists.	
Reacquire Target Anomalies (survey location stakeout and measurement)	Daily	SOP 7	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign attendance roster • Conduct daily instrument inspections and function checks for serviceability and accuracy (GPS base station and rover units and metal detectors) following the procedures in SOP 2 and SOP 7. • Navigate to the DGM target location using the RTK DGPS system to within ± 0.5-ft (15-cm) of the target coordinates obtained from the DGM survey data • Mark the interpreted DGM target location at the stakeout location with a uniquely numbered pin flag and measure the reacquired location with the RTK DGPS.	• GPS fails accuracy criteria • Metal detectors fail in IVS • Team unable to navigate using GPS to an acceptable degree of accuracy • DGM target location not correctly stakeout, marked or measured with GPS • Polar plot or spreadsheet of reacquired positions shows excessive targets outside the 0.5-ft (15-cm) metric.

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• Monitor DGM target data accuracy and report to QC immediately if the number of no-finds exceeds 8% of the total targets per grid. • Download the reacquired coordinates daily. QC will track the accuracy of the reacquired locations compared to the locations from the data against the 0.5-ft (15-cm) metric.	
Conduct Intrusive Investigations of Anomalies	Daily	SOP 8 and MEC QAPP	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign the attendance roster • Conduct daily instrument checks of the hand-held detectors at the IVS and document the results • Set up exclusion zone barricades with signs at all access roads and mark appropriately: Danger, UXO Remediation Project in Progress, DO NOT ENTER and list contact information on the barricade sign • Monitor re-growth of vegetation and cut as necessary • Use dig techniques for manual and heavy equipment as specified in SOP 8, and SOP 12. • Investigate each DGM target to a maximum Rcrit (2.5-ft (0.762-m)) of the pin flag position and either the 2-ft (0.6-m) or 4-ft (1.2-m) depth. Stop excavations when the DGM target source is removed or the 2-ft (0.6-m) or 4-ft (1.2-m) depth is reached. Document if anomalies remain at the target site below the 2-ft (0.6-m) or 4-ft (1.2-m) depth where additional investigation may be required.	• GPS fails accuracy criteria • Metal detectors fail in IVS • Improper dig techniques • Anomalies not investigated and resolved according to project criteria • Item(s) incorrectly identified and/or categorized • Dig sheets incorrectly filled out • MEC and MDEH not photographed • Safe to move MEC not documented in writing • Excavations not backfilled • Dig sheet information incorrectly entered into project database

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• Implement a three tier DGM target inspection process to positively identify the item. The first inspection is performed by the UXO Tech discovering the item, the second inspection is performed by the UXO Team Leader and the third inspection, by the SUXOS. The SUXOS will inspect 100% of MEC/MDEH. The SUXOS, UXOQCS or UXOSO will inspect 10% of MDAS and general scrap prior to placing in storage at the RAA. Personnel approved in writing by NAVFAC NW CO must inspect and certify MDAS status prior to transporting to unsited storage or TFU processing facility. Record all intrusive investigation results on the DGM target dig sheet • Record all MDAS and general scrap using the relative-weights system found in SOP 13 (for each individual item) and by daily total weights (not individual item weights). • Photograph all MEC/MDEH using the filled out MEC/MDEH photo card (SOP 12) in the background • Positively identify MEC/MDEH by its nomenclature and fuzing, determine its condition and whether it is safe-to-move for storage or requires BIP. Document all 'safe to move' MEC/MDEH in writing. • Backfill excavations within 24 hours • Transcribe or transfer daily field activity results into the project database	

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• For RAA-01 and RAA-05/ALDA-01, perform a surveillance of each production team each day and check 5% of broadcasted spoils to ensure that removal metrics are met.	
Conduct Intrusive Investigations using armored Heavy Equipment	Daily	SOP 12	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign the attendance roster • Perform daily operations checks on heavy equipment in accordance with the operator's manual • Remove the overburden in the work area in 1-ft (0.3-m) to 2-ft (0.6-m) lifts and place the overburden adjacent to the excavation for inspection by a UXO Technician • Continue with the excavation/inspection routine until the target depth of removal has been reached • Backfill the excavation and restore the area to its original grade	• Procedures in SOP 12 not followed • Excavation depth too shallow • Excavation not backfilled and returned to grade
Conduct Soil Sampling	Per event	MC QAPP	MC QAPP, SOP 14 & SOP 17	• Attend a daily safety briefing and sign the attendance roster • Collect soil samples according to the MC QAPP and its supporting SOPs • Ship the soil samples under a chain-of-custody to the laboratory • Receive analytical data from laboratory • Assess the QC of sampling and analytical methods • Send data for third party data validation • Reduce and interpret analytical data	• Soil samples improperly collected • Soil samples improperly labeled and documented • Soil samples improperly prepared for shipment • Incorrect analysis ordered or performed • If additional soil is removed, confirmation sample(s) not taken and analyzed • Soil removed not properly disposed

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
				• If required, remove contaminated soil and package the soil for off-island disposal • Collect confirmation samples according to the MC QAPP and its supporting SOPs • Remove additional soil, if needed or ship the contaminated soil off-site to the approved facility for disposal	
Dispose of MEC/MDEH	Per Event	SOP 9	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance Form, DN, NCR	• Conduct specific training on demolition procedures including the use of the Remote Firing Device (RFD) • Station road guards with communications at exclusion zone safety limits to stop unauthorized traffic as needed • Coordinate with the local community, other contractors and emergency services prior to operations • Conduct MEC disposal in accordance with SOP 9, the ESS and NAVSEA OP5 • Verify the site is clean after demolition operations. Inspect for kick-outs and collect MDAS for inspection, flashing and recycling. • Restore the demolition site by backfilling and re-seeding, as required by CWP (Appendix C).	• RFD improperly used • Exclusion zone safety limits improperly applied • Notifications improperly made • MEC and/or MDEH disposal not in compliance with SOP 9, the ESS and NAVSEA OP5 • Demolition site not properly restored
Manage and Dispose of MDAS	Daily, Per Event	SOP 10	Preparatory, Initial and Follow-up QC Check sheet, QC Surveillance	• Attend a daily safety briefing and sign the attendance roster • Store MDAS in the approved storage area in accordance with SOP 10 • Flash MDAS in the TFU in accordance with SOP 10	• MDAS improperly stored • TFU improperly operated • MDAS improperly packaged for shipment • Verification of destruction

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
			Form, DN, NCR	• Inspect and certify MDAS prior to flashing. • Package and ship MDAS with chain of custody documentation to an authorized recycling facility in accordance with SOP 10 • Verify destruction of MDAS by the authorized recycling facility with receipt of chain of custody form • Verify all MDAS that required demilitarization was treated, inspected, certified, flashed, separated from other MDAS and shipped to an authorized demilitarization contractor.	not received or not properly documented • Verification of demilitarization not received or properly documented
Perform Incidental Road and Drainage Construction	Daily	Construction Work Plan	QC Surveillance Form, DN, NCR	• Attend a daily safety briefing and sign the attendance roster • Install the temporary roads in accordance with the CWP (Appendix C) • Improve the drainage in Moffett Valley and lower the culverts into Andrew Lake in accordance with the CWP (Appendix C) • Improve the existing roads in accordance with the CWP (Appendix C)	• Improper installation of temporary roads • Drainage and existing roads damaged or condition worsens because of improper construction techniques
Manage the Project Data (administrative)	Daily	MEC QAPP, SOPs, Administrative Documents	QC Surveillance Form, DN, NCR	• Set up, test and manage the project data exchange activity in accordance with corporate policies • Authorize access to data as required in the MEC QAPP and supporting documentation	• Data exchange activity not functioning • Personnel unable to access authorized data

DFW	Surveillance Frequency	Reference	Forms Used	The UXOQCS will verify the following:	Corrective Action Criteria
Perform Quality Control (administrative)	Daily	MEC QAPP, SOPs, Administrative Documents	QA Surveillance Form, DN, NCR	• Perform the required inspections (Preparatory, Initial and Follow-up) according to the schedule in Worksheets 34, 35 and 37 • Perform grid inspections in accordance with Worksheets 34 and 35 and provide final grid certification of completion • Set up, test and maintain a data exchange process with QA and provide required deliverables	• Required inspections improperly performed • Grid inspections improperly performed • Required deliverables not provided to QA or not provided on schedule
Demobilize (administrative)	Per Event	MEC QAPP, SOPs, Administrative Documents	QC Surveillance Form, DN, NCR	• Review project data requirements (data, completeness and archiving) • Verify accuracy of the project database • Remove office facilities, shut off utilities, disconnect internet and site communications and remove field sanitary facilities, from site • Verify all excavations are backfilled • Verify all UV trails are repaired • Verify no siltation occurred in downstream areas (EPP) • Remove the IVSs, unless the contractor is returning for another field season • Inspect MPPEH operating and storage areas and verify they are empty and clean • Demobilize personnel	• Demobilization activities incomplete • MEC, MDEH and donor explosives not destroyed or removed from the site • MDAS not removed or secured • IVSs not removed or secured

36.0 MEC QAPP WORKSHEET #36 – ANALYTICAL DATA VALIDATION SUMMARY (STEPS IIA AND IIB)

(UFP-QAPP Manual Section 5.2.2.1)

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37.0 MEC QAPP WORKSHEET #37 – USABILITY ASSESSMENT

(UFP-QAPP Manual Section 5.2.3)

The table below identifies the primary deliverables that provide the data to support RAA certification that the removal has been conducted to the standard of the DQOs. It also identifies the QC documentation to support the primary deliverables. These documents, the primary and QC backup, are the documents that will be used to certify each RAA as completed. The QA activities are identified for reference.

Primary RAA Certification Deliverable	QC Backup for Primary Certification Deliverable	QA Verification for Primary Certification Deliverable [1]
DGM Data	• Instrument QC Data Table (e.g., static tests, standardization, etc.) • IVS results (x2)	• IVS Results (x2) • Instrument QC Data Table
Target List	• DGM Data Processing QC Deliverable • QC Reprocess and Compare Target Picks (10%) • QC Seed Verification (amplitude, fit to IVS, coordinate location)	• Reprocess and Compare Target Picks (100%) • QA Seed Verification (amplitude, fit to IVS, coordinate location)
Completed Dig Sheet	• Dig Results Audit (QC seed, amplitude-item comparison, completeness, accuracy of reporting) • Follow-on Inspection Check sheet for Intrusive Investigation	• Dig Results Audit (QC and QA seed, amplitude-item comparison, completeness, accuracy of reporting) • QA audit of intrusive investigation
Final QC Grid Inspection and Sign-off	• 10% Hole Checks • 100% no find checks, with large coil Vallon • QC DGM and Intrusive Investigation of Targets • Backfill and Restoration	• All checks pass
Grid Certification	• None	• Resolution of all DN/NCR • Final Grid Audit (may include physical inspection, additional DGM or just a records review)

Notes:

(1) QA performed by an independent Navy QA contractor.

Descriptions of the detailed backup required to satisfy these primary deliverables are listed in Worksheet #35 above. RAA certification will require that all backup be provided and cataloged in digital format. The information will be organized so that Navy can easily access the documentation on an ongoing basis during the project. An example backup validation and documentation table is provided in Table 37-1. In this example, entries would provide links to the digital documents (forms) utilized for the relevant DFWs at the frequency listed.

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Table 37-1: Example of the Backup-Validation and Documentation of QC Inspections for RAA Usability Assessment

WS37 Example of Backup-Validation and Documentation of QC Inspections				RAA-			
Definable Feature of Work (DFW)	**Surveillance Frequency**	**Reference**	**Forms Used**	**Grid ID**	**Grid ID**	**Grid ID**	**Grid ID**
Mobilize and Prepare the Site	Once	MEC QAPP, SOPs, Administrative Documents	Administrative Documents and SOPs, PP Inspection Checklists, DN				
Remove Vegetation	Daily	SOP-02	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Install the Instrument Verification Strip(s) (administrative)	Once, upon installation	GSV Plan	N/A				
Conduct Digital Geophysical Mapping	Daily	SOP-04, -05, GSV Plan	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Reacquire Target Anomalies (REAC)	Daily	SOP-06	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Conduct Intrusive Investigations of Anomalies	Daily	SOP-03, -07, -08, -09, -10, MEC QAPP	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Conduct Intrusive Investigations using Heavy Equipment	Daily	SOP-08	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Conduct Soil Sampling	Per event	MC QAPP	MC QAPP, SOP-14				
Dispose of MEC and MDEH	Per Event	SOP-09	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				
Manage and Dispose of MDAS	Daily, Per Event	SOP-10, -11	Preparatory, Initial and Follow-up QC Checklist, QC Surveillance Form, DN, NCR				

WS37 Example of Backup-Validation and Documentation of QC Inspections				**RAA-**			
Definable Feature of Work (DFW)	**Surveillance Frequency**	**Reference**	**Forms Used**	**Grid ID**	**Grid ID**	**Grid ID**	**Grid ID**
Perform Incidental Road and Drainage Construction	Daily	Construction Work Plan	QC Surveillance Form, DN, NCR				
Manage the Project Data (administrative)	Daily	MEC QAPP, SOPs, Administrative Documents	QC Surveillance Form, DN, NCR				
Demobilize (administrative)	Per Event	MEC QAPP, SOPs, Administrative Documents	QC Surveillance Form, DN, NCR				

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FINAL

APPENDIX A. STANDARD OPERATING PROCEDURES

Non-Time Critical Removal Action

For the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
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Prepared by:

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Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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1.0 STANDARD OPERATING PROCEDURES

This appendix contains the following Standard Operating Procedures (SOPs) associated with work on the OU B-2 NTCRA on Adak Island, Alaska.

- SOP 1 – MEC Avoidance
- SOP 2 – Digital Geophysical Mapping
- SOP 3 – Geophysical Data Processing and Interpretation
- SOP 4 – Utility Vehicle Operation
- SOP 5 – Vegetation Removal and Surface Clearance
- SOP 6 – Boundary and Grid Stakeout
- SOP 7 – DGM Target Reacquisition
- SOP 8 – Intrusive Investigation
- SOP 9 – MEC Management and Disposal
- SOP 10 – MDAS Management and Disposal
- SOP 11 – Explosives Storage and Transportation
- SOP 12 – EMM Operations
- SOP 13 – Data Management
- SOP 14 – Soil Sampling
- SOP 15 – IDW Handling
- SOP 16 – Laboratory SOP for 8033B
- SOP 17 – Field Test Kit for TNT and RDX
- SOP 18 – Waste Soil Containerization and Disposal

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1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

MEC AVOIDANCE

SOP 1

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
EM	Engineer Manual
GSV	Geophysical System Verification
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) Unexploded Ordnance (UXO)-qualified personnel to conduct munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH), avoidance procedures during the activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct avoidance operations.

Developed by:

James Walden — 19 February 2013

James Walden
Project Quality Control Manager

Date

Reviewed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide USA employees and subcontractors with the minimum procedures and safety and health requirements applicable to conduct and observe MEC avoidance procedures during operations within the identified Remedial Action Areas (RAAs) of the former NAF, Adak.

7.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct and adherence to MEC avoidance procedures during the activities within the identified RAAs on the former NAF, Adak. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the APP, applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.3 MEC/MPPEH BASIC SAFETY PRECAUTIONS

The following basic safety precautions will be observed while conducting MEC avoidance procedures.

- Do not touch or disturb MEC items; mark their location with a red pin flag and avoid them.
- Avoid the forward portions of munitions employing proximity fuzing.
- Do not expose electrically fired munitions to radio, cell phone or satellite phone transmissions within 25-ft (7.6-m).
- Do not collect souvenirs.
- Do not smoke except in designated areas.
- Do not carry fire- or spark-producing devices into the exclusion zone (EZ).
- Prohibit non-essential personnel from encroaching upon the site.
- Suspend all operations immediately upon approach of an electrical storm.

7.4 MEC AVOIDANCE

MEC avoidance operations may be required in support of the installation of the instrument verification strip (IVS), blind seeds, surveying and marking grid corners, and other non-MEC field activities requiring intrusive activities or access by non-UXO qualified personnel (e.g., soil sampling, visitor access to the EZ).

If MEC items are encountered during the activities listed above, the UXO Technician will place a red pin flag near the item, record identification and location information in the Personal Digital Assistant (PDA), take a photograph, advise all personnel of the item's location and avoid the items throughout the conduct of the activity. Under no circumstances will MEC be handled.

7.4.1 Avoidance Procedures for IVS Installation

The Instrument Verification Strip (IVS) general location is selected in accordance with the approved Geophysical Systems Verification (GSV) Plan. The IVS location is further refined by UXO Technicians conducting an instrument aided surface sweep in order to find areas "clear" of metallic debris that will

adversely affect the ability of the digital geophysical mapping (DGM) equipment (EM61 MK2) to measure the responses of the IVS test items.

7.4.2 Avoidance Procedures for Blind Seed Installation

Blind seeds [small Industry Standard Objects (ISOs)] will be installed semi-randomly at a frequency of approximately one seed per acre throughout the accessible portions of each RAA. An area 3-ft (0.9-m) around each seed emplacement will be scanned with a handheld metal detector prior to emplacement to ensure the area is free from other surface or subsurface anomalies. Holes will be excavated with a shovel. At some locations the tundra will be peeled back prior to excavation of the hole.

The blind seeds will be emplaced and documented in accordance with Subsection 5.2 of the GSV Plan.

7.4.3 Avoidance Procedures for Location Surveys and Soil Sampling

MEC encountered will be marked, avoided, and recorded as stated above. Prior to driving stakes for grid corners, installing monuments or soil sampling, the UXO Technician will search the location with a handheld metal detector. Any subsurface anomaly will be assumed to be MEC and an alternate anomaly-free location will be chosen.

7.5 WORK CLOTHING AND FIELD SANITATION

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D personal protective equipment (PPE), which includes the following.

- Short- or long-sleeved cotton coveralls or work clothing will be worn.
- Footwear will be sturdy work boots or rubber boots as appropriate (i.e., lug sole and of sufficient height for ankle support). UXO personnel will not wear steel-toe safety boots when using metal detectors.
- Safety glasses.
- Inclement weather gear as required.

The team will be outfitted with field decontamination equipment, which will consist of containers of water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

7.6 QUALITY CONTROL

The only specific quality control metrics for the MEC avoidance task are to perform a check on the all-metals detector to ensure it is functioning properly and conduct a communications check. The team will ensure all other equipment needed for the supported task is functional prior to departing for the RAA.

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8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the MEC avoidance task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
MEC Avoidance	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
				area with the metal detector, prior to digging or placing a pin flag into the ground.	
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA. The Activity Hazard Analysis (AHA), in Appendix A of the APP (for the activities the team will perform), will be reviewed and signed by all team personnel.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO technician providing MEC avoidance escort services will be equipped with the following:

- Handheld all-metals detector
- Red pin flags for marking suspected MEC items
- Logbook and/or PDA for recording data
- Camera
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

DIGITAL GEOPHYSICAL MAPPING

SOP 2

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
BC	Back Check
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
FTL	Field Team Leader
GPS	Global Positioning System
ID	Identification
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
POC	Point of Contact
PQCM	Program QC Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Areas
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc.
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist

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ATTACHMENT 1: EM61 AND DGPS OPERATION
ATTACHMENT 2: DGM CHECKLISTS
ATTACHMENT 3: TRANSECT DEVIATION CHECKLIST
ATTACHMENT 4: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct digital geophysical mapping (DGM) activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct the DGM operations.

Developed by:

Alan Crandall
Project Geophysicist

2/22/2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

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_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures and technical guidance on performing DGM to collect data on targets for potential intrusive investigation during the munitions and explosives of concern (MEC) activities at the Remedial Action Areas (RAAs), Former NAF, Adak, Alaska. The geophysical instrumentation will be used in conjunction with a real time kinematic (RTK) differential global positioning systems (DGPS) on Adak during the clearance. In addition, this SOP ensures that data will be acquired in a consistent manner during this clearance. It also identifies general quality control (QC) procedures to be performed by field personnel and verification points for use by the field QC staff.

7.2 SCOPE

This SOP outlines the procedures used for the collection of geophysical and associated coordinate data at RAAs, Former Naval Air Facility, Adak, Alaska. To support this activity, USA will use the Geonics EM61-MK2A, a high-resolution time domain electromagnetic induction sensor capable of detecting both ferrous and non-ferrous metallic objects in conjunction with RTK-DGPS to detect subsurface metallic objects, potentially related to MEC.

7.3 PROCEDURES

The following set of procedures is subdivided into procedures for the RTK DGPS base station and procedures followed at RAAs for conducting DGM.

7.3.1 RTK DGPS Base Station Procedures

The RTK DGPS base station will be set up on a known survey control point, established for each RAA, using coordinates provided for each point (see Attachment 1). The base station setup will be verified by using at least one rover RTK DGPS receiver to measure a second known location. This reoccupation test should confirm that the measured location is within 0.328-ft (10-cm) from its known location. See Table 1 below for survey control and back check (BC) point locations. For this project, survey control is based on the Adak Tidal Bench Mark 18. This is a second order horizontal and a third order vertical control point.

Table 1: USA Control Monuments

NAD83 Alaska State Plane Zone 10 US Survey Feet				
Monument	**Easting (US ft)**	**Northing (US ft)**	**Elevation (US ft)**	**Comment**
Bench Mark 18	3135925.289	315129.185	38.96	NGS second order horizontal Control Point
BR-06	3128679.075	318792.887	404.673	NGS third order horizontal Control Point
ADK-401	3135732.455	334516.414	285.936	USA Control Point
ADK-401 BC	3135732.995	334497.841	286.008	USA Back Check
RAA03 Base	3132871.712	340487.023	74.627	USA Control Point
RAA03 BC	3132885.27	340474.075	73.57	USA Back Check
ARA Base	3142011.549	345457.498	108.803	USA Control Point
ARA BC	3142015.412	345429.809	108.444	USA Back Check

Note that if there are multiple RTK DGPS base stations operating simultaneously in different RAAs, each base station radio will broadcast corrections on a different channel.

Unless a permanent full-time RTK DGPS base station is established, at the end of the day, deactivate RTK DGPS base station and radio modem. Disconnect and pack all equipment. Return to storage location. Recharge batteries.

7.3.2 RAA DGM Procedures

1. Mount the RTK DGPS rover antenna on the EM61-MK2A using the antenna mount. The antenna should be mounted and centered directly above the EM61-MK2A coil.
2. Turn on the EM61-MK2A and RTK DGPS rover units. Perform morning IVS QC tests (see Attachment 1 for equipment setup and operation and IVS checklist).
3. Proceed with the geophysical survey, without disassembly. Daily survey procedures include:
   - Sensor warm up for at least 5 minutes.
   - Sensor nulling and RTK DGPS input check.
   - Perform morning IVS QC tests (see Attachment 1).Transfer IVS data for morning evaluation and mobilize to production area. Null sensor. Note: Attachment 2 Out of the Box Equipment Checklist (Static test) is available for the Site Geophysicist, DGM Team Leaders, and the QC team to use as an additional troubleshooting tool, as necessary.
   - Input and record file name for survey.
   - Acquire survey data along longest area survey line or along site slope, up to 30 degrees as measured by an inclinometer.
   - Monitor sensor, battery, and RTK DGPS periodically.
   - Mark outer coil coverage with plastic pin flag or sand bag every 23 to 50-ft (7 to 15-m).
   - Insure sensor overlap on adjacent transects, move marking guides to outer coil coverage.
   - Continue until area is completely covered, battery needs replacing (e.g. EM61-MK2A battery reaches <12.0 volts or data logger battery reaches last segment or RTK DGPS power light flashes), or a break is required. An attempt will be made to include at least two grid corners in each data file.
   - Download morning survey data with daily instrument checks at lunch break.
   - Change and charge batteries, as required.
   - Acquire afternoon survey data.
   - Perform afternoon IVS QC tests (See attachment 1). Following these tests perform end-of-day tasks, including:
   - Download afternoon survey data with instrument checks.
   - Secure the EM61-MK2A and RTK DGPS equipment.
   - Charge all batteries overnight.
   - The logbook pages are photocopied and transferred to the Site Geophysicist.
   - The data files are submitted to the Site Geophysicist.
   - The completed survey areas are recorded in the tracking log and/or reported to the Site Geophysicist.
   - The logbook pages are accessible for verification by the field quality control (QC) staff that may inspect them weekly.

- Plan next day's activities.

4. One member of the team will be responsible for maintaining the logbook. Record the following information in the logbook:
   - Survey area ID
   - Time survey started
   - Time survey completed
   - Names of team members
   - Weather conditions
   - Serial numbers of RTK DGPS rover unit and geophysical instrumentation
   - File names for the digitally recorded data. Each page of the logbook will be dated, sequentially numbered, and identified by the logbook number; all entries will be signed. The assigned DGM team member will place photocopies of the logbook pages in the appropriate folder located in the processing center at the end of each work day.

7.3.3 Data Acquisition

The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether re-collection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks.

Survey speeds are kept below 4.77 mph to maintain an along-line sample separation 98% <= 0.5-ft (15-cm), with a sampling rate of 14 Hz. Surveys typically begin along the site's longest boundary to minimize turnaround time. Areas of the site that remain inaccessible to the DGM team [e.g., obstacles, slopes greater than 30 degrees, and areas of water (standing or running) that make it unsafe or impossible to collect data] will be documented in the positioned sensor data maps. Daily survey procedures are described in section 7.3.2 and Attachment 1.

7.4 DEVIATION FROM MAPPING PROCEDURES

Deviation from geophysical survey transect spacing and orientation will be determined and documented in the field. DGPS coordinates will be obtained at the beginning and end of the deviation. The Field Team Leader (FTL) will be responsible for determining whether an area is considered inaccessible due to site conditions. The FTL will designate one member of the team to document deviation from survey waypoints in cases where one or more waypoints are missed due to terrain, slope, or other conditions that make the area impassable by foot. The DGM Checklists, presented as Attachment 2, provide examples of such conditions and may be used in the field by the survey team to assist in documenting deviations, in addition to Attachment 3, Transect Deviation Checklist. The following steps are recommended to perform transect deviation documentation:

- The FTL will designate one member of the team to perform documentation activities on a daily rotation schedule. The team member will be responsible for completion of the checklist, logbook entries, slope measurements, and photo documentation.
- Deviations will be tied to waypoint designations. If deviation is necessary, the waypoints included in the total extent of the deviation will be noted and will provide, through the waypoints-associated RTK DGPS location, specific map coordinates. RTK DGPS coordinates will be obtained at points of deviation that are not at designated waypoints.

- Slope measurements will be taken by the geophysical team with an inclinometer at a slope-related deviation. Slopes greater than 30 degrees are considered inaccessible. The inclinometer will be positioned on a straight 2- to 3-ft board or pipe placed on the ground at the site selected for measurement. Use of a board or pipe will aid in averaging some of the smaller local changes in slope while providing a steady surface for the inclinometer. Any areas determined to be inaccessible due to slopes greater than 30 degrees will be documented.

  Logbook deviation documentation will include:

  1. Date
  2. Time
  3. Transect designation
  4. Waypoint number
  5. Slope measurements (if necessary)
  6. Photo number
  7. Photo description including orientation
  8. Feature type and description
  9. Reason for deviation (Transect Deviation Checklist in Attachment 3)
  10. RAA information

- A photographic record of the deviation will be generated by the documentation team member. A digital camera will be used to record a minimum of one photo of each deviation area. The photographs will be downloaded by data management personnel at the end of each day.
- The area of deviation will also be noted on a topographic map to the extent possible.

All documentation will be archived in the same manner as other survey documentation. Quality Assurance (QA) contractor personnel will review the documentation to facilitate the determination of inaccessible areas.

7.5 FIELD DATA COLLECTION

The field data collected includes the EM61-MK2A data, RTK DGPS data, digital photographs and inclinometer measurements.

7.5.1 EM61-MK2A and RTK DGPS Data Collection and Recording

EM61-MK2A data include all electronic geophysical instrument data produced during the DGM. RTK DGPS survey data include all electronic positional data produced during the mapping. Procedures for use of the EM61-MK2A and RTK DGPS units are provided in Attachment 1.

The DGM team will document all aspects of their activities using the following checklists:

- Checklist for Daily Instrument Checks (see Attachment 2)
- Survey Area Report Form (see Attachment 2)

- Checklist for Data Storage and Transfer (see Attachment 2)
- Checklist for Field Editing (see Attachment 2)

7.5.2 Photographs

Digital photographs will be taken of all geophysical survey areas. Digital photographs will also be taken to document site conditions and/or obstructions during geophysical surveying (e.g., standing water, debris, or slopes greater than 30 degrees). Each team will maintain a photo log in their field logbook. The date, time, and subject of each photograph will be recorded at the time the photograph is taken. The digital cameras and copies of the photo logs will be given daily to the Site Geophysicist for entry into the photo tracking form and will be upload to the project computer.

7.5.3 Inclinometer Measurements

Inclinometer measurements will be taken of inaccessible areas as a result of slopes greater than 30 degrees. Digital photographs will be taken of the inclinometer in place. Descriptive information along with the coordinate of the slope area will be recorded in the TL logbook.

7.6 DGM FIELD DATA DELIVERABLES

DGM team leaders scan their log book and checklists and provide to the Site Geophysicist, along with copies of their daily QC and Production data files at the end of each work day. The Site Geophysicist compiles the daily log book scans, DGM data, and checklists for each DGM team and delivers them to the Data Manager at the end of each work day. The Data Manager reviews each deliverable for completeness, and notifies the field QC staff that the day's data delivery requirements, for each DGM team, have been met. If there are deficiencies in the daily DGM data deliverables, the Data Manager notifies the Site Geophysicist for follow-up and correction. The field QC staff provides a copy of their 3-phase inspection checklist.

7.6.1 Raw Data by Date for Processing Center

All raw data to include log books and daily forms uploaded to the QA contractor's SharePoint site within 24 hours of data collection. Data submittals arranged by date and team. Files and forms include:

- Raw data files (*.R61, *.M61, *.N61, or *.Survey)
- Scanned DGM Log Books (*.pdf)
- Scanned DGM Survey Area Forms (*.pdf)
- Scanned Transect Deviation checklist (*.pdf)
- Survey area pictures (*.jpg)
- Field RTK DGPS Tracking form (*.xlsx)
- Field IVS Tracking form (*.xlsx)
- Field Editing form (*.xlsx)
- Data Storage and Transfer form (*.xlsx)

7.7 QUALITY CONTROL

The DGM teams will conduct and document the daily quality control test listed in Subsection 7.6.1 and meet the QC metrics listed on the attached QC Surveillance check sheet at Attachment 4.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any DGM tasks the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS and QA. The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

7.7.1 Daily Quality Control Tests

The DGM team will set up the equipment, verify that all equipment has survived transportation and is operational, and perform the following daily quality control tests, at a minimum:

- Sensor warm up of at least 5 minutes each time the sensor is turned on
- Sensor nulling and RTK DGPS input check
- Acquire morning IVS and noise strip data as established by the Geophysical System Verification (GSV) Report (±20% or ±2x the standard deviation, whichever is greater of the previous week's average, ± 9.8-in (± 25-cm).
- The Site Geophysicist will transfer these morning QC tests (e.g. exchange memory cards or download data) while the DGM team begins production DGM. The QC tests will be examined for conformance to project metrics each morning. The Site Geophysicist notifies each DGM team leader of their Pass/Fail status each morning. Any failures will require equipment/personnel checks, replacement/repair, retesting prior to proceeding to production DGM, and re-collection of affected data.
- Acquire afternoon IVS and noise strip data as established by the Geophysical System Verification (GSV) Plan (±20% or ±2x the standard deviation, whichever is greater of the previous week's average, ± 9.8-in (± 25-cm).

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 2) lists the existing and potential hazards associated with conducting the DGM task along with methods to mitigate the hazards.

Table 2: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Digital Geophysical Mapping	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the Accident Prevention Plan (APP)	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	Material Potentially Presenting an Explosive Hazard (MPPEH)	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel shall be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. All personnel will maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The teams conducting DGM operations will be equipped with the following:

- RTK DGPS
- EM61-MK2A
- Logbooks for recording data
- Inclinometer
- Camera
- Communications equipment
- Argo support vehicle

Safety equipment required includes the following:

- First-aid kit
- Level D Person Protection Equipment
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
EM61 AND DGPS OPERATION

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EM61-MK2A AND RTK DGPS OPERATION

The following is intended to provide general instructions for data acquisition with an EM61-MK2A geophysical instrument coupled to an RTK DGPS system. As various independent government contractors use a variety of RTK DGPS systems, the setup and collection of RTK DGPS data will vary with each system. The manufacturer's instruction manual should be consulted in these situations.

The following procedures are provided to assist in establishing a consistent data acquisition process. The procedures will be adhered to during data acquisition activities to ensure that the data collected are of sufficient quantity and quality to meet the program objectives. The Site Geophysicist is responsible for ensuring that these guidelines are followed, and that the data acquisition staff is adequately trained to operate the equipment.

RTK DGPS Equipment and Set-up

As each independent government contractor may use various RTK DGPS systems, the setup and collection of RTK DGPS data will vary with each system. The manufacturer's instruction manual should be consulted in these situations. Check base station setup by reoccupying and measuring a known point with at least one rover receiver each morning. Each measured location should be within 0.328-ft (10-cm) from the known location.

EM61-MK2A Setup:

1. Assemble coil assemblies
2. Attach wheels and handle or stretcher [as demonstrated at the Instrument Verification Strip (IVS)]
3. Attach rover GPS antenna mount and mount rover GPS
4. Connect upper coil to lower coil connector or attach shorting plug for bottom coil only
5. Attach battery to electronics console
6. Connect coil cable to electronics console
7. Connect data cable to electronics console and Data Logger COM1
8. Connect GPS to EM Data Logger COM2
9. Move to an electromagnetically clean area
    a. Adjust coil height to maintain height above soil mineral surface
    b. Set the EM61-MK2A Mode Switch to:
        i. 4 – for logging four (4) bottom coil time gates
    c. Set the Master/Slave Switch to M for single sensor operation
    d. Push In the Circuit Breaker on the EM61-MK2A electronics console and warm up for at least 5 minutes. Note: the Master/Slave switch may be used to turn the EM61-MK2A On and Off.
    e. Turn on Rover GPS
    f. Push the ON/OFF button to turn on the Data Logger
        i. Set Antenna Coil Size (e.g. Standard 1 x .5-m)
        ii. Set Up Logger
            1. Date
            2. Time
            3. Units (e.g. feet)
            4. COM port (e.g. COM1)
            5. Audio

6. Pause Key: (e.g. Alt F1 or any key)
7. Display (e.g. Text or Graphic)
8. Data acquisition rate (e.g. 14 Hz)

iii. Set GPS Port
1. GPS Input: (Enabled)
2. COM Port (COM2)
3. Baud Rate: (9600 or higher)
4. Parity: (No)
5. Data Bits: 8
6. Stop Bits: 1
7. Can monitor GPS data in terminal mode

iv. Set Output Port – Not used unless logging data to external PC

g. Monitor/Null Coils – After 5 minute warm-up, null EM61-MK2A – all channels should be close to 0 ±1-mV

h. Acquire Data:
i. Create File (see data logger software manual)
ii. Survey Setup (see EM61-MK2A manual) with Reads per second = 10 or greater
iii. LOG DATA
1. Wait for data display (0 to 100% internal calibration)
2. Observe time gate values
3. Observe DGPS input (observe toggle bar and correction status for letter D, letter A is unusable GPS)
4. Enter to log data– System is ready to log data. Move to start of survey line.

i. When coil is centered over start point, press ENTER again. Display will show “logging” on the top display line. Observe coil readings. Observe Station Number (STN). Note any unusual recordings on Field Survey Sheet.

j. Walk along survey line slowly (about 2.5 to 3 feet per second). Periodically observe Data Logger display. Note any unusual recordings, any deviations from the survey line, or any observed surface metal objects. Escort should log these observations and marks the outer coil edge with plastic pin flags or sand bags to insure sensor overlap on a return transect.

If fiducial marks are available, press thumb button when coil is centered over mark for 1 second.

k. Press Pause Key (e.g. Alt F1 or Any Key) when coil is centered over the line end to stop logging EM61-MK2A data.
If in the Auto mode, simply continue to next line and keep moving until survey session is complete or manually set new lines.

l. When survey is complete, exit logging. Enter a new file name to continue surveying, or return to main menu to transfer data.

m. Data Transfer (may vary with controller-see manufacturer’s owner manual).

10. Data Management in Data Logger

a. Once data transfer is complete and data has been positioned, exported (*.xyz file), and processed successfully, clear the data logger memory

11. Daily IVS Check

    a. Set up as above

    b. Acquire line 0 from start (0,0) to end (0,80) directly over the IVS center line.

    c. Increment the line number and acquire line 1 from end (0,80) to start (0,0) along the IVS noise strip.

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ATTACHMENT 2.
DGM CHECKLISTS

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CHECKLIST FOR OUT OF BOX EQUIPMENT TESTS

Project Name: _____

Project Location: _____

Contractor POC: _____

Equipment Source: _____

Equipment Serial Numbers: _____

_____

Reviewer's Name and Title: _____

Date of Review: _____

	Y	N	N/A
1. Has the equipment been inventoried and inspected for damage or wear?			
2. Has the cable shake test been performed? (Replace any faulty components if necessary)	____	____	____
3. Has the instrument (EM only) been nulled?	____	____	____
4. Has a nearby, noise-free site been selected for static background and static response tests?	____	____	____
5. Have the following instrument function tests been successfully performed:	____	____	____

Background values: TG1_____, TG2_____, TG3_____, TG4_____

• Instrument response test demonstrating normal EM61 Response (Time gate 1> 2 >3 >4)?	_____	_____	_____

Response values: TG1_____, TG2_____, TG3_____, TG4_____

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CHECKLIST FOR DAILY IVS CHECKS

Project Name: _____

Project Location: _____

Date: _____

Team: _____

IVS Test AM (example T1IVS081611AM)

File Name: _____Battery Start: _____ _____Battery End: _____ _____

Line 0: Run IVS 0 to 80-ft.

Line 1: Background Line

AM IVS Check Pass _____Fail _____

IVS Test PM (example T1IVS081611PM)

File Name: _____Battery Start: _____ _____Battery End: _____ _____

Line 0: Run IVS 0 to 80-ft.

Line 1: Background Line

PM IVS Check Pass _____Fail _____

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SURVEY AREA REPORT FORM

Project Name: _____ **Project Location:** _____

Geophysical Contractor: _____ **Field Team:** _____

Coordinate System (w/ units): _____ **Survey Type:** _____

Survey Area ID: _____ **Date:** _____

Raw Data File Name: _____ **Repeat Data File Name:** _____

Geophysical Instrumentation: _____ **Serial Number:** _____

Navigation Method: _____ **Serial Number:** _____

Battery Voltage: Start: _____ _____ **End:** _____ _____

Data Collection: Start Time: _____ **End Time:** _____

Terrain:

☐ **Level** ☐ **Moderate Slope** ☐ **Steep**

☐ **Rolling** ☐ **Ruts** ☐ **Gullies**

☐ **Rocky** ☐ **Swampy** ☐ **Dangerous**

Tree Cover: Tree Height: _____

☐ **None** ☐ **Light** ☐ **Medium** ☐ **Thick**

Weather:

☐ **Sunny** ☐ **Cloudy** ☐ **Drizzle**

☐ **Rain** ☐ **Thunderstorms** ☐ **Hail**

☐ **Fog** ☐ **Humid** ☐ **Snow**

Brush:

☐ **None** ☐ **Light** ☐ **Medium** ☐ **Thick**

Sketch of Survey Area- include North arrow, approximate scale, brief description of terrain, site conditions, and any surface features potentially affecting the data quality or coverage.

Additional Comments

_____
_____
_____
_____
_____

CHECKLIST FOR DATA STORAGE AND TRANSFER

Project Name:

Project Location:

Contractor POC:

Reviewer's Name and Title:

Date of Review:

	Y	N	N/A
• Has the transfer medium been approved by contractor?	____	____	____
• Are all files in approved formats?	____	____	____
• Have all of the following been included in the transfer packet:			
– "Read me" file detailing contents?	____	____	____
– Raw data files?	____	____	____
– Edited data files?	____	____	____
– Completed geophysical maps?	____	____	____
– Prioritized target lists?	____	____	____
– Data File Log / Spreadsheet of Delivered Data Files with Dates Sent?	____	____	____
• Have the required number of copies, per contract, been included in the transfer packet?	____	____	____

CHECKLIST FOR FIELD EDITING

Project Name: _____

Project Location: _____

Contractor POC: _____

Reviewer's Name and Title: _____

Date of Review: _____

	Y	N	N/A
1. Have the following items been evaluated for correctness and edited if necessary:			
– Line numbers?	____	____	____
– Start and end points?	____	____	____
– Line direction?	____	____	____
– Fiducial locations?	____	____	____
2. Has the data been examined in profile and evaluated for geophysical noise (all 4 EM61-MK2A time gates or as established at IVS)? Enter background noise value and compare with IVS background:_____ vs. _____	____	____	____
3. Has the data been examined for the presence of drop-outs and spikes?	____	____	____
4. Has the presence of metal on the operator been eliminated as a possible source of geophysical noise?	____	____	____
5. Has the edited data been converted to the appropriate .xyz format?	____	____	____
6. Has the positional data been evaluated for accuracy and completeness?	____	____	____

ATTACHMENT 3.
TRANSECT DEVIATION CHECKLIST

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TRANSECT DEVIATION CHECKLIST

Log Book/ DGPS Code	Condition Making Area Impassable on Foot	Description of Condition	Additional Code Information to Record
SS	Steep Slope	Slope physically too steep to walk on safely while maintaining the EM61-MK2A in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface. Use this code for slopes running upward (ridges). Ravines should be coded with RA (see last code entry). List all other factors which apply from the code list (LR, DV, etc.).	Record inclinometer reading in degrees as 2 digits following code.
LR	Loose Rock/Gravel	Loose rock or gravel over 25% or more of the surface; combined with slope makes the area impassable.	Estimated % of surface covered as 2 digits following code.
CB	Cobbles or Boulders	Cobbles or boulders over 25% or more of the surface (may combine with steep slope).	Estimated % of surface covered as 2 digits following code.
R	Rocky	Hard, rocky surface over 25% or more of the surface; combined with slope makes the area impassable.	Estimated % of surface covered as 2 digits following code.
DV	Dense Vegetation	Thickness/height of vegetation prevent safe traverse or prevent operator from maintaining EM61 in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface. List all other factors which apply from the code list.	
TH	Tundra Heads	Multiple tundra heads prevent safe traverse or prevent operator from maintaining EM61 in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface.	
ST	Stream	A stream which cannot be crossed without submerging boot tops or safely while maintaining the EM61-MK2A in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface. List all other factors which apply from the code list (LR, DV, etc.).	
WM	Wetlands/ Marshes	Wetlands, marshes, ponds or lakes which prevent safe traverse or prevent operator from maintaining EM61-MK2A in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface. Includes areas which cannot be traversed without submerging boot tops.	
RO	Rock Outcropping	Isolated rock outcropping which prevents traverse of an area.	
RA	Ravine	Slope physically too steep to walk on safely while maintaining the EM61-MK2A in a horizontal position, 15 ±1-in (0.38-m ± 2.54-cm) from the surface. Use this code for ravines only. Steep slopes running upward (ridges) should be documented using the code for steep slope (see first code entry). List all	Record inclinometer reading in degrees as 2 digits following code.

TRANSECT DEVIATION CHECKLIST

Log Book/ DGPS Code	Condition Making Area Impassable on Foot	Description of Condition	Additional Code Information to Record
		other factors which apply from the code list (LR, DV, etc.).	

Enter codes directly into the DGPS for waypoints which cannot be reached or at the point of deviation between waypoints.

Enter all codes that apply.

Enter all supplemental information such as slope reading from inclinometer (degrees) or estimated percent coverage for loose rock, dense vegetation, etc. Use two digits entered following the code for the feature making the area impassable.

Photograph the feature(s) making the area impassable.

If in doubt about code entries, or if additional information is helpful in evaluating the situation, make supplemental notations in the log book.

ATTACHMENT 4
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

DIGITAL GEOPHYSICAL MAPPING

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Target List:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP 02 Workers' Statement**	Have all DGM Team Members reviewed SOP 02?				*(P)*
2	**QAPP WS#7 & 8**	Are all Team Members trained and qualified to operate the equipment?				*(P), (I), (F)*
3	**SOP 02, Sec. 7.3.1**	Was the RTK DGPS base station setup on a known survey control point?				*(P), (I), (F)*
3A	**SOP 02 Sec. 7.3.1**	Did the daily RTK DGPS Reoccupation test measure a second known survey control point within 0.328-ft (10cm)?				*(P), (I), (F)*
4	**SOP 02, Sec. 7.3.1**	Were the morning and afternoon IVS checks performed?				*(P), (I), (F)*
5	**SOP 02, Sec. 7.3.2**	Were the RAA location procedures followed?				*(P), (I), (F)*
6	**SOP 02, Sec. 7.3.3**	Were overlapping survey lines spaced every 2.5-ft. (0.75-m) used to map the RAA?				*(P), (I), (F)*
7	**SOP 02, Sec. 7.3.3**	Were areas inaccessible to DGM documented in the positioned sensor data maps?				*(P), (I), (F)*
8	**SOP 02, Sec. 7.4**	Were deviations from geophysical survey transect-spacing and orientation documented?				*(P), (I), (F)*
9	**SOP 02, Sec. 7.4**	Were deviations tied to waypoint designations?				*(P), (I), (F)*
10	**SOP 02, Sec. 7.4 &**	Were slope measurements taken with an inclinometer to document				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
	7.5.3	slopes greater than 30 degrees?				
11	**SOP 02, Sec. 7.4 & Att. 3**	Were deviations annotated using the Transect Deviation Checklist (Att. 3)?				*(P), (I), (F)*
12	**SOP 02, Sec. 7.4**	Was a photographic record made of any deviations?				*(P), (I), (F)*
13	**SOP 02, Sec. 7.5.1 & Att. 2**	Were the checklists in Attachment 2 used to document the DGM activities?				*(P), (I), (F)*
14	**SOP 02, Sec. 7.5.2**	Were photographs of geophysical survey areas taken?				*(P), (I), (F)*
15	**SOP 02, Sec. 7.5.2**	Were the date, time and subject of each photograph recorded at the time the photograph was taken?				*(P), (I), (F)*
16	**SOP 02, Sec. 7.6.1**	Were the Field Data Submittals made?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

GEOPHYSICAL DATA PROCESSING AND INTERPRETATION

SOP 3

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C

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3. ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AOC	Area of Concern
BSI	Blind Seed Item
CD	Compact disc
CQC	Contractor Quality Control
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
DQO	Data Quality Objective
EMI	Electromagnetic Induction Survey
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
FTL	Field Team Leader
GIS	Geographic Information System
GPS	Global Positioning System
GSV	Geophysical System Verification
HE	High Explosive
IVS	Instrument Verification Strip
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAVFAC NW	Naval Facility Engineering Command, Northwest
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
POC	Point of Contact
PQCM	Project QC Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Area
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
Std. Dev.	Standard Deviation

TDEM	Time-Domain Electromagnetic
USA	USA Environmental, Inc.
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
WMP	Waste Management Plan

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ATTACHMENT 1. CHECKLIST FOR DATA PROCESSING

ATTACHMENT 2. GRID DATA DELIVERY CHECKLIST

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH), geophysical data processing and interpretation activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct geophysical data processing and interpretation operations. The Site Geophysicist, in collaboration with the field QC staff, is responsible for the maintenance of this procedure. Approval authority rests with the Project Geophysicist and Project Quality Control Manager (PQCM).

Developed by:

2/22/2013

Alan Crandall
Project Geophysicist

Date

Reviewed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 TRANSFER OF FIELD DATA AND DATA TRACKING

Several files are generated by the geophysical and RTK DGPS systems for each site surveyed. These data are stored on the data logger(s) and the RTK DGPS receiver during data acquisition activities. At the end of the day, the data collected by each field team will be turned over to the Site Geophysicist. These files are uploaded to the data management computer in the Adak Field Office via PCMCIA (or equivalent) media. The following file types are generated for each survey:

- Geophysical data file with signal intensity and position (relative or absolute) measurements
- Digital photo files (*.jpg).

Data files may also be downloaded each day from the RTK DGPS base station (if deemed necessary). The following file type is generated:

- DGPS raw data containing code and carrier phase data, position data, and site identification.

All EM61-MK2 and DGPS (if necessary) data files will be electronically logged upon receipt. The following items will be recorded in an Excel spreadsheet or MS Access database for each EM61-MK2 and DGPS file collected:

- RAA
- Grid, transect, Instrument Verification Strip (IVS), etc.
- Geo Team designator
- Date collected
- GPS file name (if necessary)
- EM61-MK2 file name
- DGPS start and stop times (if necessary)
- EM61-MK2 start and stop times.

If RTK mode is used, the EM61-MK2 and corrected position data are co-located in a single computer file. The GPS data for the receiver and base may be recorded, and post-processed, as necessary, to fill in position data at times where the GPS radio modems are not functioning.

If RTK mode is not used, the EM61-MK2 and uncorrected GPS position data are not co-located in a single computer file. The GPS data for the receiver and base MUST be recorded, post-processed, and re-merged with the EM61-MK2 data file.

The EM61-MK2 and DGPS data may be processed either on-site or at an off-site processing center. The following information will be tracked on the Excel spreadsheet or MS Access database:

- Initials of processor
- Merged data file name (*.xyz)
- Number of linear miles or acreage in file

If the data has been interpreted off-site, the selected DGM target locations will be sent from the processing center to the Adak Field Office. The DGM target locations will be added to the project database. The following information will be added to the Excel spreadsheet or MS Access database:

- Date DGM target file received

- Number of anomalies
- Date DGM target data added to project database.

7.2 DATA PROCESSING, ANALYSIS, AND INTERPRETATION

Data will be interpreted using a combination of Geonics (or equivalent) and Geosoft Oasis Montaj (or equivalent) software to provide coordinate location information for each target (see Attachment 1, Checklist for Data Processing). .

The primary interpreter of the data will be a qualified geophysicist. As a quality control measure, the project QC Geophysicist will review 10 percent of the data (linear mile or ~1 acre grids) interpreted by the primary interpreter. The QC Geophysicist also checks all BSI detections for location accuracy and response peak (see Final GSV Report). The specific data reviewed will be documented in MS Access project database or Excel spreadsheet.

Oasis Montaj will be used to generate color-coded images of the EM61-MK2 data for each survey grid or transect. Potential target locations will be selected using a combination of two target selection methods; automatic and manual. The automatic method utilizes the target selection algorithm within the Geosoft Oasis Montaj software (e. g., gridpeak.gx). This procedure selects anomaly locations based solely on the signal intensity. The second method (herein referred to as “manual”) utilizes a data interpreter who manually selects potential target locations using data characteristics such as the signal intensity from the coil and different time gates, anomaly footprint, anomaly shape and trend, track line characteristics (i.e., spatial sample density), terrain, previous intrusive information, the IVS results, and comments entered by the data acquisition crew regarding geology, terrain, weather, etc. The automatic target selector will select a pipeline, known cultural feature, or terrain-induced “noise” while the manual selection procedure generally will not. However, the automatic target selector prevents the interpreter from potentially “missing” an anomaly; i.e., it provides immediate feedback to the interpreter in the form of a quality control check. The automatic target selector amplitude will be set to the approved target selection threshold for each RAA.

Based on past experience at Adak, the size range of the items of interest for the project include small pieces of frag up to larger bombs and projectiles. The interpreter will not attempt to differentiate MEC items from non-MEC items. If the interpreter selects any anomalies that may have a high probability of being an artifact of the data acquisition and/or data processing sequence, they will enter a comment in the interpretation file (e.g., noise due to coil bump). The interpreter will also comment if they expect multiple sources within 2.5-ft (0.762-m) of a selected anomaly. These anomalies will be reviewed by grid, and if the “no find” rate >8% is reported by the intrusive team they are documented and reported to QC and QA for analysis.

A master Oasis Montaj grid map that contains all of the individual data acquisition files for each RAA will be generated and updated each day in order to track the daily progress of the geophysical survey.

The Site Geophysicist will receive and track the data from the field, load the data onto the data management computer, and transfer it to the data processing center. The geophysical data will require computer reduction prior to interpretation. The basic processes for reducing digitally recorded geophysical data include:

- Geonics software may be used to convert the raw EM61-MK2 data to ASCII with units of mV and a corresponding time stamp for each record.
- Assessing daily DGM checks and initial data quality
  - RTK DGPS Reoccupation check is within 0.328-ft (10-cm)

- IVS test amplitude response is within the large of ±20% or ±2x the Standard Deviation of the previous week's average and positioning accuracy is within ± 9.8-in (± 25-cm) for each IVS seed item
- The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether recollection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks. And no less than 98% of along-track gaps <= 0.5-ft (15-cm)

- DGM data quality demonstrates:
  - Proper time gate response (e.g. Gate 1>gate 2>gate 3>gate 4) over anomaly peaks
  - Sensor drift is acceptable (e.g. Battery voltage observed in the field remains =>12.0 volts or as determined acceptable at the IVS and drift does not exceed the ability of the leveling filter to correct)

Merging of DGPS and geophysical data, if necessary (X, Y, Z file where X and Y are the corrected positions and Z1, Z2, Z3, Z4 are the instrument readings).

The Site Geophysicist or Data Processor will then process and analyze the data to create a target list and target map. All data processing steps will be documented, including gridding parameters, any and all filtering parameters (e.g. drift correction), any and all data corrections (e.g. latency correction), and anomaly selection thresholds and procedures. Each target list will include the Contractor, Grid ID_Target ID#, target Easting and Northing coordinates, the electromagnetic response of the anomaly for all four time gate channels, and any analysis comments. The target data and target maps will then be given to the QC Geophysicist, who will reevaluate the DGM data and anomaly selections, along with their 10% review. Any additional QC targets, identified by the UXOQCS or the QC Geophysicist, will be discussed with the Site Geophysicist or Data Processor who will add them to the target list and load them into the project database. This QC process may also result in removing selected anomalies that fail to meet the established anomaly selection criteria. The intent is to ensure all anomalies are reviewed and investigated. The QC Geophysicist will also review the DGM results for the detection and amplitude of Blind Seed Items (BSIs). Continued daily data processing and analysis includes the following:

- Data import into processing and analysis software
- Second review of all instrument checks (e.g. RTK DGPS and IVS) – Flag any/all abnormal sensor or positioning data for possible resurvey (e.g. excessive noise, drift, position jumps or gaps). Provide gap location(s) and direct the DGM team to resurvey
- Assess and apply any corrections for latency, lag, from daily IVS test – log corrections
- Drift correct survey data as required – log drift correction variables
- Grid and map corrected data – log all gridding parameters
- Select anomalies on grid data – log anomaly selection methodology
- Parse final processed DGM data and Target databases by grid
- Review all anomaly selections and add any anomalies not automatically selected. Provide comments on anomalies that do not appear to be MEC-like (e.g. potential utilities). Combine anomaly selections with the UXOQCS, the QC Geophysicist, and the Independent Government QA Contractor results
- Archive all raw, processed data, and final data and data processing documentation

- Post raw, processed, final data, and data processing documentation to the project sharepoint/ftp site within 48 hours of completing the geophysical survey. The Site Geophysicist will deliver the Dig List in comma delimited (*.csv) or Microsoft Excel (*.xls) format to the Project UXOQCS
- UXOQCS reviews the daily data delivery packages, after the QC Geophysicist's review, and notifies the government QA contractor that each data package (by grid) is complete and delivered (see Attachment 2 for Grid Data Deliverable Checklist)

The raw (sensor and position data files), processed (positioned, corrected, grid data), and interpreted geophysical data (target dig lists and target maps) will be stored on compact disk (CD) and/or other archive electronic media. Reference information that will be recorded and stored for each survey area includes:

- Site identification (file name and data survey coordinates)
- Acquisition team identification and personnel
- Geophysical equipment used and survey date

This information will be entered from field notes or digital data files acquired by DGM personnel.

The specific parameters used to process the EM61 and GPS data may vary; however, the processing parameters and results are documented in digital computer files so that the sequence of events can be reconstructed and analyzed at a later date, if necessary. This level of documentation assists in ensuring that the overall process is repeatable.

7.2.1 Dig Sheet Development

The interpreted data are digitally recorded in a *.gdb file, and uploaded to a Microsoft Access database and/or Microsoft Excel spreadsheet. The dig sheet data for each survey grid will be organized by a unique identifier that includes the grid ID and a unique DGM target identifier for each target selection, its x-y coordinate location, signal intensity value(s) from the EM61-MK2 for all 4 time gates. Other pertinent information, such as relative anomaly size may be included, as necessary, depending upon the results of the IVS. A comment will be added for grid corners, but grid corners will not be included on intrusive dig sheets.

7.2.2 Interpretation Summary

The objective of the interpretation is to select all of the legitimate targets caused by buried metallic items while minimizing the false alarm rate. For this project, the targets for each RAA are primarily selected based on the anomaly intensity for the different EM61-MK2 data channels, and information derived from previously-excavated targets, as provided in the MEC QAPP. The interpreter will utilize information acquired from the IVS to supplement target selection.

During intrusive investigation, the QC Geophysicist, or their designee, will review 100% of the intrusive results (e.g., target depth, length, weight, and type) and compare with the DGM characteristics. Any intrusive results that do not compare with the DGM characteristics are reported to the UXOQCS for follow-up investigation by the field QC team. A certain percentage of selected DGM targets may turn out to be "no finds" investigated DGM targets for which no analog response on the handheld metal detector above background within 2.5-ft (0.762-m) are found at the interpreted location, and verified by the field QC team. If the "no find" target is determined to be an artifact of the data acquisition, processing, or interpretation processes, the specifics of the analysis will be noted in the project database so the interpreters can utilize this information during subsequent interpretation efforts. If more than 8% of the selected anomalies for each grid result in "no finds", or any other DGM performance metric (e.g.

coverage) fail, it will be documented by QC and QA will evaluate the data and field processes and provide recommendations as appropriate.

7.3 DATA VALIDATION

The following procedures applied during the processing phase of the project are performed each day to ensure the integrity of the data. Note: Any failures to meet DGM performance metrics are reported to the Project Geophysicist immediately. If the failure is confirmed, the Government QA Contractor, UXOQCS, and Site Geophysicist are notified. Data that is not of sufficient quality and quantity to meet the project objectives is documented and re-collected, if necessary. Procedural checks during the processing of the data include the following:

- Evaluation of the kinematic geophysical sensor check. These data allow the processor to qualitatively and quantitatively monitor the noise level and repeatability of the data over a "standard" item (e.g. small ISO), as well as ensure the data have been positioned correctly using the time-stamp information (i.e., the data contain no time or position shift-also known as "lag")
- Visual examination of the repeatability and of the track path (data are mathematically interpolated so that potential "gaps" present in the data show up as a white color in the color-coded images)
- Interpreted corner stake locations (i.e., nails) for the grids are compared to known survey data and verified (tolerance ± 2.5-ft (0.762-m))
- Sample density along transects and grids are statistically assessed 98 percent of the measurements for transect or grid data require sample distances <= 0.5-ft (15-cm) for each grid of data assessed
- The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether recollection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks.

The guidelines above are for geophysical data where the "background" is a prevalent data characteristic. In areas of high anomaly density (i.e., "cluttered" areas), the above guidelines may not apply.

The data validation measures applied during the interpretation of the data are the following:

- Targets selected interactively by the user are compared to those selected automatically by Oasis Montaj. This process ensures that anomalies that meet a certain criteria for selection are not "missed" by the interpreter and thus included on the dig sheet.
- Grid corner nails or transect end points are interpreted and some of these points may be reacquired by field personnel to verify accuracy (± 2.5-ft (0.762-m)) of the interpreted position coordinates
- Comparison of the position and EM61-MK2 data to the site features map (e.g., above-ground cultural features) are documented - should be evident by variance in track path
- Interpreted data characteristics are compared to the known responses acquired during the initial test program (e.g., IVS).

Refer to the Geophysical Systems Verification Plan for additional discussion regarding performance metrics and the geophysical data quality objectives.

7.4 GEOPHYSICAL DATA ARCHIVING AND DELIVERY

7.4.1 DGM Data Archiving

All geophysical and RTK DGPS data on the field data management computer and data processing center will be archived daily. The entire database and all associate data files will be copied to a writable CD or equivalent digital media. The archive disks will be stored in a fireproof safe located within the Adak Field Office. Maintenance of the backup data will be verified by the Site QC staff according to the schedule specified in the MEC QAPP.

7.4.2 DGM DATA DELIVERABLES

7.4.2.1 Raw Data for Processing Center

All raw data to include log books and daily forms uploaded to the QA contractor's SharePoint site within 24 hours of data collection. Data submittals arranged by date and team. Files and forms include:

- Raw data files (*.R61, *.M61, *.N61, or *.Survey)
- Scanned DGM Log Books (*.pdf)
- Scanned DGM Survey Area Forms (*.pdf)
- Scanned Obstacle Avoidance checklist (*.pdf)
- Survey area pictures (*.jpg)
- Field RTK DGPS Tracking form (*.xlsx)
- Field IVS Tracking form (*.xlsx)
- Field Editing form (*.xlsx)
- Data Storage and Transfer form (*.xlsx)

7.4.2.2 Processed Data for QC

All processed data uploaded to the QA contractor's SharePoint site within 48 hours from raw data submittal for USA QC geophysicist and UXOQCS assessment. Data submittals arranged by grid and date, and include:

- DGM survey database files (*.gdb and *.xyz)
- DGM survey database QC files (*.map and *.pdf)
- DGM target database files (*.gdb, *.xyz, and *.csv)
- DGM target map files (*.grd, *.map, *.pdf, *.tif)
- Data Tracking and Processing form (*.xls)
- All associated raw files and forms

7.4.2.3 Final Processed Data for QA

All final data package submittals uploaded to the QA contractor's SharePoint site within 48 hours from processed data submittal. Data submittals arranged by grid and date, and include:

- Final DGM survey database files (*.gdb and *.xyz)
- Final DGM survey database QC files (*.map and *.pdf)
- Final DGM target database files (*.gdb, *.xyz, and *.csv)
- Final DGM target map files (*.grd, *.map, *.pdf, *.tif)

- Final Data Tracking and Processing form (*.xls)
- All associated raw files and forms

7.5 QUALITY CONTROL

The digital geophysical data processing and interpretation tasks will meet the QC metrics listed below:

- RTK DPS check within 0.328-ft (10-cm)
- The goal for coverage at the 4 RAAs is 100% of the accessible areas. To meet this goal, DGM teams will use 2.5-ft (0.762-m) line spacing during collection of the DGM data. Due to the uneven terrain, slopes, standing water, rock outcrops, and wind/weather concerns, deviations from the 2.5-ft (0.762-m) lane spacing are expected. Deviations over 3-ft (0.9-m) will result in a data gap. The cause, size and significance of the data gaps are evaluated during data processing to determine whether re-collection of DGM data at that point is required. This is further evaluated by QC and QA during their process checks.
- >=98% sample separation is <=0.5-ft (15-cm)
- Grid corners and BSIs are positioned within 2.5-ft (0.762-m) of known location
- BSI responses are >3 mV on the leveled time gate 1 channel and in accordance with the Minimum Expected BSI Responses by RAA and depth, listed in Table 11-2 in the Final GSV Report. Note that RAA-01 BSIs will have the same metrics as RAA-03 BSIs.

The UXO Quality Control Specialist (UXOQCS) verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any data the UXOQCS determine to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS and Quality Assurance (QA). QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours. If the DGM data deliverables for a grid are acceptable, the QC Geophysicist and UXOQCS sign the Data Delivery form (attachment 2) and forward to QA.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the digital geophysical data processing and interpretation task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
DGM Data Processing and Analysis	Office Slips, Trips or Falls	Walking, climbing stairs; obstructed view	C/III/4	Personnel will assess their surroundings prior to proceeding with activities. Ensure footing at all times.	D/IV/5

8.1 HAZARD CONTROL BRIEF

Personnel will be cognizant of the surroundings at all times and remain observant of their footing in the work space.

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The personnel tasked with processing and interpreting the digital geophysical data will use computers, specialized software and use the internet to transmit the data to the project team.

Safety equipment required during data collection includes the following:

- First-aid kit
- Level D Personal Protection Equipment
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles and in the project office.

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ATTACHMENT 1.
CHECKLIST FOR DATA PROCESSING

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CHECKLIST FOR DATA PROCESSING

			FILENAMES:
Site:		Raw:	
Location:		Edited:	
Contractor:		Processed:	
Sector:		Contour Map:	
Grid:		Target List:	
Processor(s):		Target Map:	

	Y	N	N/A
Preprocessing			
1. Coordinate Conversion:	____	____	____
PROJECTED COORDINATE SYSTEM :			
2. Removal of Drift and Leveling	____	____	____
Record Corrections:			
3. Latency, Lag and Offset	____	____	____
Record Corrections:			
Processing			
4. Initial Gridding	____	____	____
Record Parameters:			
5. Digital Filtering and Enhancement			
❑ Low Pass			
❑ High Pass			
❑ Non Linear	____	____	____
❑ 3x3 Convolution			
❑ Median filter			
❑ Other _____			
6. Threshold Selection value _____	____	____	____
7. DGM target Selection	____	____	____
Number of targets _____			

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ATTACHMENT 2.
GRID DATA DELIVERY CHECKLIST

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GRID _____ GEOPHYSICAL DATA (DGM) SUBMITTAL

Date: _____

OPERABLE UNIT B-2, Remedial Action Area _____

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA

CONTRACT NO. _____

Team Name	
Survey Grid	
Survey Date(s)	
Target Picking Threshold	_____ mV Leveled Time Gate 1

I certify that the above DGM collection team and this grid have been processed and QC'ed according to the project plans, standard operating procedures (SOPs) and data quality objectives (DQOs). 100% of the DGM data (including IVS data, raw and processed production data, including maps and target lists, and QC information (see SOP 03 section 7.4.3)) deliverables were reviewed by the QC Geophysicist and have been posted to Sharepoint. All QC tests pass except as noted below.

QC Tests	**Pass**	**Fail**
AM and PM IVS Tests		
Footprint Coverage		
Velocity		
Sample Separation		
Seed Items Identification, Amplitude and Positional Accuracy		
Grid Corner Identification and Positional Accuracy		
Number of QC picks within 10% of the Initial Picks.		
Other (Identify):		

Explanation of failures or discrepancies:

Provided by: QC Geophysicist _____

Phone Number: _____

Email: _____

UXOQCS _____

Phone Number: _____

Email: _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

UTILITY VEHICLE OPERATION

SOP 4

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- ARGO Operator's Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
CFR	Code of Federal Regulations
DOT	Department of Transportation
EM	Engineer Manual
lb	pound, pounds
MEC	Munitions and Explosives of Concern
mm	millimeter, millimeters
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PPE	Personnel Protection Equipment
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
UL	Underwriters Laboratories
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXOTIII	UXO Technician III

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains minimum operational requirements, procedures, and practices applicable to the use of the ARGO utility vehicles while conducting activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used for ARGO utilization.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

This SOP establishes the minimal requirements for the safe operation of ARGO utility vehicles used to transport project personnel during operations on the former NAF, Adak.

7.2 SCOPE

This SOP applies to all site personnel, to include contractor and subcontractor personnel, who operate the ARGO. The procedures outlined here are required to help ensure the safety and health of all site personnel and the proper use and care of the ARGO. This SOP is not intended to contain all requirements needed to ensure the proper use and maintenance of the equipment, but should be used in conjunction with the operations manual for the ARGO. Consult the documents listed in Section 2 of this SOP for reference material.

7.3 RESPONSIBILITIES

7.3.1 Senior UXO Supervisor

The Senior Unexploded Ordnance Supervisor (SUXOS) is responsible for implementation of this utility vehicle safety program in the field as described below. The SUXOS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings, and that information related to its daily implementation is documented in the Site Operational Log.

7.3.2 UXO Technician III

The UXO Technician III (UXOTIII) will be responsible for the field implementation of this SOP and the hazard control briefing outlined in Section 8.1 of this SOP. In the absence of a SUXOS, the UXOTIII will be responsible for implementing the SUXOS's responsibilities outlined in Subsection 7.3.1.

7.3.3 UXO Safety Officer/Site Safety and Health Officer

The UXO Safety Officer (UXOSO)/Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO/SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with applicable SOPs and other guidelines.

7.3.1 ARGO Operator

The ARGO operator will be responsible for the safe operation of the vehicle as well as the safety of passengers.

7.4 TRAINING REQUIREMENTS

All ARGO operators and passengers will be trained on the requirements of this SOP and training materials provided by the manufacturer. The training will be documented and address the following topics:

- Basic riding tips

- Reading terrain
- Climbing hilly terrain
- Descending a hill
- Traversing a slope
- Riding through water
- Cargo carriers and accessories
- Loading and unloading
- Troubleshooting
- Winch operation
- Proper preventive maintenance, i.e. oil levels, tire pressure requirements and schedule maintenance requirements.

The UXO Quality Control Specialist (UXOQCS) will verify that all personnel receive the training and the SUXOS will maintain training records in the project field files.

7.4.1 ARGO Operators

Operators will wear seat belts while the ARGO is in operation. Each designated operator will be thoroughly familiar with all aspects of ARGO operation and will have been trained in the practical use of the vehicle. Project personnel who are to operate an ARGO during the course of the project will first demonstrate to the Competent ARGO Trainer their competence on the training course.

The training will, at a minimum, consist of negotiating steep terrain, backing, turning, and braking, as well as proper loading of equipment, basic troubleshooting, and daily preventative maintenance checks.

7.4.2 ARGO Passengers

Passengers will remain seated and wear seat belts while the ARGO is in operation. Passengers will inform the operator when exiting or entering the passenger compartment. Riding in the rear passenger compartment of an ARGO can be extremely rough. Passengers should keep the operator informed so that driving can be adjusted to make it more tolerable for passengers.

7.5 SAFETY EQUIPMENT

All ARGOs will be equipped with the safety equipment listed in Attachment 1 of this SOP.

7.5.1 Hearing Protection

Hearing protection will be worn by the operator and passengers when operating the ARGO for an extended period of time

7.5.2 Fire Extinguishers

Each ARGO will carry at least one 10-ABC fire extinguisher approved by Underwriters Laboratories (UL). Each fire extinguisher will be inspected at least once weekly to ensure that it is sufficiently charged and that the nozzle is free and clear. Discharged or defective fire extinguishers will be recharged or replaced immediately.

7.5.3 Inclinometers

Each ARGO will be equipped with an inclinometer to enable the operator to accurately access the slope of terrain in degrees. The ARGO will not be operated on side slopes greater than 20 degrees or inclines/declines greater than 30 degrees.

7.6 LOAD CAPACITY

The maximum load the ARGO Conquest can carry is 1,000-lb. When hauling cargo, the weight will be placed low in the vehicle so that the stability of the vehicle will remain within safe operating limits. It is always advisable to keep the center of gravity as low as possible when operating in mountainous terrain.

7.7 TOOL KIT

All ARGOs will be equipped with basic tools for emergency repairs. The tool kit will consist of, but not be limited to, the following: Allen wrench set, flat screwdriver, hammer, pliers, pin for removing track pin, lug wrench, portable air compressor, and low pressure air gage.

7.8 DAMAGE/ACCIDENT REPORTING

Should an employee become involved in an accident while operating an ARGO or should the vehicle sustain damage while in the possession of an employee, the operator will:

- Immediately notify his/her Team Leader, the UXOSO, SUXOS, or Site Manager of any accident involving another vehicle or personnel injuries.
- Complete an Accident/Near Miss Report Form [see the Accident Prevention Plan (APP) for the form].
- Further document the accident by photographing the accident scene and damage incurred to the vehicle(s).

Site management personnel will report all accidents and incidents in accordance with the procedures outlined in the project APP. The Project Manager is to be immediately notified of any accident involving serious injury to the driver or other parties.

7.9 QUALITY CONTROL

There are no specific quality control metrics for operating the ARGO utility vehicle. The ARGO operator will conduct before and after operations checks in accordance with the operator's manual, and operate the vehicle in a safe manner. The UXOQCS will periodically check that the vehicle is being maintained, loads are properly secured and balanced, and the driver and passengers are using the seatbelts.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix below lists the existing and potential hazards associated with operating the ARGO utility vehicle, along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Utility Vehicle Operations	Rollover	Climbing or descending hilly terrain, or traversing area obstructed from view.	C/III/4	Personnel will be trained on operational techniques for traversing hills and other terrain obstacles, and maintain a safe operating speed at all times. Assess the surrounding area prior to proceeding across.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	Material Potentially Presenting an Explosive Hazard (MPPEH) reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the Remedial Action Area (RAA) (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their surroundings as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area in which the ARGO will be operating. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the Team Separation Distance (TSD) will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

Each ARGO utility vehicle will be equipped with the following:

- ARGO tool kit
- Seat belts
- Operator’s manual
- Inclinometer

Safety equipment required includes the following:

- Communications equipment
- First-aid kit

- Level D Personal Protective Equipment (PPE)
- Hearing protection
- 10-ABC fire extinguisher
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

VEGETATION REMOVAL AND SURFACE CLEARANCE

SOP 5

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Site Safety and Health Plan (SSHP)
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- Equipment Operator's Manual(s)

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
Bgs	below the mineral ground surface
BSI	blind seed item
DGM	digital geophysical mapping
EM	Engineer Manual
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
EZ	Exclusion Zone
ft	foot, feet
GPS	global positioning system
in	inch, inches
IVS	Instrument Verification Strip
m	meter
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosives Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
OJT	On the Job Training
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAA	Remedial Action Area
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXOTII	UXO Technician II
UXOTIII	UXO Technician III
WMP	Waste Management Plan

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct vegetation removal and surface clearance during the activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct vegetation removal and surface clearance operations.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 VEGETATION REMOVAL

7.1.1 Purpose

The purpose of these procedures is to provide USA employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform vegetation removal operations within the identified Remedial Action Areas (RAAs) on the former NAF, Adak.

7.1.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct of vegetation removal operations within the RAAs. This SOP is not a stand-alone document and should be used together with the other USA SOPs, applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.1.3 Training

All training on equipment will be either formal or on-the-job training (OJT). This training will be documented by site personnel and subject to review for accuracy and completeness. The UXO Quality Control Specialist (UXOQCS) will verify and document that personnel assigned to vegetation removal teams have received training on the equipment.

7.1.4 Work Clothing and Field Sanitation

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D personal protective equipment (PPE), which includes the following.

- Short- or long-sleeved cotton coveralls or work clothing will be worn.
- Footwear is sturdy work boots or rubber boots as appropriate (i.e., lug sole and of sufficient height for ankle support). UXO personnel will not wear steel-toe safety boots when using metal detectors.
- Hand protection will consist of leather or canvas work gloves. Rubber inner or outer gloves may be required where increased protection is needed.
- Safety glasses, face shields, respirators, hearing protection, hard hats and protective chaps or aprons will be available and worn when personnel are engaged in activities where their use is prudent or required.
- Inclement weather gear as required.
- In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

The team will be outfitted with field decontamination equipment, which will consist of containers of wash water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

7.1.5 Team Composition

The Vegetation Removal Team will consist of a maximum of seven qualified personnel. These personnel will include the following:

- UXO Technician III (1)
- UXO Technicians II or I (up to 6)

During the instrument verification strips (IVS) installation and the placement of blind seed items (BSIs), minimal vegetation removal may need to be performed. A dedicated vegetation removal team structure will not be used; rather, one or two UXO qualified personnel, as necessary, will conduct the limited vegetation removal to facilitate the IVS installations and BSI placement. The UXO personnel conducting vegetation removal will be integral to the installation or placement teams. With the exception of the team structure, all operational procedures provided in this SOP will apply.

7.1.5.1 UXO Technician III

The UXO Technician III (Team Leader) is UXO qualified and directs the operation and other team personnel within the context of removal requirements. In addition, the UXO Technician III must be familiar with the equipment being utilized.

7.1.5.2 Operator

The operator(s) will be UXO Technicians, trained and qualified on the equipment being utilized (e.g., weed eater, walk-behind mower, ARGO mower deck, etc.) and operate the equipment in a safe and efficient manner. The operator performs daily inspections and maintenance functions as recommended in the operator's manual. The operator will perform other duties as needed or directed.

7.1.6 Safety

Safety is paramount and all personnel will observe those safety precautions/warnings that apply or may apply to vegetation removal operations. The precautions listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances listed are the minimum required.

- Maintain a Team Separation Distance (TSD) from other teams; as described in the Hazard Control Briefing in Section 8.1.
- Use equipment safety features.
- Observe safety precautions/warnings found in the operator's manual/manufacturer's publications.
- Maintain 6 inches of ground clearance during vegetation cutting operations (the mineral soil surface or where tundra is present, 6 inches above the tundra).
- Maintain communications between the Team Leader and equipment operator(s) at all times.
- Maintain site control.
- Observe MEC safety precautions for items encountered or suspected.

Ensure the PPE is appropriate for the task, serviceable, and worn/used properly.

Prior to operations commencing, a communications check with all team personnel will be conducted. Hand signals will be devised and used as a means of communication. All team personnel must know these hand signals prior to operations commencing. The hand signals will be documented on the tailgate safety briefing sheet each morning of operations and at each change of team personnel.

Personnel will not venture within 10-ft (3-m) of an operating piece of hand-held vegetation removal equipment. If at any time personnel venture closer than 10-ft (3-m), the operator will immediately stop, return the engine to idle speed, and cease operations.

7.1.7 Operational Procedures

In areas where vegetation removal is needed, UXO Technicians will first conduct a visual surface sweep of the area to mark any surface material potentially presenting an explosives hazard (MPPEH), remove any surface debris and identify other hazards (e.g. terrain slope, crevasses, etc.) that might damage equipment or injure personnel. Items will be marked with stakes tall enough to ensure the vegetation team can clearly see the flagging material. Items will be marked with colored flagging material shown in the Figure 1 below. Team personnel will be briefed on location and type of hazardous features before commencing the vegetation removal.

Team personnel are to ensure that a 0.5-ft (15-cm) ground clearance is maintained during removal operations. Those areas marked as hazards are to be avoided. The manner in which operations are accomplished will follow safe work practices and procedures. Areas of concern will be marked and addressed to the Senior UXO Supervisor (SUXOS) and/or UXO Safety Officer (UXOSO) as needed. All MPPEH items encountered are marked with a red pin flag and avoided. Notification of these items will be made to the SUXOS and the UXOSO.

7.2 SURFACE CLEARANCE

7.2.1 Purpose

The purpose of these procedures is to provide all USA Environmental, Inc. (USA) UXO Technicians with the minimum procedures and safety and health requirements applicable to perform surface sweep operations during the MEC activities at the Remedial Action Areas (RAAs), Former NAF, Adak, Alaska. Surface clearance procedures will be conducted in accordance with the Work Plan, the MEC Quality Assurance Project Plan (QAPP), the SSHP, the Environmental Protection Plan (EPP)/Waste Management Plan (WMP) and the Explosives Safety Submission (ESS).

7.2.2 Scope

These procedures apply to the surface clearance operations conducted to locate, identify and mark surface MPPEH and remove other metallic debris from the surface to facilitate the non-time critical removal action activities, i.e. the digital geophysical mapping (DGM) of the RAAs . The surface clearance will be technology-aided to ensure no MPPEH or other surface clutter are undetected that may be obscured from view after the vegetation is cut and covers the ground surface and in areas where no vegetation removal was necessary. In RAA-01, a technology-aided surface clearance to 6-in below the mineral ground surface (bgs) will be done to prepare for the DGM task.

7.2.3 Clearance Procedures

All surface clearance operations will be performed under the direct supervision of a qualified UXO Technician III. The UXO Technician III (UXOTIII) will assemble the UXO team members on line and direct their movement across the survey grid.

- The UXO team members will be spaced approximately 5–ft (1.5-m) apart and, at the direction of the UXO Technician III, move through the grid off set so that the metal detectors do not interfere with one another as the technicians traverse the grid lanes. The Whites DFX 300 all-metals detector will be used to detect any surface or near-surface items that may be obscured by brush or heavy grasses.

- When an item is encountered, the UXO Technician will make a tentative identification in order to determine if the item is MPPEH or non-hazardous scrap material [note, the identification of any items discovered by a UXO Technician I must be confirmed by a fully qualified UXO Technician (defined as a UXOTII or above)] and the UXO Technician II will inspect the object to determine if it is MPPEH or scrap and mark the item with the appropriate colored pin flag as shown in the table below.

Pin Flag Color	Used to Mark
Red	MPPEH items
Blue	Non-hazardous scrap material
White	Temporary boundary line for clearance teams

7-1: Color Flagging Material

- As the team moves forward the team member at the edge of the grid will use the grid stakes as one clearance lane boundary, the team member on the opposite end of the line will mark the limit of the cleared lane with white pin flags. These flags become the guide for the turnaround and define the limits of the previously cleared lane.
- This procedure is continued until the grid is completely cleared.
- The UXO Technician III will follow behind the sweep line ensuring that proper spacing is maintained, inspect and verify the identification of the flagged items, and record data on the type, nomenclature, and location of the items.

Upon completion of the grid clearance the team under the direct supervision of the UXO Technician III, will collect the metallic debris marked by blue pin flags (larger than or equal to 3-in (7.6-cm) in any dimension) and any other non-hazardous debris that may interfere with the DGM effort. Items marked with red pin flags will be left in place for the Senior UXO Supervisor (SUXOS) and UXOSO to confirm the identity and determine if the items are acceptable to move and place in the Material Documented as an Explosive Hazard (MDEH) magazine or must remain in place to be treated using the blow-in-place method.

The team leader will photograph all MEC and MDEH, and record as much information as possible in the Team Leader's logbook or in the personal digital assistant (PDA). Recorded data include nomenclature (if known), type (projectile, mortar, rocket, mine, deck marker, etc.), size, physical condition, fuzed or unfuzed and fuze type by function (e.g., point detonating, mechanical time, etc.), condition (e.g., fired or unfired, armed or unarmed), filler if known, global positioning system (GPS) coordinates.

7.3 QUALITY CONTROL

The vegetation removal and surface clearance teams will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet. The QC team will conduct a 10%-random selected sampling of each completed surface cleared grid to check if any MPPEH or metallic debris greater than 3-in or greater in any dimension remains.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any grids the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit it to the SUXOS and Quality Assurance (QA). QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting vegetation removal and surface clearance activities, along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Vegetation Removal and Surface Clearance	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the TSD between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities UXO-qualified person will locate an anomalous-free area with the metal detector, prior to placing a pin flag into the ground. Mark all MPPEH items with a red pin flag for later assessment by the SUXOS and the UXOSO	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The Exclusion Zone (EZ) will be established prior to beginning intrusive operations (209-ft (63.7-m) for RAA-02 and 224-ft (68.3-m) for RAA-03 and RAA-04). Maintain the TSD as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SSHP.

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO technicians conducting Surface Clearance and Vegetation Removal operations will be equipped with the following:

- Handheld all-metals detector

- Weed eaters with metal blades
- ARGO with mower deck as needed
- Red white and blue pin flags for marking suspected MPPEH items
- Logbook and/or PDA for recording data
- Camera
- Communications equipment.

The required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Hearing protection
- Face shields
- Inclement weather gear, as needed.

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

VEGETATION REMOVAL AND SURFACE CLEARANCE

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP 5 Workers' Statement**	Have all Vegetation Removal and Surface Clearance Team Members read this SOP?				*(P)*
2	**SOP 5, Sec. 7.1.5.2**	Are all Vegetation Removal Team Members trained and qualified to operate removal equipment?				*(P), (I), (F)*
3	**SOP 5, Sec. 6**	Is the PPE serviceable and properly worn by all team members?				*(P), (I), (F)*
4	**SOP 5, Sec. 7.1.7**	Did team maintain 0.5-ft (15-cm) of ground clearance during vegetation cutting operations (i.e. the mineral soil surface or, where tundra is present, 0.5-ft (15-cm) above the tundra?				*(P), (I), (F)*
5	**SOP 5, Sec. 7.1.7**	Are team members remaining 10-ft (3-m) away from operating handheld powered cutting tools?				*(P), (I), (F)*
6	**SOP 5, Sec. 7.1.7**	Were all MPPEH items marked with a red pin flag?				*(P), (I), (F)*
7	**SOP 5, Sec. 7.2.3**	Were scrap metallic items 3-in (7.6-cm) or larger in any dimension removed from the grid?				*(P), (I), (F)*
8	**SOP-5, Sec 7.2.2**	Was a technology-aided surface to 6-in bgs clearance conducted on each grid in RAA-01 to prepare for DGM?				*(P), (I), (F)*
9	**SOP 5, Sec. 7.2.3**	Were all MEC and MDEH photographed?				*(P), (I), (F)*
10	**SOP 5, Sec. 7.2.3**	Was identification data and GPS location of all MEC and MDEH recorded in the team leader's logbook or PDA?				*(P), (I), (F)*
11	**Sec 8.1**	Was the EZ established and the TSD				*P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
		for the RAA observed?				
12	**SOP 5, Sec; 7.3**	Was any MEC/MPPEH or metallic debris 3-in or greater in any dimension found on a completed grid?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

BOUNDARY AND GRID STAKEOUT

SOP 6

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
GIS	Geographic Information System
MEC	Munitions and Explosives of Concern
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Area
RTK	Real Time Kinematic
SOP	Standard Operating Procedures
SUXOS	Senior UXO Supervisor
USA	USA Environmental, Inc.
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXOTII	UXO Technician II

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct the boundary and grid stakeout during Munitions and Explosives of Concern (MEC) activities at Remedial Action Areas (RAAs) at the former Naval Air Facility, (NAF) Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct boundary and grid stakeout operations.

Developed by:

James Walden — 19 February 2013

James Walden
Project Quality Control Manager

Date

Reviewed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revisions will be made to this SOP as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures for stakeout of the boundaries and grid corners in RAA 02, 03, and 04 to prepare the RAAs for the MEC activities on the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the MEC Quality Assurance Project Plan (QAPP).

7.2 SCOPE

This SOP applies to USA employees tasked to survey-in (stakeout) the boundaries and grid corners of RAA 02, 03, and 04.

7.3 PROCEDURES

The survey crew will establish and maintain radio communications with the site project office, the Senior UXO Supervisor (SUXOS) and the UXO Safety Officer (UXOSO) prior to departing each day to the RAAs. The UXO Technician II (UXOTII) escort will check the handheld all-metals detector for operability each day at the RAA's Instrument Verification Strip, ensuring that all five IVS seed items are detected, before departing. The survey team leader documents the IVS check results in their log book.

To provide positive control of the digital geophysical mapping (DGM) data collection and the surface and subsurface removal and to ensure complete coverage, the RAAs will be physically subdivided into individual 200-ft (60.96-m) grids. The Field Engineer, escorted by a UXOTII, will use a Real Time Kinematic (RTK) Differential Global Positioning System (DGPS) survey equipment to locate each boundary point and grid corner, as described in SOP 2 (set up and check within 0.328-ft (10-cm)). Each grid corner point will be marked with 4-ft (1.2-m) survey witness stakes and 10-in (25-cm) nails, following anomaly avoidance procedures. If anomaly avoidance or other field conditions result in an offset grid corner point, the final location of the 10-in nail, as well as all boundary points, will be measured with the rover RTK DGPS, and the project GIS database will be updated accordingly. Each grid corner stake will be marked with a dedicated point ID (typically the Grid's SW corner), color-coded paint, and survey tape. Appendix I of the MEC QAPP contains maps with the grid overlay and numbering scheme and a data file containing the grid corner points to be used for stakeout.

The UXOTII, using a handheld all-metals detector will check each boundary and grid corner point to ensure no anomalous feature is present before the stakes and nails are driven into the ground. If an anomaly is present, the UXOTII will find an anomaly free area as close to the original stake location as possible for the stake to be placed. Should any stakes have to be relocated; the data file will be updated with the new location and provided to the Geographic Information System (GIS) Manager.

7.4 QUALITY CONTROL

The teams performing the boundary and grid stakeout tasks will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any boundary or grid stakeout tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix below lists the existing and potential hazards associated with conducting the boundary and grid stakeout task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Boundary and Grid Stakeout	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
				area with the metal detector, prior to digging or placing a pin flag into the ground.	
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will be briefed on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The survey team will be equipped with the following:

- RTK-DGPS
- Logbook
- Handheld all-metals detector
- Survey lathes, 10-inch nails, and surveyor's tape
- Hand tools/hammer
- Communications equipment

The required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1:
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

BOUNDARY AND GRID STAKEOUT

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP-6 Workers' Statement**	Have all Boundary and Grid Stakeout Team Members read this SOP?				*(P)*
2	**SOP-6, Workers' Statement**	Are all Boundary and Grid Stakeout Team Members trained and qualified to conduct the tasks they are assigned?				*(P), (I), (F)*
3	**SOP-6, Sec. 7.3**	Was the RTK DGPS survey equipment used to locate each boundary point and grid corner?				*(P), (I), (F)*
4	**SOP-6, Sec. 7.3**	Has the RTK DGPS reoccupation check been performed successfully (within 0.328-ft (10-cm)?				*(P), (I), (F)*
5	**SOP-6, Sec. 7.3**	Has analog system (sensor and operator) successfully detected all five RAA IVS seed items?				*(P), (I), (F)*
6	**SOP-6, Sec. 7.3**	Is the survey team following anomaly avoidance procedures?				*(P), (I), (F)*
7	**SOP-6, Sec. 7.3**	Have Boundary points been staked out to within 0.328-ft (10-cm)?				*(P), (I), (F)*
8	**SOP-6, Sec. 7.3**	Was each grid corner point marked with 4-ft (1.2-m) survey witness stakes and 10-in (25.4-cm) nail, following anomaly avoidance procedures?				*(P), (I), (F)*
9	**SOP-6, Sec. 7.3**	Was the final location of any offset grid corner or boundary points measured with the rover RTK DGPS, and the project GIS database will be updated accordingly?				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
10	**SOP-6, Sec. 7.3**	Was each grid corner stake marked with a dedicated point ID (typically the Grid's SW corner), color-coded paint, and survey taped?				*(P), (I), (F)*
11	**SOP-6, Sec. 7.3**	Has RAA survey controller data been transferred to the Project GIS Database?				*(P), (I), (F)*
12	**Sec 8.1**	Was the TSD maintained from other teams?				*P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

DGM TARGET REACQUISITION

(SURVEY LOCATION STAKEOUT AND MEASUREMENT)

SOP 7

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C.

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DGPS	Differential Global Positioning System
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
ID	Identification
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NAVFAC NW	Naval Facility Engineering Command Northwest
NTCRA	Non-Time Critical Removal Action
PDA	Personal Digital Assistant
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RAA	Remedial Action Area
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc.
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
WMP	Waste Management Plan

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct consistent reacquisition of targets for excavation during the MEC activities at the Former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct target reacquisition.

Developed by:

2/22/2013

Al Crandall
Project Geophysicist

Date

Reviewed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures for the consistent reacquisition (survey location stakeout and measurement) of targets for excavation during the Munitions and Explosives of Concern (MEC) activities at the RAAs, Former Naval Air Facility (NAF), Adak, Alaska. Target reacquisition procedures will be conducted in accordance with the Quality Assurance Project Plan (QAPP), the Site Safety and Health Plan (SSHP), the Environmental Protection Plan (EPP)/Waste Management Plan (WMP) and the Explosives Safety Submission (ESS).

7.2 SCOPE

This SOP applies to the reacquisition of targets identified from the interpretation of geophysical sensor data. The target positions are derived from final processed data from the real time kinematic differential global positioning system (RTK DGPS) and the EM61-MK2 time domain electromagnetic induction sensor. These guidelines will be used to locate targets identified as potential MEC through interpretation of the geophysical data. The major elements of this SOP are:

- System setup
- Navigation/occupation of desired coordinates (interpreted DGM target relocation)
- Information recording
- Demarcation of coordinates
- Quality Control (QC).

The reacquisition team is not refining DGM anomalies, as there are sufficient DGM checks (e.g., IVS, grid corners, and BSIs) to document any systematic offset between RTK DGPS and EM61-MK2 data. Refining and clearing anomalies within 2.5-ft (0.762-M) are the responsibilities of the intrusive and QC teams.

The Site Geophysicist, in collaboration with the Project Quality Control Manager (QCM), is responsible for the maintenance of this SOP. Approval authority rests with a qualified geophysicist, the Project QCM, and Naval Engineering Facilities Command Northwest (NAVFAC NW).

Personnel requirements and responsibilities are presented in the MEC Quality Assurance Project Plan (QAPP).

7.3 GENERAL PROCEDURES

The general procedures for DGM target reacquisition consist of system setup, navigation/occupation to desired coordinates, recording coordinate information, demarcation of coordinates, and quality control. Personnel who perform target reacquisition are responsible for understanding these procedures.

7.3.1 System Setup and QC Checks

Setup procedures for the RTK DGPS can be found in SOP 2, Digital Geophysical Surveying. QC checks include:

- RTK DGPS reoccupation checks [at least one rover reports known location within 0.328-ft (10-cm).
- White DFX 300 battery check and default UXO settings loaded from memory
- Sensor nulling for local background

- Sensor check over the Instrument Verification Strip (IVS). Document any changes to the default UXO settings in log book.

7.3.2 Navigation/Occupation of Coordinates (DGM target relocation)

- Ensure target(s) coordinates from the dig sheet have been uploaded into the RTK DGPS survey controller. Coordinates should be sorted to expedite reacquisition as much as possible.
- Use instrument data and visual aids to interactively navigate to approximate coordinates of the target. For relative or specialized coordinate system, field personnel must understand the Cartesian system.
- Place RTK DGPS over interpreted location (within 0.5-ft (15-cm), record these coordinates and add any comments.
- Mark the *interpreted* location using a pin flag or other means of temporarily identifying the location, following anomaly avoidance procedures.

7.3.3 Recording of Reacquisition Information

- Record all information for the reacquired location(s) either manually, or on the field-ready personal digital assistant (PDA), if available, to store the information of the *reacquired* location(s).
    - Measure each reacquired location with the RTK DGPS to document stakeout accuracy
    - Add any reacquisition comment (e.g. source identified, terrain feature (e.g., bump))
- Mark the target location with a non-metallic pin flag or other approved means.
- Ensure that the marker (i.e., pin flag) is pushed into the ground at least 3 to 4-in (7.6 to 10.2-cm). On hard surfaces, use another pre-approved method.
- Ensure that the target identification (ID) number from the database is written on the pin flag. Each marked location requires a UNIQUE number.
- Continue to the next target location.
- Update dig sheet with reacquisition results.

7.4 QUALITY CONTROL

The Target Reacquisition teams will meet the QC metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any reacquired targets the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to Senior UXO Supervisor (SUXOS) and Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the MEC avoidance task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Target Reacquisition (Survey location stakeout and measurement)	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the Accident Prevention Plan (APP)	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel shall be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap

and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXO Safety Officer, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

A listing of the components of the positioning systems and other required equipment is provided below.

- Real Time Kinematic Differential Global Positioning System (RTK DGPS)
  As each independent government contractor may use various RTK DGPS systems, the necessary equipment and set up procedures will vary with each system. The manufacturer's instruction manual should be consulted in these situations. A copy of the manufacturer's manual is available with each RTK DGPS.
- White DFX 300 all-metals detector, used for anomaly avoidance in marking surveyed target locations
- Logbook
- Communication radio (2-way)
- Color-coded sensor map with dig sheet
- Field-ready personal digital assistant (PDA) or dig list to record results of each target reacquisition. On PDA, drop down menus ensure that all the required information is recorded for each target.
  - Initial staked out coordinates (X, Y) and Stakeout Comments
  - DGM target stake out coordinates (X, Y) and Comments
  - Pin flag labeled with unique DGM target ID
- Non-metallic white pin flags or other means of demarcation
- Permanent marker (e.g., Sharpie)
- Electrician's tape

- Plastic bags
- Clipboard
- Non-sparking probe to pilot pin flags

The required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed.

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

TARGET REACQUISITION (SURVEY LOCATION STAKEOUT AND MEASUREMENT)

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Target List:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST

Item	Ref.	Inspection Point	Yes	No	N/A	Comments
1	**SOP 02 & 07 Workers' Statement**	Have all Target Reacquisition Team Members reviewed SOP 02 & 07?				*(P)*
2	**QAPP WS#7 & 8**	Are all Team Members trained and qualified to operate the equipment?				*(P), (I), (F)*
3	**SOP 07, Sec. 7.3.1**	Were the system setup and QC checks for RTK DGPS and White DFX300 performed prior to reacquisition of targets?				*(P), (I), (F)*
4	**SOP 07, Sec. 7.3.2**	Was the RTK DGPS placed within 0.5-ft (15-cm) of the interpreted DGM target location and the coordinates recorded?				*(P), (I), (F)*
5	**SOP 07, Sec. 7.3.3**	Was reacquisition information recorded on each pin flag/log book/ survey controller (measured stakeout location and reacquisition comments)?				*(P), (I), (F)*
6	**SOP 07, Sec. 7.3.4**	Was the DGM target location marked with a non-metallic pin flag pushed 3 to 4-in (7.6 to 10.2-cm) into the ground?				*(P), (I), (F)*
7	**SOP 07, Sec. 7.3.4**	Was dig sheet updated with the reacquisition results/comments?				*(P), (I), (F)*

FINDINGS

Item	Comments

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

INTRUSIVE INVESTIGATION

SOP 8

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations (CFR) 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers, Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
BSI	Blind Seed Item
CFR	Code of Federal Regulations
DGPS	Differential Global Positioning System
DMM	discarded military munition
DOD	Department of Defense
EM	Engineer Manual
EMT	Emergency Medical Technician
EPP	Environmental Protection Plan
ESQD	Explosive Safety Quantity Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
GPS	Global Positioning System
GSV	Geophysical System Verification
HE	High Explosives
MDAS	material documented as safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
MPPEH	Material Potentially Presenting an Explosive Hazard
MPPEH	material potentially presenting an explosive hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	Personnel Protection Equipment
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Technician
TL	Team Leader

TSD	team separation distance
USA	USA Environmental, Inc
UXO	Unexploded Ordnance
UXOTI	UXO Technician I
UXOTII	UXO Technician II
WMP	Waste Management Plan

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ATTACHMENT 1: MEC DAILY ACTIVITIES CHECKLIST

ATTACHMENT 2: CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG

ATTACHMENT 3: MEC EQUIPMENT CHECKLIST

ATTACHMENT 4: VEHICLE/EARTH MOVING MACHINERY INSPECTION CHECKLIST

ATTACHMENT 5: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct intrusive investigations for material potentially presenting an explosive hazard (MPPEH) during activities at RAAs at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct intrusive investigation operations.

Developed by:

James Walden — 19 February 2013
Project Quality Control Manager — Date

Reviewed by:

Manok Synakorn — 19 February 2013
Project Manager — Date

Validated by:

Tony Tennyson — Date
UXO Safety Officer

Approved by:

Robert Crownover — 2/19/2013
Director of Safety and Quality — Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedural guidance for intrusive investigative clearance of digital geophysical mapping (DGM) targets in Remedial Action Areas (RAAs) where DGM is collected and subsurface anomalies in RAAs where the detect and dig approach is used during the munitions and explosives of concern (MEC) Clearance at RAAs on the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the MEC Quality Assurance Project Plan (QAPP), the Site Safety and Health Plan (SSHP), and Explosives Safety Submission (ESS).

7.2 SCOPE

This SOP provides guidelines for the intrusive investigation, and documentation of DGM targets subsurface anomalies. Specific requirements and definitions for community notification, personnel, training, and equipment/material, are found in the Environmental Protection Plan/Waste Management Plan (EPP/WMP) and the MEC QAPP.

7.3 DAILY OPERATIONAL BRIEFINGS

At the beginning of each work day, the Senior Unexploded Ordnance Supervisor (SUXOS) or his/her designee will hold a daily briefing in accordance with the requirements of the approved MEC QAPP. At a minimum, this briefing will include the following:

- Work assignments
- Site Specific Explosive Safety Quantity Distance (ESQD)
- Team separation distances (TSDs)
- Entry and control points
- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards and the measures that will be used to mitigate those hazards
- Review of environmental concerns
- Procedures for coordination of intrusive investigation work with personnel performing non-MEC activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The SUXOS will document the daily briefing in his/her logbook and will obtain the signatures of those attending the briefing on a daily briefing attendance sheet. During the daily briefing, the SUXOS will also assign work sites to each of the UXO teams for intrusive operations. Each team will receive a map and a dig package containing the necessary information to perform the assigned work. The SUXOS will complete the top portion of the MEC Daily Activities Checklist (Attachment 1) and transfer it to the UXO Team Leaders [(TLs), UXO Technician III] with the assigned dig package(s). The top portion of this checklist verifies that the TL has received the necessary information to support daily activities, including a complete dig package, information on utilities that may be present in the work area and daily briefing and safety information. They will brief their team on potential hazards in the area where they will be working and document the briefing on the MEC Daily Activities Checklist, as well as on the Tailgate Safety

Briefing Form in the APP. Work assignments, equipment inspections, and other routine daily activities will be documented on the MEC Daily Activities Checklist as well.

7.4 GENERAL REQUIREMENTS FOR INTRUSIVE INVESTIGATION

- Each intrusive investigation team will be composed of a maximum of seven members: 1 UXOTIII TL and up to six UXO Technicians II/I (UXOTII/I).
- Intrusive investigation activities will not be conducted until the required training (both general and site-specific) and proper equipment/vehicle checks have been completed.
- Intrusive investigation operations will not be initiated until an appropriate Exclusion Zone (EZ) is established based upon the munition with the greatest fragmentation distance (MGFD) in accordance with the approved ESS.
- A fully supplied Emergency Medical Technician (EMT) will be centrally located to provide support to all project teams; and the appropriate civilian medical personnel will be notified and on-call whenever intrusive operations are conducted.

The SUXOS will be notified of all MEC finds. The following sections discuss various elements of the intrusive process.

7.5 EXCAVATION PROCEDURES

Reacquisition personnel will reacquire and mark anomalies to be excavated in accordance with SOP 07, *Target Reacquisition*. The TLs will be provided with dig packages containing the coordinates of the DGM targets to be investigated that day. The TL will record recovered DGM target data on ruggedized Personal Digital Assistants (PDAs), using pull-down menus or on the Clearance Data and Munitions Accountability Log in Attachment 2. For details on completing the Clearance Data and Munitions Accountability Log, see Section 7.6.

The intrusive team will use the pin flags or painted markers left by the reacquisition team to locate anomalies. The TL will notify the Field Site Office prior to commencing intrusive operations. The all-metals detector will be used to locate the boundaries of the anomaly. If possible, the boundary area will be gently probed to determine the depth and location of the anomaly. Most of the excavations will be performed by hand, but in accessible areas, a backhoe or other approved piece of earth-moving machinery may be used to excavate a shallow trench 12-in (30.5-cm) to one side of the DGM target to provide easier access and reduce the labor required for the intrusive investigation.

If, at any time during the excavation, water begins pooling in the hole and obscures the bottom of the dig, a 20 gallon per minute pump will be used to drain the hole. If the water recharge rate exceeds 0.25-in per minute, the team will contact the UXO Safety Officer (UXOSO) and UXO Quality Control Specialist (UXOQCS) to assess whether it is safe to continue the excavation. The UXOQCS will contact the Navy QA to determine whether to continue with the excavation or if the dig should be abandoned. The hole will then be backfilled and the condition preventing investigation (e.g., water in the hole) will be noted in the Comment section of the Clearance Data & Munitions Accountability Log as an abandoned dig, and the reason(s) for the abandonment.

The specific intrusive investigation procedures are outlined below:

- An appropriate EZ will be set up for intrusive operations.
- Each DGM target will be investigated by locating the boundaries and excavating gently to one side of the DGM target. A shovel may be used to remove the tundra plug for restoration use and

excavate to within 12-in (30.5-cm) of the DGM target. The final 12-in (30.5-cm) of cover will be removed using hand tools.

- If a backhoe or other approved mechanical excavator is used for intrusive investigation, a trench will be excavated beside the DGM target location. The trench will be offset approximately 12-in (30.5-cm) from the DGM target and will be about 2-ft (0.6-m) wide and 2-ft (0.6-m) deep. The length of the trench will be dictated by the needs of the UXO personnel because they will work within this space to hand-excavate the DGM target. When the trench is complete, the team will utilize the all-metals detector, shovel or trowel, and a probe to pinpoint and unearth the DGM target.
- Munitions debris will be collected at designated locations within the work area for transport to a storage area pending shipment off island for demilitarization. Should large concentrations of munitions debris be encountered (e.g. “frag pits”), they will be verified by QC and Quality Assurance (QA), and documented in the PDA
- If the DGM target is determined to be MEC/MDEH, the item will be marked/surveyed with RTK DGPS and the SUXOS will be notified to determine disposition of the item.
- If the item is determined by the SUXOS to be MEC/MDEH and unacceptable to move, it will be left in place and barricaded until it can be safely detonated at the end of the workday. Notifications to the Project Manager will be made as outlined in the MEC QAPP.
- If MEC is not intact upon discovery, i.e. exposed high explosives (HE) or filler, this will be noted on the Remedial Investigation Data Sheet. If the munitions item is judged to be safe to transport, it will be placed in a container to prevent further loss of the filler. Any HE or filler that is found on the soil will be collected and the location marked with RTK DGPS coordinate and logged in the TL’s logbook. The excavation will be left open and soil sampling procedures will be performed IAW the MC QAPP.
- The TL will verify that the source of the DGM target was located. Check that the DGM target location has been searched/cleared to a maximum 2.5-ft (0.76-m) lateral radius and a 2-ft (0.6-m) (RAA-02, RAA-03E, RAA-03W) or 4-ft (1.2-m) depth below the mineral surface (RAA-04) and to depth of detection in RAA-01 of the pin flag position or to the confirmed DGM target source and results documented on the PDA.
    - Either the DGM target is resolved and there is no remnant analog response with a handheld detector, or
    - The excavation has been identified and verified, with the QC team, as saturated with fragmentation and no metal larger than 3-in (7.6-cm) in any dimension remains, or
    - It is identified and verified, with the QC team, as cultural or construction material which cannot reasonably be removed or the DGM target is verified as deeper than the excavation requirement for that RAA, or
    - The excavation fills with water and cannot be dewatered sufficiently for safe investigation, verified with the UXOSO and QC team,
    - It is identified and verified by the QC team as deeper than the RAA removal action depth. and
    - The excavation is backfilled and leveled to grade and the flag left in place to facilitate the 10% QC check, using the large coil Vallon, of DGM targets to verify DGM target resolution.
- If the selected DGM target disappears after the soil has been disturbed (e.g. rust pocket that has now been disturbed), re-verify DGM target location with a global positioning system (GPS).

- If the DGM target is not discovered within a 2.5-ft (0.762-m) lateral radius of the original DGM target coordinate, and there is no evidence of rust, document the DGM target as a no find. The investigation team will leave the hole open and report the no find to the QC team. The QC team will verify all no finds using a large coil Vallon. If the no find rate exceeds 8% for any grid, notify the UXOQCS and QA.
- Team Leaders to verify dig sheets/PDAs are filled out correctly, are complete, correct, standardized nomenclature is used, and no-finds are listed. MEC and material documented as an explosive hazard (MDEH) items require positive identification on the dig sheet. Material documented as safe (MDAS) is documented by an assigned number (Worksheet #17). Gross weight of MDAS per grid is documented separately. Location and depth of item is recorded.
- Blind seed items (BSIs) must be recovered and correctly identified/documented.

After excavation, backfilling, and data entry are complete, the team will proceed to the next DGM target to be investigated.

The TL will inform the Field Site Office when intrusive activities are completed, and will complete the remaining items on the MEC Daily Activities Checklist (Attachment 1) to document successful completion of required activities. The completed checklist will be submitted to the SUXOS.

7.6 DGM TARGET REPORTING

When a PDA is used, an entry will be made for each DGM target encountered by the dig team members. All fields will be completed by the TL in accordance with the pull-down menu instructions. The TL will turn over the PDA to the Data Manager at the end of the day. The Data Manager will check the data for completeness and accuracy, download the data to the project database, and upload the PDA with the next day's DGM target data.

When a PDA is not used, the dig teams will record DGM target data on the Clearance Data and Munitions Accountability Log. In the field, the UXO team will complete all fields on the top portion of the form. If information is not known or a field is not applicable to an DGM target (e.g., Munitions Mark/Mod), so indicate in the field, and do not leave fields blank. The TL will check each form for completeness and will turn them over to the SUXOS daily. All Clearance Data and Munitions Accountability Logs, digital photographs, and checklists will be turned over to the SUXOS at the end of each working day without exception. It is critical that data not be compromised through loss or improper handling. The SUXOS will identify errors in the forms, have the TL correct the errors, and turn the forms over to the Data Manager for entering into the project database.

A photograph will be taken of all MEC and each MDEH item recovered and annotated on the Clearance Data and Munitions Accountability Log to further document the item. The photograph will include a white board with the date, the grid and Global Positioning System (GPS) location of the item, the DGM target reference number, any identifying information as to the type of munition, size and condition [e.g. fired, discarded military munitions (DMM), etc.]. The photograph number will be annotated on the DGM target dig sheet.

Any suspected hazardous material located that is not MPPEH related will be assessed on a case-by-case basis by the Project Manager in consultation with the Navy. A material will be suspected to be hazardous if it emits a chemical odor, has caused soil staining, or is contained in a drum or other container commonly used (or marked) for storage of hazardous materials. If in doubt, materials will be reported for investigation.

7.7 ANALOG DETECTION AND ANOMALY EXCAVATION

Prior to any access path or drainage maintenance or improvements, UXO teams will conduct a technology-aided surface clearance (White's DFX 300 all-metals detector) of the proposed construction footprint. Prior to beginning the clearance the construction footprint will be surveyed and marked with white pin flags or survey laths with white streamers. Any areas used to lay down equipment, materials or for equipment turn-around will also be identified, marked and cleared. The teams will remove all MPPEH and metallic debris 3-in (7.6-cm), or larger in any dimension.

Materials recovered during the technology-aided surface clearance will be managed as described in Sections 7.5 and 7.6 above and meet the quality control metrics in Section 7.9.

Prior to any construction intrusive work, UXO Technicians will detect and remove all anomalies within the designated construction intrusive work area using the White's DFX 300.

7.8 DAILY SITE RESTORATION

Following intrusive sampling each day, pin flags, signs, and barricades will be removed as appropriate and the excavated area will be backfilled and leveled to grade. Backfill material will consist of native soil from the excavation.

7.9 QUALITY CONTROL

The Intrusive Investigation teams will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Att. 5). The location of QC mini grid locations (two per grid) are semi-randomly selected at the discretion of QC in consideration of no finds and other grid considerations (e.g., over/near MEC). Mini grid locations are provided to QA.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any intrusive investigations the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Report or Nonconformance Report and submit to SUXOS and QA. QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix below lists the existing and potential hazards associated with conducting the intrusive investigation task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Intrusive Investigation	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the TSD between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities Excavate with hand tools to the side of the anomaly until it is exposed; continue removing the overburden with hands or small hand tool (e.g., trowel or garden hand spade) to make initial identification.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap

and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area the sun as well.

The potential for encountering MPPEH is high. The EZ will be established prior to beginning intrusive operations (209-ft (63.7-m) for RAA-02 and 224-ft (68.3-m) for RAA-03 and RAA-04). Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SSHP.

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO teams conducting intrusive investigations will be equipped with the following:

- Handheld White's DFX 300 all-metals detectors
- Red pin flags for marking suspected MEC items
- Shovels, trowels and other tools needed for excavating
- Logbook and/or PDA for recording data
- Camera
- Communications equipment

Teams will use the equipment checklists in Attachments 3 and 4 to ensure all equipment is on hand and operational prior to departing for the RAAs.

Safety equipment required includes the following:

- First-aid kit
- Level D personal protective equipment (PPE)
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1
MEC DAILY ACTIVITIES CHECKLIST

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USA Environmental, Inc.

MEC DAILY ACTIVITIES CHECKLIST

Project Information

Project Name: _____ Date: ___

Project Location: _____ Team No. ___

Work Area:

SUXOS Checklist items

Name: _____

Check Items Complete

- ☐ Conduct daily briefing (safety, emergency procedures, munitions information, etc.).
- ☐ Notify team leader of utilities or other dangers. _____
- ☐ Assign work area and provide data package.

UXO Team Leader Checklist Items

Name: _____

Check Items Complete

- ☐ Ensure that all necessary data have been provided by the SUXOS for daily operations.
- ☐ Conduct vehicle inspection.
- ☐ Conduct tailgate safety briefing.
- ☐ Perform equipment inspections and operational tests (record in log book).
- ☐ Verify daily heavy equipment inspection.
- ☐ Identify known utilities.
- ☐ Ensure that work area is secure as required (road closures, exclusion zone set up, etc.).
- ☐ Notify site office of start time for ordnance operations.
- ☐ Ensure that all required data have been recorded (data sheets, log books, photo log, etc.).
- ☐ Ensure that site restoration required is complete.
- ☐ Notify site office of stop time for ordnance operations.

Approvals

SUXOS Signature: _____ Date: ___

Team Leader Signature: _____ Date: ___

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ATTACHMENT 2.
CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG

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CLEARANCE DATA &
MUNITIONS ACCOUNTABILITY LOG

FOR UXO TEAM USE

Site Name:	Team Leader:	
Grid or Lane Number:	Work Area:	Date:

Location: X (Lat): _____ Y (Long): _____ Location Type (UW or UG): _____

Other Location Information: _____

Depth (feet): _____ Inclination (Degrees): _____ Orientation (N–S, E-W): _____

TARGET/ANOMALY CHARACTERISTICS

Type of Target/Find: ☐ Surface Find ☐ Analog & Dig Target ☐ DGM Target ☐ Validation (QA/QC) ☐ No Dig

Type of Anomaly: ☐ MPPEH ☐ MDEH ☐ MDAS ☐ Metallic Scrap ☐ No Find* ☐ Rock ☐ Rust Layer ☐ Abandon Dig* ☐ Misc.*

*Comments:

Diameter/Width:	Length:	Estimated Weight:

DIGITAL PHOTO RECORD

Was photo taken? ☐ Yes ☐ No	Camera No.:	Frame No.:	File Name:

MUNITIONS NOMENCLATURE (If Known, Record Below and record fuze condition and disposition)

Munitions Mark/Mod:	Fuze Mark/Mod: ☐ Nose:_____ ☐ Tail: ☐ Transverse:_____ ☐ Casing:_____	N.E.W. Total:

MUNITIONS CHARACTERISTICS

Munitions Filler: ☐ Explosive ☐ Inert ☐ Propellant ☐ Pyrotechnic ☐ Other:

Munitions Category: ☐ Depth Charges ☐ Land Mine ☐ Projectiles ☐ Sea Mines
☐ Bombs ☐ Grenades ☐ Misc. Explosive Devices
☐ Pyrotechnics and Flares ☐ Small Arms
☐ Clusters/Dispensers ☐ Guided Missiles ☐ Mortars ☐ Rockets ☐ Torpedoes

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ATTACHMENT 3.
MEC EQUIPMENT CHECKLIST

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MEC EQUIPMENT CHECKLIST

Basic Equipment (Required for all UXO work)

✓	Quantity	Item Description
☐	1	Air horn
☐	2 rolls	Caution tape
☐	1	Emergency eye wash
☐	1	Fire extinguisher
☐	1	First-Aid/trauma kit (equipped for white phosphorus burns)
☐	1	Flashlight
☐	1 pair	Gloves, leather (or other approved work gloves) (per team member)
☐	2	Radios (2-way)
☐	TBD	Pin flags (non-metallic)
☐	1	Metal detector (White's DFX 300)
☐	3	Shovel, round point
☐	2	Warning signs for exclusion zone
☐	2 rolls	Tape, duct
☐	2 rolls	Tape, plastic
☐	1	Toolbox, general hand tools
☐	1	Trowel
☐	3	Water bottle, 1 liter
☐	--	Field log book and field forms (as appropriate)
☐	1	Water, drinking, 5 gal (if required)

Site-Specific Items (Write in items and quantity)

✓	Quantity	Item Description
☐		
☐		
☐		
☐		

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ATTACHMENT 4.
VEHICLE/EARTH MOVING MACHINERY INSPECTION CHECKLIST

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USA Environmental, Inc.

VEHICLE/EARTH MOVING MACHINERY INSPECTION CHECKLIST

Project:		Equipment Type:	
Equipment No.		Model:	
Manufacturer:		Date:	
Engine Hrs/Mileage		Team Number:	

Equipment Checklist (Check all that apply and provide description of corrections needed)

	Condition Good	Correction Needed
Steering		
Service Brakes		
Emergency Brakes		
Retarder		
Transmission		
Controls		
Hydraulic Leaks		
Exhaust System		
Warning Gauges		
Windshield		
Lights		
Mirrors		
Seat and Seat Belts		
Tires/Tread		
Regular Horn		
Back-up Alarm		
Steps, Hand-holds		
Fire Extinguisher		
Rollover Cage		
Other:		
Other:		

Remarks:

Approvals

Operator's Signature (Team Leader):	Date:
SUXOS Signature:	Date:
Equipment Supervisor's Signature (Repairs/ Adj. Completed):	Date:

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ATTACHMENT 5.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

INTRUSIVE INVESTIGATION

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST

ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	**SOP 8 Workers' Statement**	Have all Intrusive Investigation Team Members read this SOP?				*(P)*
2	**SOP 8, Sec. 7.3**	Did all personnel attending the morning safety/operational briefing sign-in?				*(P), (I), (F)*
3	**SOP 8, Sec. 7.3**	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				*(P), (I), (F)*
4	**SOP 8, Sec. 8.1**	Was the EZ established and the TSD for the RAA observed?				*(P), (I), (F)*
5	**SOP 5, Sec. 8 Hazard Analysis Matrix**	Are team members using excavation techniques to mitigate hazards?				*(P), (I), (F)*
6	**SOP 8, Sec. 7.5**	Has each DGM target location been searched to a maximum 2.5-ft (0.762-m) lateral radius and a 2-ft (0.6-m) (RAA-02, RAA-03E, RAA-03W) or 4-ft (1.2-m) depth below the mineral surface (RAA-04)?				*(P), (I), (F)*
7	**SOP 8, Sec 7.5**	Were 10% of the DGM target excavations checked using a large coil Vallon?				*(P), (I), (F)*
8	**SOP 8, Sec. 7.5**	Were attempts to dewater investigation hole performed?				*(P), (I), (F)*
8a	**SOP 8, Sec. 7.5**	Were there any DGM targets that "disappeared" after the soil was disturbed?				*(P), (I), (F)*
8b	**SOP 8, Sec. 7.5**	If answer to #8a is yes, was the interpreted DGM target location re-verified with a GPS?				*(P), (I), (F)*
8c	**SOP 8, Sec. 7.5**	Was an DGM target located within a 2.5-ft (0.762-m) radius of the DGM target?				*(P), (I), (F)*
9	**SOP 8, Sec. 7.5**	If the answer to 8c was no, was the DGM target documented as a "no find" and reported to the QC team? If the no find				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
		rate exceeds 8% for a grid, was it reported to the UXOQCS and QA?				
9a	**SOP 8, Sec. 7.5**	Were all no finds verified by QC using a large coil Vallon?				*(P), (I), (F)*
9b	**SOP 8, Sec. 7.5**	Were there any anomalies identified and verified as saturated with fragmentation and no metal larger than 3-in (7.6-cm) in any dimension remains? or it				*(P), (I), (F)*
9c	**SOP 8, Sec. 7.5**	Were there any anomalies identified and verified as cultural or construction material which cannot reasonably be removed				*(P), (I), (F)*
10	**SOP 8, Sec. 7.5**	Were there any anomalies where the DGM target was verified as deeper than the excavation requirement for that RAA?				*(P), (I), (F)*
11	**SOP 8, Sec 7.5**	Did the UXOQCS and UXOSO assess the dewatering methods for effectiveness and safety and contact the Navy QA to determine if the excavation should continue or if the dig should be abandoned and backfilled?				*(P), (I), (F)*
12	**SOP 8, Sec. 7.6**	Were dig sheets filled out correctly, using standardized nomenclature for MEC and MDEH?				*(P), (I), (F)*
13	**SOP 8, sec 7.5**	Were all MEC and MDEH items photographed?				*(P), (I), (F)*
14	**SOP 8, Sec 7.5**	Were all blind seed items recovered and correctly documented?				*P), (I), (F)*
15	**SOP 8, Sec. 7.7**	Were areas for access path or drainage maintenance or improvement surveyed and marked?				*P), (I), (F)*
16	**SOP 8, Sec. 7.7**	Was a Technology-aided surface clearance conducted in the access path/drainage footprint to remove MPPEH and metallic debris ≥3-in (7.6-cm) in any diameter				*P), (I), (F)*
	SOP 8, Sec. 7.8	Were all DGM target excavation holes backfilled and leveled to grade?				*P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

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1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

MEC MANAGEMENT AND DISPOSAL

SOP 9

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- NAVSEA OP 5, Volume 1, Seventh Revision, Ashore
- EODB 60A-1-1 31, EOD Disposal Procedures
- 27 CFR 555, Commerce in Explosives
- FM 5-250, Explosives and Demolitions
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
BIP	Blow in Place
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
DOD	Department of Defense
DS	Demolition Supervisor
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FM	Field Manual
GPS	Global Positioning System
HE	High Explosive
MD	Munitions Debris
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
PETN	Pentaerythritol Tetranitrate
PPE	Personnel Protection Equipment
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
RPM	Remedial Program Manager
SOP	Standard Operating Procedures
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TBD	To Be Determined
TEU	Technical Escort Unit

USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
USEPA	U. S. Environmental Protection Agency
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXO	Unexploded Ordnance

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ATTACHMENT 1: DEMOLITION EQUIPMENT CHECKLIST

ATTACHMENT 2: HEALTH AND SAFETY EQUIPMENT CHECKLIST

ATTACHMENT 3: GENERAL SAFETY PRECAUTIONS

ATTACHMENT 4: DISPOSAL OPERATIONS CHECKLIST

ATTACHMENT 5: EXPLOSIVE DISPOSAL LOG

ATTACHMENT 6: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) UXO-qualified personnel to conduct munitions and explosives of concern (MEC) management and disposal procedures during the activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct MEC management and disposal operations.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

This document provides MEC management and basic explosive demolition procedures for the treatment of MEC and material potentially presenting an explosive hazard (MPPEH) found during the MEC activities in the Remedial Action Areas (RAAs) at the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the Work Plan, the Site Safety and Health Plan (SSHP), and the Explosives Safety Submission (ESS).

7.2 SCOPE

This SOP provides the detailed information needed to safely configure, conduct demolition procedures, and perform post demolition inspection and area restoration.

7.3 MEC MANAGEMENT

When MEC and MPPEH items are discovered, they are inspected and positively identified using a three-tiered inspection process:

- Inspected first by the UXO technician discovering the item(s) to determine if it is MEC or MPPEH
- Second by the Team Leader to independently classify the item(s) and
- Third by the Senior UXO Supervisor (SUXOS), UXO Quality Control Specialist (UXOQCS), or UXO Safety Officer (UXOSO).

For MEC items the SUXOS and UXOSO must assess and agree that the risk associated with movement is acceptable. They will document the decision in writing before transporting the items to the storage magazines for temporary storage.

For MEC items the SUXOS and UXOSO determine are unacceptable to move, they will be conspicuously marked, secured and scheduled for Blow-in-Place (BIP) treatment by a demolition team.

MPPEH items will be further classified as material documented as safe (MDAS) or material documented as an explosive hazard (MDEH). The chain of custody documentation will be initiated and the items segregated and stored so that comingling of the materials (MDAS and MDEH items) will not occur (see SOP 10 for procedures to manage and dispose of MDAS).

MDEH may be transported to the storage magazines for temporary storage.

All MEC and MDEH is photographed and as much information as possible is recorded on the dig sheet and in the Team Leader's logbook. Recorded data include nomenclature (if known), type (projectile, mortar, rocket, mine, deck marker, etc.), size, physical condition, fuzed or unfuzed and fuze type by function (e.g., point detonating, mechanical time, etc.), condition (e.g., fired or unfired, armed or unarmed), filler if known, Global Positioning System (GPS) coordinates (if different from the relocated position) and depth. One hundred percent of MEC and MDEH are inspected using this three-tiered inspection process.

7.4 MEC AND MDEH TREATMENT

7.4.1 Notifications

The SUXOS will ensure that the agencies responsible for emergency response (fire department and airport operations) and other contractors working in Parcel 4 are notified as far in advance as possible that disposal activities will be taking place. The notifications should address scheduling, evacuations, road closures, exclusion zones (EZs), and any other required support. Table 1 provides a list of emergency telephone numbers and contacts.

Table 1: Emergency Contact Numbers

Contact	Phone Number
Ambulance	911 or VHF Channel 2
Police/Fire	911 or VHF Channel 2
Health Clinic	911, 907-592-8383, VHF Channel 1
Airlift Northwest (Juneau – VA contract)	1-800-426-2430
Harris Air (Sitka)	907-966-3050/752-0220
Guardian Flight, Inc. (Ketchikan)	1-888-997-3822
Aero Med (Anchorage)	1-888-283-7220
Life Guard (Providence Hospital, Anchorage)	1-800-478-5433 or 907-243-5433/2434
Life Flight (Alaska Regional Hospital, Anchorage)	1-800-478-9111 or 907-258-3822
Guardian Flight, Inc. (Fairbanks)	1-888-997-3822
TEMSCO Helicopters (Ketchikan)	907-225-5141
TEMSCO Helicopters (Juneau)	1-877-789-9501
TEMSCO Helicopters (Skagway)	907-983-2981
Poison Control Hotline	1-800-222-1222
USEPA National Response Center	1-800-424-8802
CHEMTREC	1-800-424-9300
Federal OSHA Emergency Hotline	1-800-321-OSHA (6742)
Technical Escort Unit (TEU) (duty hours)	410-671-3601
TEU (after duty hours)	410-671-2773
Navy RPM, Justin Peach	360-396-0082
Navy NTR, John Pittz	360-396-0005
USA Program Manager, George Spencer	813-343-6358
USA Project Safety Manager, Cheryl M. Riordan	757-689-4737

Contact	Phone Number
Site Superintendent, Frank Magner	Project number - TBD
SUXOS 1, Larry Mazerac	Project number - TBD
SUXOS 2, Pat Gildea	Project number - TBD
UXOSO, Jeff Barefield	Project number - TBD
UXOQCS, Jose Garcia	Project number - TBD

7.4.2 Exclusion Zones and Road Closures

The SUXOS will ensure exclusion zone (EZ) barricades are set up with signs at all access roads and marked appropriately: Danger, UXO Remediation Project in Progress, DO NOT ENTER and list contact information on the barricade sign.

Table 2 provides the primary and contingency EZ for the four RAAs.

Table 2 Primary and Contingency Exclusion Zones for RAAs

MGFDs		EZs (ft)				
Description	NEW (lb)(1)	Fragmentation Effects(1)		Blast Overpressure Effects(1)		
		HFD	MFD	K328	K40	K24
RAA-02 & 05						
81 mm M43A1	1.23	209	1,579	351	43	26
RAAs-03 & 04						
75 mm M48	1.34	224	1,794	362	44	26
Contingency Exclusion Zone for all RAAs						
155mm,M101	14.6	389	2,894	802	98	59

Note:

(1) *From DDESB Fragmentation Data Review Form Database dated April 2, 2012.*

7.4.3 Weather and Environmental Considerations

Prior to commencing disposal operations the SUXOS or UXOSO will obtain a local weather report.

Disposal operations will not be conducted if electrical storms are within 6 miles of the disposal site or during severe weather conditions that would impact safety.

The SUXOS and UXOSO will make a determination on whether wind speed and visibility (minimum 600-ft (183-m)) will hamper the safe execution of disposal operations.

7.4.4 Emergency Medical Support

The Emergency Medical Technician' (EMT) location will be briefed and communications established prior to demolition operations commencing.

Emergency medical personnel will be notified of the location and duration of disposal operations. The emergency contact telephones numbers are listed in Table 1.

At least two UXO technicians on each demolition team will be trained in first aid and cardiopulmonary resuscitation (CPR).

A first aid kit, portable eyewash, and blood-borne pathogen kit will be onsite at all times. The first aid kit will contain dressings capable of treating traumatic injuries that could result from an explosion.

7.4.5 Fire Support

The fire department will be notified of the location and duration of disposal operations. The telephone number of the Adak Fire Department is located in Table 1. A 20-lb ABC fire extinguisher and shovels will be onsite to fight small fires; personnel will not attempt to extinguish fires involving explosives. Personnel will evacuate the area if the fire approached ordnance or explosives.

7.4.6 UXO Personnel Requirements

Explosive demolition operations require specific organizational roles and personnel assignments, specifically:

- A Demolition Supervisor (DS) is responsible for planning, directing, and executing all disposal operations.
- A UXOSO to ensure that all work is performed safely and in accordance with the approved site-specific plans.
- A minimum of three UXO Technicians per team will be used to conduct disposal operations.
- One UXO Technician III will be designated as the DS.
- Two UXO Technicians (level II or I) will assist the DS.

The UXOSO will act as safety observer; this individual will be located in the safe area and will maintain visual contact with the team down range. He/she will maintain communications with the team, the SUXOS, and USA Site Field Office.

7.4.7 Pre-Treatment/Demolition Briefing

The DS will brief all personnel involved in range operations in the following areas:

- Type of MEC and MDEH being destroyed
- Type, placement, and quantity of demolition material being used
- Method of initiation (electric)
- Means of transporting and packaging MEC
- Route to the disposal site
- Equipment being used (e.g., RFD, galvanometer, blasting machine, firing wire, etc.)
- Misfire procedures
- Post-shot cleanup of range

7.4.8 Demolition Procedures Review

Before any disposal operations commence, all technicians assigned to or working with disposal teams will attend a site-specific orientation. The purpose of the orientation will be to review MEC disposal and emergency response procedures. The topics to be covered during the orientation will include, but are not limited to:

- Accident Prevention Plan (APP)
- SSHP
- This SOP
- Demolition firing systems and components
- Disposal charge placement
- Explosives transportation
- Site ordnance briefing
- Engineering controls
- Type and condition of MEC
- Emergency response equipment
- Emergency procedures
- Team assignments.

7.5 EXPLOSIVE OPERATIONS

The SUXOS will oversee all MEC treatment operations.

7.5.1 Initiation Sequence

The SUXOS or DS will ensure that the actions taken prior to initiating a demolition shot are completed as follows.

- Ensure all required notifications have been made.
- Set up EZ and post guards at the barricades.
- Visually inspect EZ and surrounding area for unauthorized personnel.
- Announce on the radio that air-horn demolition warnings will follow.
- **Five-minute warning**. The SUXOS/DS will give the five-minute warning on the radio, followed by a one minute blast on the air-horn.
- **One-minute warning**. The SUXOS/DS will give the one-minute warning on the radio, followed by a one minute blast on the air-horn prior to the shot.
- Prior to initiating the shot, the SUXOS/DS will give three loud "*Fire in the Hole!*" warnings and then give the “fire” command on the radio.
- When the area has been cleared (post-blast), the SUXOS will sound a prolonged blast on the air-horn.
- The SUXOS/DS will announce on the radio that demolition operations have ceased.

7.5.2 Initiation Systems

The firing system will use the Remote Firing Device (RFD) with electric blasting caps. As a back-up contingency to the RFD, the HR1 Non-electric starter or the HBR Scorpion will be used to initiate the electrical firing system.

7.5.3 Preparing Electric Detonators (Caps) for Initiation

To prepare electric blasting caps for initiation, the procedures listed below will be followed:

- Prior to making connection with the electric blasting cap, the firing circuit will be continuity tested.
- All parts of the firing circuit will be kept insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.
- The shunt will not be removed from the wires until the individual performing the operation has been grounded. Electric blasting caps will be connected to the firing circuit before connection to the main initiation charge.
- Electric blasting caps of different manufacturers or types will not be used in the same system.
- The electric blasting caps will be tested for continuity with a galvanometer at least 50-ft (15.2-m) downwind from any explosives prior to connecting them to the firing circuit. After the testing is completed, the lead wires will be short-circuited by twisting the bare ends of the wires together. The wires will remain shunted until ready to connect to the firing circuit.
- The electrical lead wires of electric blasting caps, detonators, or other electro-explosive devices should not be pulled; detonation may occur.
- The legs should be unrolled so that the cap is as far as possible from the operator and pointing away from him.
- The blasting cap will be placed in a hole or behind a barricade before removing the shunt and testing for continuity. The cap should not point toward other personnel or explosives.
- Only authorized and serviceable testing equipment will be used.
- The remote receiver will not be connected to the firing wires until all pre-firing tests have been completed, and all preparations have been made to fire the charge.
- The blasting cap will not be held directly in the hand when un-coiling the leads. The wires will be held approximately 6 inches from the cap. This will minimize injury should the cap explode. The lead wires should be straightened by hand and not thrown, waved, or snapped to loosen the coils.
- The shunt will not be removed from the lead wires of blasting caps except when testing for continuity or actual connection into the firing circuit. The individual removing the shunts should be grounded prior to performing this operation to prevent accumulated static electricity from firing the blasting cap.

7.5.4 Preparing Donor Charges for Initiation

To prepare the explosive charge for initiation, the procedures listed below will be followed.

- Prepare and place all explosive charges after locating a firing position a safe distance away from the charges.
- Ground yourself.
- Test the blasting caps by removing the short circuit shunt. Touch one end of the cap lead wire to one post and other cap lead wire to other post of the galvanometer. The galvanometer's needle should deflect at least half scale; if not, the cap is defective and should not be used. When testing is complete, ensure cap lead wires are twisted together.

- Connect blasting cap lead wires to the remote receiver after checking it for static electricity.
- Request permission to prime from the SUXOS and, when granted, connect the blasting caps to the donor charges.
- Depart to firing point.
- Take cover.
- Obtain a head count.
- Ground yourself.
- Test entire circuit using test procedures for RFD. This should cause the lamp to glow. If the firing circuit is defective then go down-range and recheck circuits. If a wire is found defective replace the wire. If a splice is found defective, disconnect and re-splice the wires. If the cap is found defective, replace it. Retest the entire circuit again to make sure that all breaks have been located before attempting to fire.
- Follow the instructions in RFD manual.
- Request permission to initiate the charge(s) from the SUXOS.
- When granted permission, make three announcements of "Fire in The Hole" on the radio and three long blasts on the safety vehicle's horn, and then initiate the charge.
- Observe a 5-minute wait time after the detonation. This wait time may be waived by the SUXOS based on observation of the detonation.

7.5.5 Post Demolition/Treatment Procedures

The SUXOS and UXOSO will examine the demolition site while all other personnel remain in the safe area. Once the SUXOS gives the all-clear, the team will conduct the following procedures:

- Check demolition area for low orders or kick outs.
- Examine the area for, and remove any munitions debris remaining after the treatment procedures.
- Backfill hole, as necessary.
- Recover all equipment.

7.5.6 Misfire Procedures

A thorough check of all equipment, firing wire, and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below will be followed.

Electric Misfires

If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below.

- Follow procedures contained in the RFD Manual.
- If unsuccessful, commence a 30-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the designated technician will proceed down-range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires, check the replacement detonator for continuity, connect the new detonator to the remote receiver, and prime the charge without disturbing the original detonator.

- Follow normal procedures for effecting initiation of the charge.

Detonating Cord Misfire

USA uses detonating cord to tie in multiple demolition shots, and to ensure that electric detonators are not buried. In addition to the electrical misfire procedures above, the following will be conducted.

- If there is no problem with the initiating system, wait the prescribed amount of time, and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection, simply attach a new initiator, and follow the appropriate procedures in Paragraph 4.3.3.
- If the initiator detonated and the cord did not, inspect the cord to ensure that it is a detonating cord and not time fuze. Also, check to ensure that there is Pentaerythritol Tetranitrate (PETN) in the cord at the connection to the initiator.

It may be necessary to uncover the detonating cord and replace it. This must be accomplished carefully, to ensure that the donor charge and the MEC item are not disturbed

7.6 RECORDKEEPING

Forms and checklists should be generated and/or modified to meet site-specific requirements. The forms provided in this SOP may be used or alternate forms containing the same information may be used. The SUXOS will make this determination. For disposal operations, the SUXOS or the UXO DS will, as a minimum, complete the following.

- General Safety Precautions (Attachment 3)
- Disposal Operations Checklist (Attachment 4)
- Explosive Disposal Log (Attachment 5)

7.7 QUALITY CONTROL

The MEC Management and Disposal operations will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Attachment 6).

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Report or Nonconformance Report and submit to the SUXOS and Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The Hazard Analysis Matrix lists the existing and potential hazards associated with conducting MEC management and disposal tasks along with methods to mitigate the hazards.

Table 3: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
MEC Management and Disposal	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MEC/MDEH	MEC/MDEH reacts to impact by equipment, tools or personnel.	C/II/3	All personnel will wear cotton clothing Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities Make all emergency notifications prior to commencing demolition operations. Establish the EZ as listed in Table 2. Demolition operations will not take place if electrical storms are within 6 miles.	D/II/4
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

At the beginning of each work day, the Senior Unexploded Ordnance Supervisor (SUXOS) or his/her designee will hold a daily briefing in accordance with the requirements of the approved MEC QAPP and the SSHP. All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA. The demolition Team Leader will brief all personnel on the operation covering topics listed in the attached briefing checklist.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel shall be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve (cotton) clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bear skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The EZ as listed in Table 2, will be established and maintained throughout the MEC Management and Disposal tasks.

All personnel will strictly adhere to the directions of the demolition Team Leader throughout the demolition operation. All personnel will be moved outside the appropriate maximum fragmentation distance (MFD) in Table 2 and accounted for prior to initiation of donor charges during disposal tasks. Personnel will remain outside of the MFD until the SUXOS and UXOSO recon the disposal site and give the all clear.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO teams conducting MEC management and disposal tasks will be equipped with the following:

- Handheld all-metals detector
- Disposal equipment (Demolition Equipment Checklist, Attachment 1)
- Donor explosives
- Logbook and/or PDA for recording data
- Camera
- Communications equipment

Safety equipment required includes the following:

- Health and Safety Equipment (Health and Safety Equipment Checklist, Attachment 2)
- Level D PPE
- Inclement weather gear as needed.

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
DEMOLITION EQUIPMENT CHECKLIST

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DEMOLITION EQUIPMENT CHECKLIST

Equipment List

Equipment	Quantity	Comments
Explosive Vehicle(s)		
Personnel Vehicle(s)		
Digital Camera		
Air Horn		
Handheld Radios		
Satellite Telephone(s)		
Remote Firing Device		
White XLT all-metals detector		
Shovel, round point, long handle		
Shovel, round point, short handle		
Blasting Machine		
Tape, duct		
Tape, measuring, 50- or 100-meter		
Tape, electricians, plastic		
Toolbox, general hand tools		
Galvanometer		
IME-22 container		
Knife		
Initiating explosives		
Donor explosives		
Fire Extinguishers, 20B:C		
Wheel Chocks		

Checklist Verification

Disposal Supervisor Signature:	Date:

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ATTACHMENT 2.
HEALTH AND SAFETY EQUIPMENT CHECKLIST

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HEALTH AND SAFETY EQUIPMENT CHECKLIST

Equipment List

Equipment	Quantity	Comments
Air Horn, emergency		
Burn Blanket		
Burn Kit		
Emergency Eye Wash		
Hand-held Radio and Satellite Phone		
Lightning Detector		
Fire Extinguisher, 20-pound ABC		
Blood-borne Pathogen Kit		
First Aid Kit		
Gloves, leather		
Goggles		
Face Shield(s)		
Fire Retardant Gloves		
Fire Retardant Apron(s)		
Rain Suit(s)		
Safety Vest(s)		
Stretcher		
Water, 5-gal bottle (emergency shower)		
Water, drinking -- 1 liter per person		

Checklist Verification

Disposal Supervisor Signature:	Date:

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ATTACHMENT 3.
GENERAL SAFETY PRECAUTIONS

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GENERAL SAFETY PRECAUTIONS

1. Carry blasting caps in approved containers and keep them out of the direct rays of the sun. Keep the caps located at least 25 feet from other explosives until they are needed for priming.
2. Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc.
3. Do not use explosives or accessory equipment that is obviously deteriorated or damaged. They may cause premature detonation or fail completely.
4. Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
5. Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
6. Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.
7. Do not use improvised methods for initiating blasting caps.
8. Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
9. Test electric-blasting caps for continuity at least 50 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.
10. In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least 30 minutes after the expected detonation time, when firing electrically.
11. Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.
12. Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments will be minimized not only to protect personnel but also property, such as buildings, trees, etc.
13. Avoid inhaling the smoke, dust, or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if inhaled.
14. Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
15. Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.
16. Inert ordnance will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO Procedure for the Management and Disposition of MPPEH will be met prior to releasing any inert ordnance material.
17. Maintain minimum safe distances between electromagnetic-radiating sources and electro-explosive devices (IAW EODB/TM-TO 60A-1-1-12).

18. Do not conduct blasting or demolition operations during an electrical, dust, sand, or snowstorm severe enough to produce atmospheric static electrical charges, or when such a storm is nearby (within 6 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.
19. Loose initiating explosives: lead azide, mercury fulminate, lead styphnate, and tetracene, these explosives manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.
20. Exercise extreme care when handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, or friction.
21. Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
22. Photo flash bombs must be handled with the same care as black powder-filled munitions.
23. MEC containing white phosphorous will not be detonated into the ground. White phosphorous munitions will be counter-charged on the bottom centerline (CCBC) when possible.
24. A search of the detonation site, after the demo operation, will be conducted to assure complete disposal was accomplished.
25. Do not abandon any explosives.
26. Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.
27. Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace, or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.
28. Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.
29. Know and observe federal, state, and local laws/regulations that apply to the transportation, storage, and use of explosives.
30. Do not permit metal, except approved metal truck bodies, to contact explosive containers.
31. Do not transport metal, flammable, or corrosive substances with explosives.
32. Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.
33. Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.
34. Assure the load is blocked and braced to prevent it from movement and displacement.
35. Do not drive vehicles containing explosives over public highways until all permits and certifications have been obtained from the state enforcement agencies.
36. All routes must be approved in writing prior to transporting explosive materials over public highways.
37. Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless USA UXO personnel have been specifically licensed and certified to make the shipment.
38. Never leave a vehicle that is loaded with explosives unattended.
39. Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container, or magazine with other explosives.

40. Store explosive materials in military or ATF-approved magazines only. Ensure the magazines used for the storage comply with quantity distance requirements, for the class of explosive material they contain. Reference documents include: NAVSEA OP-5, TM 9-1300-206, AMCR 385-100, ATF - Explosives Law and Regulation, ATF P 5400.7, and 49 CFR.
41. Do not store spark-producing metal/tools in an explosive magazine.
42. Do not permit smoking, matches, or any source of fire or flame within 100 feet of an explosive magazine.
43. Do not allow leaves, grass, brush, or debris to accumulate within 50 feet of an explosive magazine.
44. Do not permit the discharge of firearms within 300 feet of an explosive magazine.
45. Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.
46. Do not permit smoking, matches, or other sources of fire or flame within 100 feet of an area in which explosives are being handled.
47. Do not expose explosives or devices containing explosive to prolonged exposure to direct sun light. Such exposure can increase sensitivity and deterioration.
48. Ensure all unused explosives are returned to their proper containers and the container closed after use.
49. Do not carry explosives or explosive components in pockets or on the body.
50. Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator, or other explosive initiating device. A detonation may occur.
51. Do not pull on the electrical lead wires of electric blasting caps, detonators, or their electro-explosive devices. A detonation may occur.
52. Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.
53. Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.
54. Do not use pull rings or safety pins to lift or handle explosive devices.

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ATTACHMENT 4.
DISPOSAL OPERATIONS CHECKLIST

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DISPOSAL OPERATIONS CHECKLIST

FUNCTION	DATE/TIME	SIGNATURE
SUXOS		
Assign Disposal Team		
Brief Disposal Team Review emergency procedures Discuss MEC/MPPEH to be disposed Describe Disposal procedures and method		
Inspect Range/Exclusion Zone upon completion of operations		
Disposal Supervisor		
Assign demolition task to team members		
Verify Not Later Than (NLT) disposal time includes wait time for misfire procedures		
Verify roads are closed		
Verify Exclusion Zone boundaries in place		
Complete health and safety and equipment checklists		
Ensure Field Site Office has completed the verification checklist Responsible activity Medical Facility Fire Department Security/Police Department		
Disposal Supervisor tailgate safety brief: Designate emergency vehicles Designate emergency evacuation route Review emergency response procedures		
Verify daily equipment inspection		
Verify detonators are separated from explosives		
Verify area has been evacuated		
Verify engineering controls are correct		
Notify Field Site Office that operations are commencing		
Start disposal activities		
Inspect shot after designated wait time		
Collect all metal fragments for later disposal		
QC check performed		
Stop disposal activities		
QA check (if required)		

USA notify upon completion: Notify Client Responsible Activity Medical Facility Fire Department Security/Police Department		
Complete MEC/MPPEH Accountability Log		
Record data in Explosive Disposal Log		
Demolition Supervisor signature:		Date:

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ATTACHMENT 5.
EXPLOSIVE DISPOSAL LOG

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USA Environmental	**EXPLOSIVE DISPOSAL LOG**

Project Information

Project Name:		Start Time:	
Project Location:		Stop Time:	

MEC Disposed of This Date (List items and quantity of each item)

Donor Explosive Used (List types and quantity)

Remarks

Approval

Demolition Supervisor:	Date:

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ATTACHMENT 6.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

MEC MANAGEMENT AND DISPOSAL

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST

ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	**SOP 9 Workers' Statement**	Have all MEC Management and Disposal Team Members read this SOP?				*(P)*
2	**SOP 9, Sec. 8.1**	Did all personnel attending the morning safety/operational briefing sign-in?				*(P), (I), (F)*
3	**SOP 9, Sec. 8.1**	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				*(P), (I), (F)*
4	**SOP 9, Sec. 7.3**	Did all recovered MPPEH undergo the three-tiered inspection process?				*(P), (I), (F)*
5	**SOP 9, Sec. 7.3**	Did the SUXOS and UXOSO assess all MEC and agree that the risk associated with movement is acceptable or not?				*(P), (I), (F)*
6	**SOP 9, Sec. 7.3**	Was the decision to move MEC documented in writing before movement or transporting the items to the storage magazines for temporary storage?				*(P), (I), (F)*
7	**SOP 9, Sec. 7.3**	Were MPPEH items further classified as MDEH or MDAS?				*(P), (I), (F)*
8	**SOP 8, sec 7.5**	Were all MEC and MDEH items photographed?				*(P), (I), (F)*
9	**SOP 9, Sec. 7.4.7**	Did the Demolitions Supervisor conduct and document the demolitions briefing?				*(P), (I), (F)*
10	**SOP 9, Sec. 8.1**	Was the EZ established and the TSD for the RAA observed?				*(P), (I), (F)*
11	**SOP 9, Sec. 7.5.1**	Was the demolition sequence observed?				*(P), (I), (F)*
12	**SOP 9, Sec. 7.5.4**	Were donor charges properly prepared?				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
13	**SOP 9, Sec. 7.5.5**	Were post-demolition operations conducted?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

MDAS MANAGEMENT AND DISPOSAL

SOP 10

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Navy. 2011. Ammunition and Explosives Ashore: NAVSEA OP 5, Volume 1, Seventh Revision, change 10. Commander, Naval Sea Systems Command. Washington, D.C. July 1.
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DOD	Department of Defense
EM	Engineering Manual
ESS	Explosives Safety Submission
EZ	Exclusion Zone
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosives Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
MTDU	Mobile Thermal Destruction Unit
NAF	Naval Air Facility
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
NTCRA	Non-time Critical Removal Action
OPNAVINST	Chief of Naval Operations Instruction
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
UOXTIII	UXO Technician III
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET
ATTACHMENT 2: THERMAL FLASHING EQUIPMENT CHECKLIST
ATTACHMENT 3: MTDU OPERATING INSTRUCTIONS

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to manage and dispose of material documented as safe (MDAS) during munitions and explosives of concern (MEC) activities at Remedial Action Areas (RAAs) at the former Naval Air Facility, (NAF) Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct MDAS Management and disposal operations.

Developed by:

James Walden — 19 February 2013

James Walden
Project Quality Control Manager

Date

Reviewed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 MDAS COLLECTION DAILY CERTIFICATION AND STORAGE

7.1.1 Purpose

The purpose of these procedures is to provide procedures for the collection, daily certification and storage of MDAS recovered during the non-time critical removal action (NTCRA) on the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the MEC QAPP.

7.1.2 Scope

This SOP applies to USA UXO Technicians accounting for, managing and preparing MDAS for off-island disposal. This SOP is not a stand-alone document and should be used together with the MEC QAPP, other USA SOPs, the Site Safety and Health Plan (SSHP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.1.3 Collection, Certification and Storage Procedures

All recovered MPPEH items will undergo a 100% inspection and an independent 100% re-inspection by two UXO Technician IIIs to determine and document whether the item is MDAS or material documented as an explosive hazard (MDEH). MDAS is recorded by the depth recovered and a brief description is documented in the Comments block of the dig sheet. Individual weights for MDAS are not required; however the numerical valuations shown in table below are used to categorize the relative size/weight of the item(s) removed.

Number to Assign MD on the Dig Sheet	Relative Size/Weight
1	< 2-in (5-cm) in any dimension; < ¼ pound in weight
2	< 3-in (7.6-cm) in any dimension; ¼ to ½ pound in weight
3	> 3-in (7.6-cm) but < 5-in (12.7-cm) in any dimension; ½ to 1 pound in weight
4	> 1 pound but < 5 pounds in weight; any dimension
5	> 5 pounds in weight; any dimension

The total MDAS weight by area is documented by the Team Leader at the end of each workday. MDAS will be containerized, locked, and segregated to prevent comingling with MDEH or MPPEH pending categorizing. MDAS will be certified daily to maintain its explosive safety status. MDAS will be treated in the thermal flashing unit or the Mobile Thermal Destruction Unit (MTDU), as described in the following section, before off-island shipment to a recycler.

7.2 MDAS THERMAL FLASHING CERTIFICATION AND CONTAINERIZATION

7.2.1 Purpose

The purpose of this document is to provide procedures for the operation of the MTDU during the MEC activities at RAAs on the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the Work Plan, the SSHP, and the Explosives Safety Submission (ESS).

7.2.2 Scope

These procedures apply to all USA unexploded ordnance (UXO) technicians conducting thermal flashing operations with the MTDU.

7.2.3 Personnel Requirements

A minimum of two UXO technicians [one will be a UXO Technician III (UXOTIII)] are required to operate the MTDU. UXO personnel training and experience requirements are described in the QAPP.

The UXOTIII will conduct and document a briefing covering the procedures prior to conducting TFU operations.

7.2.4 Thermal Flashing Procedures

Only MDAS will be treated in the MTDU. The QC team will verify that the proper inspections of the material were completed and documented prior to flashing material. Under no circumstances will MEC, or MDEH, be processed through the MTDU.

The MTDU can process between 30-lb to 70-lb of MDAS in a single burn. Thermal flashing will be performed in four phases:

- Pre-Flashing Phase – Setup of site, equipment, Exclusion Zones (EZs), and materials to be flashed.
- Flashing Phase – Notifications, loading procedures, thermal flashing, and wait times.
- Post-Flashing Phase – MTDU shutdown, cool down, and downloading procedures.
- Certification/Verification – Inspection and sampling to confirm flashed items are free of explosives residue.

7.2.4.1 Pre-Flashing Procedures

Procedures for setting up a work area for the MTDU follow.

- After the location for the MTDU has been selected, clear vegetation from a 50-ft (15.2-m) radius surrounding the unit.
- Park the trailer in the prepared safe location. Unhook the trailer from the tow vehicle. Chock the trailer tires. Crank up the tongue jack to lift the front of the trailer slightly higher than the rear.
- A 75-ft (22.9-m) EZ (for all personnel) will be established and maintained while the MTDU is in operation.

7.2.4.2 Flashing Procedures

Procedures for flashing operation are outlined below.

- All operators must wear the proper safety equipment including Level D work clothing, welder's gloves, aprons, safety glasses, and a hard hat with a full-face shield.
- Establish communications with the command post (Site Field Office) and the UXO Safety Officer (UXOSO).
- Check all gas hoses and valves for leaks, splits or malfunctions.
- Check that the MTDU is empty of any unwanted materials.
- Assemble the propane fuel source and torches and connect the apparatus to the MTDU.

- Open all exhaust vents.
- Open the front doors of the burn and access the burn box. Spread 30 to 70 lbs of MDAS evenly within the burn box.
- Close and toggle the doors.
- Request permission from the Senior UXO Supervisor (SUXOS) to start the unit.
- Two personnel (one safety observer and one operator) are required to start the MTDU; all other personnel will leave the 75-ft (22.9-m) EZ.
- Ignite the torches.
- Allow the unit to burn for **8 minutes. During this period the temperature must remain between 600 and 1500 degrees Fahrenheit.**

7.2.4.3 Post-Flashing Procedures

Guidelines to follow after the flashing operation are outlined below.

After a burn time of **8 minutes**, one operator will return to the MTDU. A safety observer will maintain visual contact with the operator from a safe distance. The operator will execute the following steps.

- Turn off the torches.
- Back away and let unit cool down for **30 minutes**.
- After cool-down is complete, return to the MTDU. Remove the flashed MDAS from the burn box into metal buckets. Scrape and clean the unit and vents after each burn to prevent build-up.
- Check a minimum of five **items with the EXPRAY explosive test kit according to the provided instructions. If any of the items fail, re-flash the entire batch. Repeat the flashing/test process until items are explosive free.**
- Place all flashed MDAS and residue in 55-gallon drums and complete the chain-of custody documents as described in Section 7.2.5.
- Repeat flashing- and post-flashing procedures until all items scheduled for flashing are processed.
- Make notifications that operations are complete (fire, medical, security).

7.2.4.4 EXPRAY Testing

The operating temperature range for the EXPRAY kit is 32 to 110 °F. It is recommended to use the spray in a ventilated area and to avoid inhalation of the spray. The use of butyl gloves is required while using the EXPRAY test kits.

The spraying order must not be altered and all three sprays should be used when testing to perform a complete test. If EXPRAY-2 is sprayed after a positive result was obtained with EXPRAY-1, a change to pink color is an indication of a double-base or a triple-base explosive (such as Composition B and triple-base gunpowder). Even when group B explosives only are tested, one should start with EXPRAY-1 and only then spray with EXPRAY-2. If nitrate-based explosives are suspected, one should still start with EXPRAY-1, then move to EXPRAY-2, and only then apply EXPRAY-3.

If nitrite compounds (such as sodium nitrite) are tested, a color reaction will be obtained even after applying EXPRAY-1 and EXPRAY-2. No other false positives are known, but one should note that only the colors listed should be observed. If a different color appears in any stage, it should be disregarded. Furthermore, an un-reacted test paper left in the open air will gradually change in color to light pink. Note that there are some varnishes and lacquers made of nitrocellulose (which is a group B explosive), and if the kit is applied directly to a surface treated with such coatings, a positive (pink) reaction will appear.

The varnishes do not disperse residues, so that touching a varnished surface will not cause a positive reaction on the touching hand or surface.

USING THE EXPRAY TEST KIT

Step 1 - Slide one collection paper from the gray dispenser (# 00530). The collection paper is hermetically sealed to prevent either pre- or cross contamination.

Step 2 - Peel the protective silicon layer exposing the collection surface. Be sure not to touch the exposed the adhesive collection surface, thus, avoiding contamination.

Step 3 - Wipe the suspected area (objects, hands, etc.), or touch the suspected substance with the collection paper.

Step 4 - Shake the EXPRAY-1 can before spraying.

Step 5 - Spray the EXPRAY-1 can briefly and away from the body onto the #00530 test paper from a distance of approximately 10cm (4 inches).

Step 6 - Observe for an immediate dark-brown color reaction similar to the color of the letter **E** on the EXPRAY-1 can label. A positive reaction indicates the presence of group A explosive residues on the paper.

Step 7 - Next, **shake** and **spray** the EXPRAY-2 onto the same test paper from a distance of approximately 10 cm (4 inches).

Step 8 - Observe for an immediate pink color reaction similar to the color of the letter **X** on the EXPRAY-2 can label. A positive reaction indicates the presence of group B explosive residues on the paper.

Step 9 - Next, **shake well** and **spray** the EXPRAY-3 onto the same test paper from a distance of approximately 10cm (4 inches).

Step 10 - Observe for an immediate pink color reaction similar to the color of the letter **I** on the EXPRAY-3 can label. A positive reaction indicates the presence of nitrate-containing residues on the paper.

7.2.5 MDAS Certification and Containerization

MDAS that passes the EXPRAY test will be certified explosives free by the SUXOS and the burn batch recorded in the field log. Only processed material that has passed the test will be placed in the processed drums and sealed. This sealed container is then locked, weighed, and labeled, and a chain-of-custody (DD Form 1348-1A), with numbered seals, is generated.

The DD Form 1348-1A will contain the following statement to be signed by the SUXOS and a Navy QA representative (Battelle):

> *"The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard".*

The MDAS will be shipped off-island to a recycler under the chain-of-custody procedure. The chain-of-custody will be terminated when the material is smelted or demilitarized by the recycling facility and documentation is returned from the facility attesting to the process.

7.3 QUALITY CONTROL

The MDAS Management and Disposal operations will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Report or Nonconformance Report and submit to the SUXOS Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the MDAS Management and Disposal tasks along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
MDAS Management and Disposal	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
				information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	MDAS will be inspected, containerized and segregated to prevent comingling with MPPEH/MEC/MDEH. All personnel will receive a safety briefing prior to commencing MDAS management activities. Maintain the EZ of 75-ft (22.9-m) while the MTDU is in operation. Properly don PPE prior to conducting MTDU operation. Maintain the chain-of-custody on MDAS to preserve its explosives safety status.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the MDAS holding area or the MTDU prior to commencing any MDAS Management or Disposal activities.

Personnel will be cognizant of the surroundings and remain observant of their footing as they at all times. All personnel shall be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The EZ (75-ft (22.9-m) for all personnel) for thermal flashing operations will be established and maintained throughout the flashing operation.

The potential for encountering MDEH comingled with MDAS is very low. Should MDEH be discovered, it will be left in place, the SUXOS and the UXOQCS will be notified to investigate the occurrence and determine the corrective actions.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SSHP.

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The MDAS Management team will be equipped with the following:

- MDAS containers (e.g., 55 gallon drums)
- Container handling equipment as required
- Seals
- MTDU
- Propane
- Logbook and/or PDA for recording data
- Camera
- Communications equipment

Required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Protective clothing for operating the MTDU listed in Attachment 2
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

MDAS MANAGEMENT AND DISPOSAL

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP 10 Workers' Statement**	Has the MDAS Management and Disposal Team read this SOP?				*(P)*
2	**SOP 10, Sec 7.1.3**	Did all MPPEH items undergo a 100% inspection and an independent 100% re-inspection by two UXO Technician IIIs to determine and document whether it is MDAS MDEH?				*(P), (I), (F)*
3	**SOP 10, Sec 7.2.4.1**	Is the MTDU properly setup and is the EZ (75-ft (22.9-m)) established and maintained?				*(P), (I), (F)*
4	**SOP 10, Sec 7.2.4.1**	Is vegetation cleared for a 50-ft (15.2-m) radius around the MTDU?				*(P), (I), (F)*
5	**SOP 10, Sec. 7.2.3.1**	Did the UXOTIII conduct and document a briefing covering the procedures prior to conducting MTDU operations?				*(P), (I), (F)*
6	**SOP 10, Sec 7.2.4.1**	Were communications established with the site field office and the UXOSO?				*(P), (I), (F)*
7	**SOP 10, Sec. 7.2.3.2**	Is the PPE serviceable and worn properly?				*(P), (I), (F)*
8	**SOP 10, Sec. 7.3.2.2**	Was the MDAS batch limited to between 30 and 70 lbs?				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
9	**SOP 10, Sec. 7.2.2.2**	Was permission requested from the SUXOS to start the MTDU?				*(P), (I), (F)*
10	**SOP 10, Sec. 7.3.2.2**	Was the startup sequence properly performed?				*(P), (I), (F)*
11	**SOP 10, Sec. 7.3.2.2.**	Was the temperature range (600-1500 degrees Fahrenheit) maintained for 8 minutes?				*(P), (I), (F)*
12	**SOP 10, Sec. 7.2.3.3**	Were the post-flashing procedures properly conducted?				*(P), (I), (F)*
13	**SOP 10, Sec. 7.2.3.3**	Were a minimum of 5 flashed items checked with the EXPRAY explosives test kit?				*(P), (I), (F)*
14	**SOP 10, Sec. 7.2.3.3**	Are butyl gloves worn when using the EXPRAY explosives test kit?				*(P), (I), (F)*
15	**SOP 10, sec 7.2.3.3**	If any items tested positive for explosives residue, was the entire batch flashed again?				*(P), (I), (F)*
16	**SOP 10, Sec. 7.2.4**	Was successfully flashed MDAS placed in containers, sealed, locked, weighed, labeled, and a 1348-1A signed by the SUXOS and the Navy QA representative attached to the drum(s)?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

ATTACHMENT 2.
THERMAL FLASHING EQUIPMENT CHECKLIST

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THERMAL FLASHING EQUIPMENT CHECKLIST

USA Environmental, Inc.	**THERMAL FLASHING EQUIPMENT CHECKLIST**
Date:	**Team:**
Inventoried By (Name):	

Thermal Flashing Equipment

✓	Quantity	Item Description
☐	1	Thermal flashing unit
☐	2	Propane bottles (20 gallons)
☐	1	Propane lighter
☐	2	Fire extinguisher
☐	1	First aid/Trauma kit
☐	1	Eye wash
☐	1	Burn blanket
☐	2	Radios (2-way)
☐	4	5-gallon plastic buckets
☐	4	3-gallon galvanized buckets
☐	8	Wheel chocks
☐	1	Wheel barrow
☐	1	Weight Scale (with a capacity greater than 100 lb)

Personal Protective Equipment

☐	1	Safety glasses
☐	1	Hearing protection
☐	1	Hard hat
☐	1	Full-face shield
☐	1	Welding gloves
☐	1	Welder's apron
☐	1	Butyl rubber gloves (required only by technician using EXPRAY test kit)

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ATTACHMENT 3.
MTDU OPERATING INSTRUCTIONS

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VISIT OUR WEBSITE:
www.remtc.com

E-MAIL:
remtc@aol.com

Reactive & Explosive
MATERIALS TRAINING CORPORATION

133 Route 206 • Branchville, New Jersey 07826 • 973-948-0270 • Fax: 973-948-5972 • 1-800-REMTC95

1. Preoperational Precautions

The MTDU #1 & #2 are not Explosive Containment Chambers. They will not contain overpressure as a result of a deflagration or detonation. CN/CS Grenades, Hand Held Distress Flares and Consumer Grade Fireworks must be individually fed through the insertion tube for destruction.

Preoperational Health and Safety Meeting. The Site Health and Safety Supervisor (SHSS) will hold a preoperational meeting with all personnel involved in MTDU operations to assess and identify potential hazards, ensure compliance with the Health and Safety Plan, to ensure clarity of communications and to confirm the chain of command.

Preoperational MTDU Requirements

a.) The MTDU must be grounded if burning static sensitive material
b.) Check all gas hoses and valves for leaks, splits or malfunctions
c.) Check that the MTDU is empty of any unwanted materials
d.) Assemble the propane fuel source, torches and connect the apparatus to the MTDU
e.) Open all exhaust vents
f.) Install "straight tube" for items and when there is no appreciable "projectile" hazard
g.) Ignite and adjust the rate of fuel feed and venting to ensure reliable ignition of introduced material
h.) Allow the MTDU to preheat for a minimum of five minutes before reliable ignition of hazardous material can be expected

2. MTDU Operations Required Documents:

a.) Reactive & Explosive Materials Training Corporation's Operation of Portable Mobil Thermal Destruction Unit (MTDU)
b.) Required MSDS(s)
c.) Hazards Assessment Work Sheet
d.) Job and Site Specific Work Instructions
e.) Operators Training Certification

MTDU Equipment

a.) Inner Box
b.) Main Containment Chamber
c.) Optional Recombustion Chamber
d.) Propane Fuel Source
e.) Propane Torches
f.) Propane Igniter

3. Personal Protective Equipment (onsite operational personnel)

a.) Nomex Coveralls
b.) Nomex Hood
c.) Fire Resistant Gloves
d.) Kevlar Helmets with Face Shield
e.) Conductive Safety Shoes (Steel Toe)
f.) ABC Fire Extinguisher (2)
g.) Remote Arm or Probe
h.) Safety Glasses
i.) Hearing Protection
j.) Level of PPE can be downgraded depending on material being disposed

4. Safety Distance Perimeter

a.) Technicians/Operations/Qualified Work Personnel (immediate work zone area).
b.) Technicians/Operators cannot stand directly in line with the door
c.) Observers (100 feet, radius)

5. Acceptable Materials for MTDU Disposal

a.) Small caliber ammunition (up to and including 50 caliber)
b.) CN/CS Grenades, Hand Held Distress Flares, Consumer Grade Fireworks. These items must be fed individually, through the insertion tube.

6. Operating Precautions

a.) The MTDU operator must monitor the gas supply and flame constantly during operations. In the event that the flame blows out for any reason during operation of the MTDU, the gas must be turned off and the MTDU must vent for five minutes before the torches are reignited.

b.) The MTDU will not function properly if the wind is greater than fifteen (15) mph. It is unsafe to operate the MTDU with wind greater than fifteen mph.

c.) MSDS(s) for the materials to be destroyed will be reviewed by the operators prior to the destruction of said material to ensure that the potential hazards presented by the hazardous substances contained in the materials to be destroyed are understood.

d.) The main door is designed to be the weakest section of this unit. In the event that something is placed in the unit that shouldn't be, overpressure may cause the door to open. ***As a result, personnel should not stand in the area of the door when burning material.***

7. Loading of MTDU Chamber (Ammunition)

a.) Single Load: before the application of heat to the MTDU, open front doors and access the burn box. Load the burn box with ammunition to be thermally destroyed, keeping the amounts of material within the safe handling limits. Shut and toggle the doors and ignite the torches. After the torches are ignited all personnel will move to designated safe areas within the prescribed work zones for the period of time required to complete the destruction of the material placed in the MTDU. The MTDU will begin to react with materials within fifteen (15) minutes at which time the chamber will reach 600° F - 1500° F.

b.) After the last sign of reaction (audible or visual). Allow the system to burn for 30 minutes ensuring consumption of all reactive materials contained in the chamber. To remove any material remaining after the burn, the chamber must cool down for a minimum of thirty (30) minutes after the torches are turned off. If the MTDU is at a temperature that allows the operator to open the chamber without risk of burning oneself, the chamber doors may be opened for final inspection. Final inspection is required at the end of every operational cycle of the MTDU. Final inspection will be done before the loading or reloading of the chamber for additional burns. All spent material and ashes must be removed in order to ensure that no hot or glowing material remains that could inadvertently ignite new material that is being introduced to the MTDU. To restart the single load cycle the same steps that have been defined in this paragraph will be followed.

c.) **Direct (continuous) feed:**

CN/CS Grenades, Hand Held Distress Flares, Consumer Grade Fireworks must be introduced through the insertion tube individually, small amounts at a time, for destruction. Before the application of heat to the MTDU, open front door and access the burn box, check that the amount of spent material in the chamber to ensure that there is not a quantity of sufficient mass to adversely affect the heating of the burn box or block the progress of unrelated material being introduced to the MTDU by way of the continuous feed tube. Shut and toggle the doors after which the torches are ignited. After the torches are ignited all personnel will move to designated safe areas within the prescribed work zones for the period of time required to complete the destruction of material placed in the MTDU. The MTDU will begin to react within fifteen (15) minutes at which time the chamber will reach 600° F. Ensure that materials introduced to the tubes are small enough as is or as packaged to prevent the material from becoming lodged in the tube. If the straight tube gets jammed with material, said material may "cook-off" in the tube and possibly cause a "mortar effect" expelling materials from the tube. The

supervisor will review the materials to be destroyed and set acceptable quantities of said material that can be introduced at any one time into the tube. These quantities may under no circumstance be exceeded nor shall a second amount of material be introduced into the tube before complete consumption of the previously introduced material. After the last sign of reaction (audible or visual) allow the system to burn for thirty minutes ensuring consumption of all reactive materials contained in the chamber. To remove any material remaining after the burn the chamber must cool down for a minimum of thirty (30) minutes after the torches are turned off. If the MTDU is at a temperature that allows the operator to open the chamber without risk of burning oneself the chamber doors may be opened for final inspection. Final inspection is required at the end of every operational cycle of the MTDU.

8. Site Operational Requirements

a.) Work Zone
b.) Exclusion Zone will include the footprint of the MTDU
c.) The Hotline will be a line running ten (10) feet around the MTDU
d.) The Support Zone shall extend from the edge of the hotline & contamination control line out to 100 feet from the MTDU
e.) At a pre-approved location outside support zone an over watch station will be located with line of sight and audible contact with the MTDU and associated work zones.

9. Personnel Access to Work Zones

a.) General Site Workers will have access to all work zones and the over watch station.
b.) Onsite Management Supervisor will have access to all work zones and the over watch station.
c.) Visitors may be granted access to all work zones after the hazards to the health and safety of those individuals has been studied and characterized and the PPE of said individuals offers sufficient levels of protection.
d.) Emergency Personnel may be granted access to all work zones after the hazards to the health and safety of those individuals has been studied and characterized and the PPE of said individuals offers sufficient levels of protection. Emergency personnel may have access to the over watch station without PPE.
e.) The Site Health and Safety Supervisor will have access to the over watch station at anytime before, during or after operations.
f.) Guest or unexposed off-site observers may be granted access to the over watch station after they have met with the site health and safety supervisor and information covering potential hazards, alarm signals and evacuation plans.
g.) Only individuals with the specified level of training will have access to active work zones other than the over watch station.

10. Preliminary Survey

a.) The survey that deals with the hazards presented by the materials to be destroyed will be reviewed each time there is a change in materials or the manner in which the material is being processed

b.) Exposure duration vs. ambient heat for site worker wearing PPE as specified in this document

c.) A break is defined as helmet off, hood off, and vest open as a minimum at 60° F to 40° F: 10 minute break every 50 minutes of work time minimum.

d.) At 75° F to 60° F: 10 minute break every 40 minutes of work time minimum.

e.) At 80° F to 75° F: 10 minute break every 25 minutes of work time minimum.

f.) At 90° F to 80° F: 10 minute break every 1 minutes of work time minimum.

g.) At 91° F or above the immediacy and intensity of the work to be done will be weighed against the prevailing environmental conditions to determine if said work will take place under those conditions. If a positive determination of work is made, the individuals required to wear PPE will be continually monitored for signs of heat fatigue and or heatstroke. Frequency of breaks and duration of breaks will occur as warranted by the nature of the work and the environmental conditions.

h.) Potable water will be available in marked containers, as conditions require.

11. Potential Health and Safety Hazards Associated

a.) The operation of the MTDU must be managed by trained personnel , familiar with reactive materials.

b.) The materials that will be introduced into the MTDU for destruction are classified as reactive material components and therefore present the expected hazards of reactivity. **(Remedy):** The correct employment of PPE, work procedures and the use of common commercial best practices will limit the hazards presented by this material.

c.) The materials also may present varied levels of toxicity when burnt. (**Remedy):** The correct utilization of this procedure, to ensure that there is no exposure to hazardous levels of said materials.

d.) The utilization of PPE with temperature levels in excess of 70° F or more may lead to heatstroke or heat fatigue if the break schedule is not followed. (**Remedy);** Strict adherence to and timely monitoring of the break schedule, in conjunction with annual medical monitoring will ensure that conditions contributing to heatstroke and/or heat fatigue do not adversely affect individuals utilizing PPE during the operation of the MTDU.

e.) Standing in front of the door may expose the operator to the possibility of explosively ejected material. (**Remedy):** The operator will wear the correct PPE and will not stand in line with the mouth of the door at any time during the operation of the MTDU.

f.) Standing in the down-wind exhaust plume of the MTDU may expose the operator to hazardous levels of fumes that may be hazardous to the operator's health and/or safety. (**Remedy):** Do not stand in the down wind area.

12 Alarm System

a.) Audio Alarms: Air Horn or Car Horn
One (1) continuous long horn blast - emergency.
Two (2) short horn blast - commencing operations, /test ongoing
Three (3) short horn blasts - all clear.

Visual Alarms: Flags
Orange - emergency
Red - commencing operations, explosive shot or test, operations/test on going
Green - all clear.

Cellular phones may be authorized for emergency use only after review of the benefits derived from the intended use of the phone is weighed against the hazards presented by the use of the cellular phone. Two-way radios may be authorized only when there is an extreme threat to life and all operations that maybe affected by the two-way radios. The supervisor will grant authorization for the specific use of two-way radios.

DAILY WORK SHEET

DATE:

LOCATION:

BRIEF DESCRIPTION OF OPERATION:

CHARACTER OF MATERIALS:

IDENTIFIABLE POTENTIAL HAZARDS:

REQUIRED PPE:

SPECIAL PERCAUTIONS:

EOD SUPERVISOR **Signature** _____

EOD TECHNICIAN **Signature** _____

_____

_____

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1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

EXPLOSIVES STORAGE AND TRANSPORTATION

SOP 11

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Occupational Safety and Health Administration (OSHA), 29 CFR 1910, Occupational Safety and Health Standards
- OSHA, 29 CFR 1926, Construction Standards
- Applicable sections of Environmental Protection Agency (EPA), 40 CFR Parts 260 to 299, Protection of Environment
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- Naval Sea Systems Command (NAVSEA). 2011. Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping. OP 5 Vol 1 Rev 7 Ch 10. July 1.
- NAVSEA. 2007. Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives and Related Hazardous Materials. SW020-AF-HBK-010 Rev 6. July 1.
- Navy. 2003. Physical Security Instruction for Conventional Arms, Ammunition and Explosives (AA&E). OPNAV 5530.13C. September 26.
- Department of Defense (DOD) 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- TM 9-1300-214, Military Explosives
- TM 60 Series Publications
- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Publication 5400.7. 2012. Federal Explosives Law and Regulation, April
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers, Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

AA&E	Arms, Ammunition and Explosives
APP	Accident Prevention Plan
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
B/L	Bill of Lading
CFR	Code of Federal Regulations
COR	Contracting Officer's Technical Representative
DOD	Department of Defense
DS	Demolition Supervisor
EM	Engineer Manual
EPA	Environmental Protection Agency
ft	foot, feet
HBK	Handbook
IME	Institute of Makers of Explosives
in	inch, inches
KO	Contracting Officer
lb	pound, pounds
MEC	Munitions and Explosives of Concern
NAF	Naval Air Facility
NAVSEA	Naval Sea Systems Command
NEW	Net Explosive Weight
NFPA	National Fire Protection Association
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PO	Purchase Order
PPE	personal protective equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
USA	USA Environmental, Inc

UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOTIII	UXO Technician III

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ATTACHMENT 2: EXPLOSIVE VEHICLE INSPECTION: ON-SITE CHECKLIST
ATTACHMENT 3: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct explosives storage and transportation during the munitions and explosives and concern (MEC) operations at RAAs on the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct explosives storage and transportation operations.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this SOP is to provide USA employees with the minimum procedures and safety and health requirements applicable to the acquisition, storage, transportation and accountability of explosives during operations within the identified Remedial Action Areas (RAAs) on the former NAF, Adak.

7.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the storage, transportation and accountability of explosives for use within the identified RAAs on the former NAF, Adak. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the APP, applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.3 PROCEDURES

7.3.1 Acquisition

USA maintains a valid ATF manufacturer's license/permit, which allows USA to purchase, store and use explosives. USA documents in writing those employees holding current ATF employee possessor clearance that are authorized to receipt for explosives shipments (see Figure 1, Explosives Purchase/Receipt Authorization List). Copies of USA's manufacturer's license and the receipt authorization list are on file throughout the duration of the project.

7.3.1.1 Explosives Receipt

Only those individuals named on the authorization list may sign for explosives from the shipper. In order to ensure that the quantity shipped is the same as the quantity listed on the shipping documents, the Senior UXO Supervisor (SUXOS) or his designee and the UXO Quality Control Specialist (UXOQCS) will inventory the shipment prior to signing for it.

7.3.1.2 Shipping Documents

Explosive shipments generally are accompanied by the explosive suppliers Bill of Lading (B/L) and the freight company's shipping document. The initial inventory will include reconciling the two documents with the actual shipment and creating an on-site record that includes these documents and the inventory records. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company's shipping document will be attached to a copy of the Purchase Order (PO) request and the PO. One copy of each of the four documents will be kept on file on-site, and one complete set will be forwarded to the Corporate Office.

7.3.1.3 Receipt Discrepancies

In the event that there is a discrepancy between the amount shipped and the amount received, the SUXOS will immediately contact the explosive supplier and inform the supplier of the discrepancy. It is then the responsibility of the supplier and shipper to rectify the situation and inform USA of the results. The supplier and/or shipper must then correct their documents and forward the corrected documents to the site. In all cases, only the amount received will be entered on the Explosives Accountability Record/Magazine Data Card.

USA Environmental, Inc.

List of Persons Authorized to Accept Delivery of Explosives

Name:	USA Environmental, Inc.	Address:	720 Brooker Creek Blvd, Ste# 204
License No:	1-FL-103-20-4J-00784		Oldsmar, FL 34677
Expires:	9/1/2014		

By my signature below, I certify that the persons listed below are authorized by me to accept delivery of, possess and use explosives on behalf of USA Environmental, Inc.:

James Walden
Print Name

Quality Manager, Responsible Person
Job Title

Signature

Date Signed

Intended Use Statement: Unexploded ordnance detonation.

List of names (last name, first name, mi):

TBD TBD TBD

No further names.

SAMPLE

720 BROOKER CREEK BLVD, SUITE #204, OLDSMAR, FL 34677 TEL.: (813) 343-6336 FAX: (813) 343-6337

Figure 1: Explosives Authorization

7.3.2 Storage

There are two government-owned, ATF Type II portable magazines (with a Class C cap magazine attached) sited in the vicinity of RAA-03. Prior to placing any explosives in the magazine, they will be inspected for serviceability and have an electrical inspection performed in accordance with NAVSEA OP 5, described below.

The two magazines will not be sited closer than the inter-magazine distance based upon the net explosive weight (NEW) stored in the donor explosives magazine (not to exceed 100-lb)

The magazines will be kept free of extraneous material, inside and out. The vegetation will be no taller than 18-inches (45.7-cm) for a 50-ft (15.2-m) radius around each magazine.

7.3.2.1 Electrical Inspection

An electrical inspection test must be conducted at 24-month intervals. The grounding kit (supplied with the magazine) will be installed and inspected as discussed below.

- Single portable magazines (Type II) greater than 25-ft^2 (7.6-m^2) will be grounded by using two separate grounding rods, each placed in a different corner.
- The grounding rod will be not less than ¾-in (1.85-cm) in diameter and 10-ft (3-m) in length, copper-clad steel, and free of paint or other nonconductive coatings.
- The grounding rod will extend vertically not less than 10-ft (3-m) into the earth. The earth will be compacted and made tight against the length of the grounding rods. When the depth cannot be obtained vertically, the grounding rod will be placed in a trench not less than 1-ft (0.3-m) deep or to bedrock, whichever depth is greater; the soil will be replaced, compacted, and made tight against the rod.
- All earth connections must provide 25-ohms or less resistance-to-earth. No greater than 1-ohms resistance between structural steel and the grounding system (bonding check).

7.3.2.2 Lightning Protection

Separate lightning protection is not required if the following criteria are met:

- The magazine is constructed of metal that is 3/16-in (0.48-cm) steel or larger [reference Appendix L of National Fire Protection Association (NFPA) 780].
- The magazine is grounded in accordance with NFPA 780 requirements.

All parts of the magazine are located at least 6.5-ft (2-m) from the nearest fence.

7.3.2.3 Visual Inspection

Visual inspection of the magazine and grounding system will be conducted and documented at 6-month intervals. The grounding cable visual inspection consists of the following two steps.

- Inspect the cables and clips for signs of breakage, excessive wear, frayed conductors, loose or corroded connections, worn or broken clip springs, etc. Connections will not be taped over.
- Tug on the cable to ensure that it is securely attached to its clips. Cables with opaque insulation will be felt for any kinks, sharp bends, or crushing that may indicate damage.

7.3.2.4 Locks

Each door will be equipped with two padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers and a case-hardened shackle of at least 3/8-in (0.95-cm) diameter. Padlocks will be protected with not less than ¼-in (0.64-cm) steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

7.3.2.5 Key Control

Magazines will remain locked except when receipts and issues are being made. The two locks on the magazines will require two different keys to unlock. One key will be kept by the SUXOS and the second key by the Site Superintendent. This procedure ensures that access to the magazines cannot be made without obtaining the two keys and no one individual can gain access to the magazines.

7.3.2.6 Signs and Placards

The ATF and the DOD require that all magazines be appropriately posted to indicate the hazard class of the contents, the fire fighting hazards, and the emergency notification list. Magazines will be placarded in accordance with DOD 6055.09-M. This will require that the magazine area be posted for the most hazardous items stored in the magazine area. In the event that there are two fire division or hazard class items in the same magazine, use the higher hazard division/class placard. A Fire Division Class 1 placard is required when the magazine contains explosives.

7.3.3 Accountability

USA will employ the following procedures to account for explosive materials:

- Control of and access to explosive magazines will be strictly controlled by the SUXOS.
- All issues and turn-ins of explosives will be properly documented and verified, through physical count, by the UXOQCS.
- On receipt, the type, quantity, and lot number of each explosive item is recorded on a magazine data card (Figure 2), and the original receipt documents will be maintained on file by the Site Superintendent.
- All requests for explosives, from the individual operating sites, will be reviewed by the SUXOS. Only sufficient explosives for the day's operations are issued.
- Issues of explosives are recorded on explosive usage records (Figure 3) and deducted from the magazine data card(s) (Figure 2). This procedure will ensure that the quantities of explosives on-the-floor in the magazine reflect the quantities listed on the magazine data card, and that issued explosives are accounted for while they are in the possession of individual users.
- Entries made on the explosive usage records and magazine data cards will be verified through physical count by the demolition supervisor (DS) drawing or turning in the explosives, and the UXOQCS.
- All unused explosives are turned in at the end of each day, re-entered on the magazine data card and recorded on the explosive usage record.
- At the end of each day the SUXOS and the DS reconcile the entries on each explosive usage record, and will turn these records over to the Site Superintendent.

Magazine Data Card

Nomenclature:

Lot Number: Unit Of Issue:

Date	Name	Received	Issued	Balance	Checkers Initials

Figure 2: Magazine Data Card

Explosives Usage Record

Contract Number:

Team Number: Date: Project Name:

Team Leader: Work Areas & Grid Numbers:

Explosives Issued Signature Of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended Signature Of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned Signature Of QC Officer:

Item	Quantity	Lot Number	Checkers Initials

The signatures in each section of this document indicate that the items listed in that section were in fact issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

Figure 3: Explosives Usage Record

7.3.3.1 Usage Inventory

Following each occurrence of a receipt or issue of explosive material, the SUXOS will conduct a joint inventory in conjunction with the DS, drawing out or returning the explosives. Only those items issued/returned will be inventoried. The SUXOS will appropriately annotate the two sets of magazine data cards and the explosive usage record (Figure 3).

7.3.3.2 Weekly Inventory

On the last day of each work week, the SUXOS, the UXOQCS and a third individual (who will be changed each week) will conduct an inventory and record results on the two sets of magazine data cards. These inspections will include a physical count of the explosives and a comparison of this amount with the amount listed on the individual magazine data cards.

7.3.3.3 Discrepancies

In the event that there is a discrepancy during any inventory, the item will be recounted a minimum of two additional times. If a discrepancy still exists, the Site Superintendent, the Project Manager, the Contracting Officer (KO) or the Contracting Officer Representative (COR) and the ATF will be notified. All actions from this point will be dictated by the ATF.

7.3.4 TRANSPORTATION REQUIREMENTS FOR EXPLOSIVES AND MEC

USA will comply with the following when transporting explosives onsite:

- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate Institute of Makers of Explosives (IME)-22 container (49 CFR 173.63) and secured away from other items.
- Compatibility requirements will be observed.
- Only UXO Technicians III (UXOTIII) and above may be issued and may transport explosive materials. The receiving party shall sign the receipt documents for accountability (the SUXOS is responsible for maintaining the explosives inventory).
- Operators transporting Hazard Division (49 CFR 173.50) 1.1 explosives will have completed the explosives drivers training, meet the medical and physical requirements and be subjected to random drug testing as required by NAVSEA SW020-AF-HBK-010.
- Drivers will have a valid driver's license and comply with posted speed limits but will not exceed a safe and reasonable speed for road conditions. Vehicles transporting explosives off-road will not exceed 25 miles per hour and will be properly equipped (Section 8.1).
- Personnel will not ride in the cargo compartment with explosives or MEC.

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7.3.4.1 Explosive Transportation Vehicle Requirements

Explosives will be transported in closed vehicles whenever possible. The load will be well braced and, except when in closed vehicles, covered with a fire-resistant tarpaulin or in an appropriate shipping container (IME-22).

- If the vehicle designated for transporting explosives is a rental vehicle, written agreement from the rental agency authorizing its vehicle to transport explosives is required to be on file.
- Vehicles transporting explosives or MEC will be inspected daily using the Explosive Vehicle Inspection Checklist: On Site, see Attachment 2, (for transportation over public roads, use DD Form 626 to inspect vehicles) and will be properly placarded (1.1B) in accordance with 49 CF, 172, Subpart F.
- Vehicle engine will not be running when loading/unloading explosives.
- Explosive-loaded vehicle wheels will be chocked when parked.
- Vehicles transporting explosives will have a first aid kit, two 10: BC rated fire extinguishers, and communications.
- Initiating explosives, such as blasting caps, will remain separated from other explosive materials at all times.
- Compatibility requirements will be observed.

A written acknowledgement from the lease vehicle carrier to transport explosives will be obtained and kept on file before vehicles will be used to transport explosives.

7.4 QUALITY CONTROL

The Explosives Storage and Transportation operations will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Attachment 3).

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS and Quality Assurance. The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the Explosives Storage and Transportation tasks along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Explosives, Storage and Transportation	Slips, Trips or Falls	Climbing into and out of the vehicle cargo area.	C/III/4	Personnel will assess their footing and hand holds at all times. Personnel will never jump from a vehicle.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	Donor Explosives	Donor explosives react to impact, heat, shock and friction.	C/II/3	Vehicles designated to transport explosives will be inspected and any deficiency corrected before the vehicle is used. Properly block and brace donor charges in the cargo area of the vehicle. Store detonators separately from donor charges in an IME-22 when transporting and in the sited detonator	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
				magazine Personnel handling explosives will wear cotton clothing.	
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

Explosives drivers will observe posted speed limit signs and drive no faster than the road or weather conditions dictate. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Personnel will wear cotton clothing when handling explosives. Wear long sleeve (cotton) clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

Personnel will inspect the vehicle using the checklist (Attachment 2) and correct any deficiencies prior to using the vehicle to transport explosives. Explosives will be loaded

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO technician conducting explosives storage and transportation services will be equipped with the following:

- Communications equipment
- Vehicle with wheel chocks and tarpaulin
- Blocking and bracing materials
- Explosives placards as needed

- IME-22 container
- ATF-approved day box for moving detonators to demolition events
- ATF Type II magazines

Safety equipment required includes the following:

- 10 B : C or larger fire extinguishers on the truck
- First-aid kit
- Level D personal protective equipment (PPE)
- Inclement weather gear, as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
MAGAZINE INSPECTION CHECKLIST

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MAGAZINE INSPECTION CHECKLIST

Inspected by:	Date:
Reviewed by Senior UXO Supervisor:	Date:

Any discrepancies must be explained at the bottom of the form.

Inspection Item	Action Required Yes / No	Addressed Date / Initial
Are placards intact, secure, posted and in good condition?		
Is a 50-ft (15.2-m) area surrounding magazines clear of trash and combustible materials?		
Are any other fire hazards visible?		
Is the fencing secure?		
Are the sand bags in acceptable condition?		
Are there any indications of vandalism or attempted entry?		
Are unusual odors or temperatures notable?		
Are NEW limits exceeded?		
Are any detonators in storage?		
Is the explosive material stored against the interior walls?		
Are the ventilation ports clear?		
Are the containers closed with markings visible?		
Is the grounding system in place?		
Is the fire, chemical hazard, and safety information posted on the inside of the magazine door?		
Are the magazine interiors clean and dry with no evidence of new floor staining?		
Additional Observations/Explanations of Discrepancies:		

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ATTACHMENT 2.
EXPLOSIVE VEHICLE INSPECTION: ON-SITE CHECKLIST

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Explosive Vehicle Inspection: ON-SITE

This form must be filled out for any vehicle carrying explosives, prior to loading.
This form is for use on-site only, if traveling on public highways use DD Form 626

DRIVERS NAME LICENSE NUMBER _____
COMPANY
TYPE OF VEHICLE VEHICLE NUMBER _____
INSPECTION DATE/TIME INSPECTOR _____

PARTS INSPECTED	SAT.		UNSAT.		COMMENT
HORN					
STEERING SYSTEM					
WIPERS					
MIRRORS					
FIRE EXTINGUISHERS (10 ABC, 2 EACH)					
REFLECTORS					
EMERGENCY FLASHERS					
LIGHTS					
ELECTRIC WIRING					
FUEL SYSTEM					
EXHAUST SYSTEM					
BRAKE SYSTEM					
SUSPENSION					
CARGO SPACE					
TIRES, WHEELS, RIMS					
TAILGATE					
TARPAULIN					

INSPECTION RESULTS (INSPECTOR INITIALS) ACCEPTED _____

REJECTED _____

REMARKS

DRIVER'S SIGNATURE/DATE

INSPECTOR'S SIGNATURE/DATE

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ATTACHMENT 3.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

EXPLOSIVES STORAGE AND TRANSPORTATION

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP 11 Workers' Statement**	Have all personnel assigned to store or transport explosives read this SOP?				*(P)*
2	**SOP 11, Workers' Statement & Sec. 7.3.4**	Are all personnel assigned to store or transport explosives qualified to perform their duties?				*(P), (I), (F)*
3	**SOP 11, Sec. 7.3.4**	Do all explosives drivers possess a current medical certificate to transport explosives?				*(P), (I), (F)*
4	**SOP 11, Sec. 7.3.4.1**	Is there a written acknowledgement from the lease vehicle carrier to transport explosives on file?				*(P), (I), (F)*
5	**SOP 11, Sec. 7.3.4.1**	Are vehicles inspected using the checklist in Attachment 2 prior to loading explosives?				*(P), (I), (F)*
6	**SOP 11, Sec. 7.3.4.1**	Were the wheels of vehicle chocked before loading explosives?				*(P), (I), (F)*
7	**SOP 11, Sec. 7.3.4**	Are detonators transported in an IME-22 container?				*(P), (I), (F)*
8	**SOP 11, Sec. 7.3.2**	Are the magazines placed not closer than the inter-magazine distance (84-ft (25.6-m) for 100-lb NEW)?				*(P), (I), (F)*
9	**SOP 11, Sec. 7.3.2.4**	Are high security locks used to secure the magazines?				*(P), (I), (F)*
10	**SOP 11, Sec. 7.3.2.5**	Are the keys to the magazines stored separately from other keys and accessible only to those individuals with written designated access?				*(P), (I), (F)*
11	**SOP 11, Sec. 7.3.2.1**	Are magazines grounded to provide 25 ohms or less ground resistance?				*(P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
12	**SOP 11, Sec. 7.3.2.1**	Are magazine ground systems tested, inspected and the results maintained on site?				*(P), (I), (F)*
13	**SOP 11, sec 7.3.2**	Are magazines free of extraneous material?				*(P), (I), (F)*
14	**SOP 11, Sec. 7.3.2**	Is the vegetation around each magazine maintained at maximum of 18-in, (45.7-cm) out to a radius of 50-ft (15.2-m)?				*(P), (I), (F)*
15	**SOP 11, Sec. 7.3.2.6.7**	Are the correct hazard/fire division symbols posted on the magazines?				*(P), (I), (F)*
16	**SOP 11, Sec. 7..3.6**	Are Magazine Data Cards and Explosive Usage Records being accurately completed and maintained?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

EARTH MOVING MACHINERY OPERATIONS

SOP 12

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- DDESB Technical Paper (TP) 16, Fragmentation Characteristics Database
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- EMM Operator's Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DDESB	Department of Defense Explosives Safety Board
DOD	Department of Defense
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
OJT	On the Job Training
PPE	Personal Protection Equipment
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
ROPS	Rollover Protective Structure
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TL	Team Leader
TSD	Team Separation Distance
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer

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ATTACHMENT 1. EMM OPERATIONAL PROCEDURES
ATTACHMENT 2. EMM SAFETY CHECKLIST
ATTACHMENT 3. QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that are necessary for USA Environmental, Inc. (USA) field staff to operate earth moving machinery (EMM), e.g. a backhoe, min-excavator or tracked excavator, during the non-time critical removal actions (NTCRA) at RAAs on the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used for surface clearance operations.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide procedures and the minimum safety and health requirements applicable to the operation of EMM during operations within the identified Remedial Action Areas (RAAs) on the former Naval Air Facility (NAF), Adak.

7.2 SCOPE

EMM may be used to remove the overburden during the investigation of subsurface anomalies, and for minor road repair to facilitate site access and egress. This SOP contains information specific to EMM operations. It will be used along with manuals and publications relevant to EMMs that may be leased, purchased, or otherwise employed on the site. It is incumbent upon all designated operators to familiarize themselves with this SOP and to periodically review it in an effort to remain current with safe, productive EMM procedures. Consult the documents listed in Section 2 of this SOP for additional information.

7.3 PROCEDURES

USA employees who operate EMM on the project site will be qualified through on-the-job training (OJT). Equivalent OJT will be documented through previous employment or experience or through documented formal training. When engaged in EMM operations, the operator will perform daily inspection and maintenance functions and operate the EMM as directed. A qualified operator may also conduct OJT of other project personnel at the discretion of the Senior Unexploded Ordnance Supervisor (SUXOS).

7.3.1 Team Composition

The TL will serve as a safety observer and director for other team personnel and all members of the EMM team will be UXO qualified when the EMM is used to remove the overburden. The minimum team make-up will be:

- One operator
- One TL
- One UXO Technician I/II

7.3.2 Personal Protective Equipment

Level D personal protective equipment (PPE) will be required for personnel engaged in EMM operations and will include:

- Coveralls or work clothing, as prescribed
- Inclement weather gear as needed
- Work gloves, leather or canvas, as appropriate
- Safety glasses
- Hardhats
- Work Boots: Sturdy and of sufficient height to aid in ankle support
- Hearing Protection: Noise Attenuating Helmet or earplugs will be worn by anyone within 25-ft (7.6-m) of the EMM while it is operating
- Dust Masks - as wind conditions and airborne particulate matter dictate.

7.3.3 General Safety Precautions

The following general safety will be maintained when operating EMM on a UXO site:

- Personnel will conform to the approved safe separation distance for the task being performed by other personnel and/or will maintain team separation distance (TSD) from other UXO personnel conducting manual, intrusive operations.
- Prior to starting an excavation, a safety arc will be etched in the ground, with the rear boom fully extended.
- If operating on a hard surface, the safety arc will be marked with bright spray paint, traffic cones, and/or other identifier.
- The EMM will not be operated without a spotter. This includes using the front and rear attachments, and backing of the tractor.
- Personnel will know and observe all applicable material potentially presenting explosive hazard (MPPEH) safety precautions.
- Personnel will know and use appropriate hand signals.
- An air horn will be used by the spotter to signal the operator to stop operations immediately

The separation distances listed above may be reduced or extended by the UXO Safety Officer (UXOSO), based on an assessment of site history, expected MEC, terrain features, or other such factors that may apply.

Prior to anyone entering the safety arc, the operators will:

- Swing the boom arm fully to one side
- Lower the bucket to the ground
- Return the engine to idle speed
- Hold his/her hands clear of the controls or in the "Hands Up" position

7.3.4 General Operational Procedures

The operator will have a radio in place to monitor radio transmissions while driving the EMM to and from excavation sites and for communications with the spotter and/or team leader. Prior to shutting off the tractor engine, the operator should let the engine run at idle speed for a few minutes to allow the engine to cool.

Prior to excavation operations, the SUXOS will establish/review hand signals with all members of the team. The EMM will not be used to excavate closer than 12-in from any MPPEH (except in RAA-01 and.05 as discussed in Section 7.3.5 below). Removed dirt will be placed at least 2-ft (0.6-m) from the expected edge of the excavation, and on the uphill side when working on a slope.

Excavations will not be deeper than 4-ft (1.2-m) without authorization from the UXOSO. Such excavations require the UXOSO/competent person to determine step/slope requirements.

7.3.5 Excavations in RAA-01 and 05

Areas of saturated anomalies have been identified in RAA-01 and RAA-05. In these areas discrete anomaly investigation is not feasible and mechanical excavation of these saturated areas is required. For mechanized excavation, USA will use a tracked excavator shielded with a 3.5-in plexiglass blast-shield (to prevent perforation by fragments up to an 81-mm mortar, M43A1) to assist the intrusive investigation through the trash, debris, soil, and cobbles at these RAA's. A wheeled front end loader will assist in backfill and maintaining contours at the site.

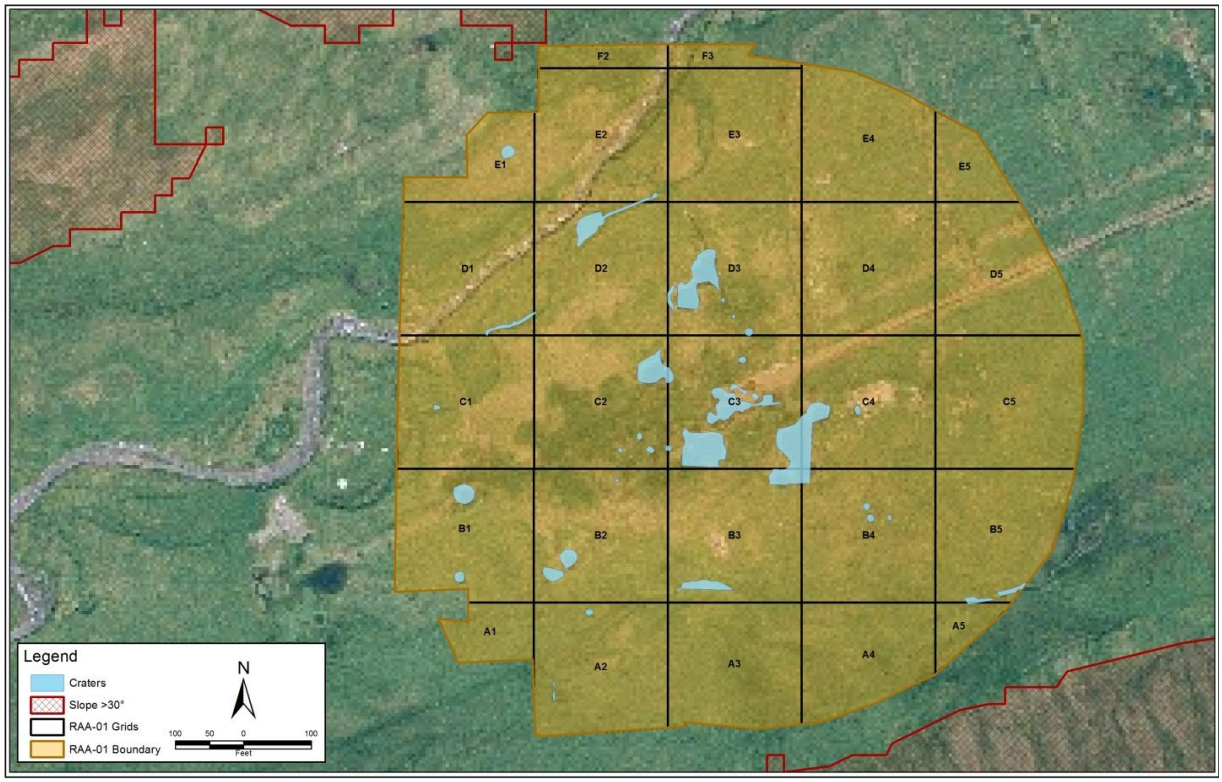
RAA-01, see Figure 7-1, as evidenced by multiple large craters in the area, was a former MEC demolition area. The surface is covered by tundra with shallow ground water and saturated soils. The first step in the Removal Action at this RAA is to investigate the bottom of the existing demo holes (craters) located at RAA-01. This mechanically assisted investigation is necessary to ensure no MEC hazards remain at this site and to prepare a clear accessible site for the follow-on DGM survey.

Prior to starting the investigation of the craters, large-capacity water pumps (100 gallon per minute capacity) are used to drain the craters until the bottom is exposed or visible. Should the water recharge rate exceed 1-ft per minute in the crater, the team will contact UXO Safety Officer and UXO Quality Control Specialist (UXOQCS) to assess whether it is safe to continue the excavation. The UXOSO and UXOQCS will make the decision whether to continue with the excavation or if the dig should be abandoned. The UXOQCS will notify the Navy QA and offer the opportunity for verification in real time.

The excavator will reach down into the craters to remove the bottom 1.5-ft of the hole and broadcast the excavated soil at a designated processing area (clean areas at least two feet from the edge of the excavations). The MEC team will search through the excavated soil for MPPEH using White's DFX-300. The screened spoils will be placed back in the hole after the QC team checks 5% of the excavated soil to ensure removal metrics are met. Once the craters are cleared of MPPEH items and with concurrence from the Navy QA, USA will restore the holes to grade using clean fill.

For RAA-01 only, technology-aided surface clearance will be conducted using the White's DFX-300 to remove MPPEH from the surface down to 6-in below ground surface (bgs). The purpose of the surface clearance is to locate and remove surface MPPEH and to locate and remove obstructions (e.g., metallic objects and large debris) that may interfere with the DGM surveys.

RAA-05 is former dump area (RAA-05/ALDA-01) identified on historical site maps and visible on historical aerial photographs (see Figure 7-2). The surface of the site is composed of large cobbles with sparse vegetation. Exposed waste is visible along the north edge of the site where it is eroded by wave action. The excavator will be used to scoop the investigation area and broadcast the excavated soil at a designated processing area (clean areas near the excavation). The MEC team will search through the excavated soil for MPPEH using White's DFX-300. The analog-detect and dig/excavation procedure will be conducted across the entire RAA to the required 2-ft depth. However, in areas indicative of waste disposal (where MEC or evidence of MEC remains at the 2-ft excavation depth), the MEC team will extend the search to a 4-ft depth. The Navy has the option of pursuing the excavations to the depth of the filled materials if warranted based on site conditions observed during the field work. Of particular interest is the area extending 150-ft back from the beach, to eliminate the potential for continued erosion of this material by the surf action. Cobbles and soil will be used to re-grade the site. Other waste material (metal debris, garbage, other non-MEC waste) will be reconsolidated in an area that will not be susceptible to beach erosion or removed from the site for recycling or other disposal alternatives. Any hazardous materials encountered during the investigation will be characterized and consolidated in accordance with applicable state and federal regulation.



7-1: Craters (Yellow Outline) at RAA-01 (Former OB/OD Area)

7-2: RAA-05/ALDA-01

7.4 WORK CLOTHING AND FIELD SANITATION

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D PPE, which includes the following.

- Short- or long-sleeved cotton coveralls or work clothing will be worn.
- Footwear is sturdy work boots or rubber boots as appropriate (i.e., lug sole and of sufficient height for ankle support). UXO personnel will not wear steel-toe safety boots when using metal detectors.
- Hand protection will consist of leather or canvas work gloves. Rubber inner or outer gloves may be required where increased protection is needed.
- Safety glasses, face shields, respirators, hearing protection, high visibility vests, hard hats and protective chaps or aprons will be available and worn when personnel are engaged in activities where their use is prudent or required.
- Inclement weather gear as required.
- In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

The team will be outfitted with field decontamination equipment, which will consist of containers of water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

7.5 QUALITY CONTROL

The EMM operations will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet (Attachment 3). The QC team will perform surveillance of each production team each day. The EMM operator will conduct before and after operations checks in accordance with Attachment 1: EMM Operational Procedures, and operate the equipment in a safe manner. The operator will use the Attachment 2: EMM Safety Checklist to document that the equipment is operational. The Quality Control team will periodically check that the equipment is being maintained, safety arcs are etched on the ground when the equipment is operational, and safety precautions outlined in this SOP are observed.

For the RAA-01 and -05 excavations, the QC team will conduct a 15%-randomly selected sampling of each completed grid. If the team locates any MPPEH or metallic debris 3-in or greater in any dimension, The QC team will generate a deficiency notice or nonconformance report and the UXOQCS will notify the SUXOS of the grid failure for rework.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the MEC avoidance task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
EMM Operations	Slips, Trips or Falls	Mounting or dismounting EMM.	C/III/4	Use steps and safety holds when mounting or dismounting equipment; never jump from equipment.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Rollover or Tipping	Operating the EMM on a grade or using as a hoist	C/II/3	Operate the EMM on level ground or use the buck to grade the area if possible. Employ the stabilizers When using as a hoist keep the weight over the back of the equipment, never to the side	D/IV/5
	Crushing	Impact to personnel by EMM	C/II/3	Personnel will remain outside of the safety arc when the equipment is operational A dedicated safety observer will use hand signals to communicate with the operator. The operator will place the bucket on the ground and take his hands off of the control when personnel must enter the safety arc. Personnel working around equipment will wear safety vest, hard hats and boots with toe protection	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment or uncontrolled mechanical force.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities Remove the earth overburden to the side of target anomalies and only to within 12-in of the anomaly.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. When the EMM (mini-excavator) is used to remove the earth overburden from DGM targets in RAAs 02, 03, 04 and 05, the anomaly will be excavated only to within 12-in (30.5-cm); the remaining overburden will be removed using hands and hand tools only. All personnel will remain outside of the safety arc of the EMM until the operator lowers the bucket to the ground, removes hands from the controls and the safety observers give the verbal all clear to enter the safety arc. For excavations in RAA 01 and RAA-05/ALDA-01 a track-excavator armored with 3.5-in plexiglass will be used to excavate the areas in lifts.

Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The EMM team will be equipped with the following:

- Handheld all-metals detector
- Red pin flags for marking suspected MEC items
- Logbook and/or PDA for recording data
- Camera
- Communications equipment

Safety equipment required includes the following:

- 3.5-in plexiglass blast-shield for RAA 01 and 05 excavations
- First-aid kit
- Level D PPE
- High visibility vests
- Air horn
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
EMM OPERATIONAL PROCEDURES

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EMM OPERATIONAL PROCEDURES

BEFORE USING THE MACHINE

- Read the owner's manual to learn the characteristics of your machine.
- For your personal protection you will need to wear some or all of the following:
  - sturdy pants and shirt
  - safety shoes
  - high visibility vest
  - hard hat
  - safety goggles or glasses
  - gloves
  - hearing protection
  - respirator for dusty conditions
- Sunscreen protection is vital in bright sunshine if not under a roof.
- Check the EMM for the presence of the following safety devices in good working order:
  - rollover protective structure (ROPS)
  - seat belt (if ROPS equipped)
  - guards
  - shields
  - backup warning system
  - lights and mirrors
- Fill the fuel tank while engine is off and cool. Never fill inside a building. Do not smoke. Wipe up any spills immediately.
- Check the machine daily for broken, missing, or damaged parts. Make the necessary repairs or replacements.
- Keep the machine clean -- especially steps, hand rails, pedals, grab irons, and floor of the cab. Slippery surfaces are very hazardous.
- Remove or secure loose items in the cab that could interfere with operating the controls.
- Check the work area for hidden holes, obstacles, drop-offs, etc. Clear children, pets, and bystanders from the area.
- Check overhead for utility lines, roofs, and other obstacles.
- Request Blue Stake service to locate underground cables, gas lines, water, and sewer lines before digging. You need to request this service in advance.
- Always use the hand rails, ladders, and steps provided when mounting the machine; never grab controls or the steering wheel.
- The cab was designed for one person -- allow no riders, especially children.

OPERATING THE LOADER

- Adjust the seat, fasten the seat belt, set the brake, and place transmission in park or neutral before starting the engine.
- If machine is in a garage, be sure ventilation is adequate. CARBON MONOXIDE KILLS!
- Start the engine and check all controls for proper function. Check horn and backup alarm. Do not use if anything is faulty.
- If the backhoe is still attached, be sure to use chains and locks to prevent it from swinging.
- If the backhoe is removed, you may have to use counterweights. Check your owner's manual.
- Keep the working area as level and clean as possible. Use the bucket to grade the area frequently.
- Always carry the bucket low for good visibility and maximum stability.
- Use extreme caution when backfilling to avoid collapsing the wall of the trench.
- When undercutting high banks or material piles, be alert for falling rocks and/or cave-ins.

OPERATING THE EMM

- Keep the loader bucket on the ground.
- Level the machine for maximum stability.
- Operate the EMM only from the seat.
- Never swing the bucket over a truck cab.
- Dump the bucket uphill if possible when operating on a slope. If you must dump downhill, swing slowly to avoid tipping the machine.
- If using the EMM as a hoist, do so with the weight over the back of the machine -- NEVER THE SIDE -- to avoid tipping.
- Be sure the load you are lifting is balanced, and move the boom slowly to avoid swaying the load.

SAFE STOPPING PROCEDURE

- Park the machine on level ground if possible and set the parking brake. Place transmission in park if so equipped.
- Lower the loader and EMM buckets to the ground.
- Stop the engine and remove the key.
- Work the hydraulic controls to relieve pressure.
- Wait until all motion has stopped and then dismount carefully, using steps and safety holds. Do not jump from the machine.

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ATTACHMENT 2.
EMM SAFETY CHECKLIST

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EMM SAFETY CHECKLIST

Site/Location: _____ Date: _____

EMM Characteristics:

- ☐ Labeled for operating rated capacity.
- ☐ Steps and grab handles.
- ☐ Seat belts / ROPS.
- ☐ Protective shields or guards.
- ☐ Correct bucket size.
- ☐ Proper lighting and signals.
- ☐ Operating handles easy to reach for operator with full view of work area from all positions.
- ☐ Brake system.
- ☐ Appropriate type of fire extinguisher readily available.

EMM Operators:

- ☐ Trained and designated to use the equipment.
- ☐ Never exceed the equipment's rated capacity.
- ☐ Use warning signal to alert others in the work area to problems.
- ☐ Allow proper clearance, including overhead.
- ☐ Select correct size of bucket.
- ☐ Ensure area to be dug has been marked. Observe the area and contact the utilities company(s) for locations of utilities. Request “blue stake” service in advance of operations.
- ☐ Tighten sling without hands or fingers between sling and load.
- ☐ Know maximum depth capability.
- ☐ Ensure stop locks or barricades are placed near the excavation.
- ☐ Balance loads placed in buckets.
- ☐ Wear correct personal protective equipment while operating EMM.
- ☐ Remove and secure loose clothing, tools, equipment, etc., out of operating area in cab.
- ☐ Never operate boom or bucket in an unsafe manner.
- ☐ Use equipment smoothly, avoiding sudden starts and stops.

Bucket Characteristics:

- ☐ Select by rated capacity and job requirements for model being operated.

EMM Inspection:

Operators are to check, observe, correct, and ensure the following at a minimum:

- ☐ Observe warnings, cautions, precautions, and recommendations in the operator’s manual.
- ☐ Operating mechanism: check all controls and throttle.
- ☐ Hydraulic system: Check hoses, lines, and connections or fittings
- ☐ Proper fluid levels: Check all fluid levels; use only approved fluid replacements.
- ☐ Hoses and lines: Check for cuts, excessive wear, or leaks.
- ☐ Air filter system: Check for cleanliness and in place.
- ☐ Frame-lock lever: Check lever and lock stop for damage.
- ☐ Lighting and mirrors: Check for serviceability.
- ☐ Frame, steps, and grab handles: Check for damage.
- ☐ Brakes: Check for stopping ability on and off road.
- ☐ Backup warning alarm: Check for serviceability.

- ☐ Seatbelts/ROPS: Check for cuts or missing/inoperable components.
- ☐ Exhaust system: Check for leaks or missing components.
- ☐ Check for fluid leaks: Check for any fluid leaks, use spill control methods until repaired.
- ☐ Tires: Check for proper inflation, tread wear and damage to rims.
- ☐ Grease fittings: Check fittings and grease every 8 hours of use; ensure correct type and amount is utilized.
- ☐ Inspect work area: Check for stop blocks or barricades, collapsed walls, unauthorized personnel in area, obstacles, or other hazardous or dangerous conditions/situations.
- ☐ Conduct repair/maintenance outside of populated work area. Turn equipment off, lower buckets, display warning signs.

Comments:

_____ _____
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Completed By:

_____ _____
Name Position

ATTACHMENT 3
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

EMM OPERATIONS

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
1	**SOP 12 Workers' Statement**	Have all Team Members read this SOP?				*(P)*
2	**SOP 12, Sec. 7.3**	Are all EMM operators trained and qualified to operate removal equipment?				*(P), (I), (F)*
3	**SOP 12, Sec. 7.3.2**	Is the PPE serviceable and properly worn as needed?				*(P), (I), (F)*
4	**SOP 12, Sec. 7.3**	Has the EMM operator performed the daily inspection and maintenance functions on the equipment prior to operating?				*(P), (I), (F)*
5	**SOP 12, Sec. 7.3.3**	Has a safety arc been marked on the ground prior to starting an excavation?				*(P), (I), (F)*
6	**SOP 12, Sec. 7.3.3**	Is a spotter/safety observer been designated and in place?				*(P), (I), (F)*
7	**SOP 12, Sec. 7.3.3**	Is the spotter/safety observer equipped with an air horn?				*(P), (I), (F)*
8	**SOP-12, Sec 7.3.5**	Is the tracked excavator shielded with at least 3.49-in of plexiglass?				*(P), (I), (F)*
9	**SOP 12, Sec. 7.3.5**	Are craters in RAA-01 dewatered, using 100 gallon per minute pumps, sufficiently to see the bottom of the crater before conducting an excavation with the EMM?				*(P), (I), (F)*
10	**SOP 12, Sec. 7.3.5**	Was the UXOSO and UXOQCS contacted to assess the safety of continuing to excavate if the water recharge rate exceeds 1-ft per minute in a crater?				*(P), (I), (F)*
10a	**SOP 12, Sec 7.3.5**	If the answer to 10 was yes, was the Navy QA contacted to determine if dewatering should continue or if the excavation should be abandoned?				*P), (I), (F)*

CHECKLIST						
ITEM	**REF.**	**INSPECTION POINT**	**YES**	**NO**	**N/A**	**COMMENTS**
11	**SOP 12, Sec; 7.3.5**	Was any MPPEH or metallic debris 3-in or greater in any dimension found in checked spoils prior to placing back into the crater?				*(P), (I), (F)*
12	**SOP 12, Sec 7.5**	Was any MPPEH or metallic debris 3-in or greater in any dimension found during the 15%-randomly selected sampling of each completed grid?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

DATA MANAGEMENT

SOP 13

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- SOP 03, Geophysical Data Processing and Interpretation
- Geophysical Systems Verification Plan
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DFW	Definable Feature of Work
DGM	Digital Geophysical Mapping
DGPS	Digital Global Positioning System
GIS	Geographic Information System
GSV	Geophysical Systems Verification
ISO	Industry Standard Object
MC	Munitions Constituent
MD	Munitions Debris
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
NTCRA	Non-time critical removal action
PM	Project Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Areas
RPM	Remedial Project Manager
RTK	Real Time Kinematic
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
USA	USA Environmental, Inc
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) staff to manage the project data generated during the non-time critical removal action (NTCRA) at the Remedial Action Areas (RAAs) at the former Naval Air Facility, (NAF) Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used with regard to data management activities during the NTCRA.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures for project data management during the non-time critical removal action (NTCRA) of the RAAs on the former NAF, Adak, Alaska. These procedures will be conducted in accordance with the Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP).

7.2 SCOPE

This SOP applies to USA employees tasked to generate, share and manage project data for the NTRCA of the RAAs on the former NAF, Adak, Alaska. This SOP is not intended to contain all requirements needed to ensure the proper management of project data, but should be used in conjunction with the documents listed in Section 2 of this SOP.

7.3 DATA

7.3.1 Types of Data Needed

The following data are required to meet the project quality objectives:

- Digital Geophysical Mapping (DGM) data to use for selecting target anomalies and determining the target anomaly coordinates. DGM data will be validated by quality control (QC) tests (static, standardization, etc.) and by Instrument Verification /strip (IVS) tests (twice daily). IVS tests must meet the amplitude and positioning criteria specified in the Geophysical Systems Verification (GSV) Plan (Appendix G of the MEC QAPP). DGM data must also demonstrate detection of the blind seed Industry Standard Objects (ISOs) to the criteria specified in the GSV Plan.
- Accurate target coordinate data from reacquisition to ensure the correct anomalies are investigated. Reacquisition teams will relocate the target anomaly coordinates provided from the DGM data, and provide the following documentation:
    - Measurement of the staked out location to document accuracy.
    - Reacquisition team comments.
- Intrusive investigation data to document material potentially presenting an explosive hazard (MPPEH) identification and management. The intrusive investigation team will document results for each and every target anomaly location, regardless of the result of the investigation on their PDAs
    - Single anomaly source identified/removed (all confirmed MPPEH location measured with RTK DGPS)
    - Multiple anomaly sources identified/removed
    - Extended anomaly source identified
    - Anomaly identified as the same source as another flag
    - MC sampling location (measured with RTK DGPS)
- Photographs are required to document inaccessible areas, munitions and other items/areas outside what would be considered normal. Inaccessible areas are defined as areas with greater than a 30-degree slope, covered in water, or otherwise not accessible by personnel without using extraordinary means (e.g., rappelling, etc.).
- Munitions Constituents (MC) soil sampling will be conducted if breached munitions, discolored soil or unusual odors are detected during intrusive investigations. Soil samples will be taken to

determine if explosives are present. If explosives are detected above the screening criteria, soil removal will be completed in accordance with the MC SAP (Appendix B).

- QC documentation to document the effectiveness of the removal actions. QC will execute the three phases of control methodology and will conduct follow-on inspections for each Definable Feature of Work (DFW) for each day the DFW is performed, including verification of frag pits, abandoned cultural sources, holes abandoned due to unsafe water recharge rate, all no finds, MC sampling locations, as well as post intrusive hole checks.

- QC mini grids (two per grid) are semi randomly selected at the discretion of QC team in consideration of No Finds and other grid considerations (e.g., over/near MEC). Mini grid locations are provided to QA.

7.3.2 Data Collection and Reporting

All of the surface clearance and intrusive investigation data will be collected and generated by UXO technicians, qualified to the standards of training and experience required by Department of Defense Explosive Safety Board Technical Paper #18 for their respective positions on the project. All other data, including reacquisition, geophysical, soil sampling and survey, will be collected by craft labor and geosciences field operators.

Results of the intrusive investigations are captured by the intrusive teams. Overall results are reported as tables generated from the database which contains the data from the intrusive team dig sheets. This information includes the date, team information, a unique target identifier, target coordinates, anomaly amplitude and space for the team to enter anomaly source identification (e.g., item nomenclature, material documented as safe, or material documented as an explosives hazard, etc.).

Data from the dig sheets are entered into the project database. Dig results, photographs of MEC encountered, confirmation that the anomaly was removed, and MEC and material documented as an explosive hazard (MDEH) treatment information will be entered in this way. QC data will be captured and included into the project database for every target checked.

Progress will be presented using color-coded maps created in the project geographic information system (GIS) using ArcGIS 9.x software. The maps will reflect the work to be accomplished, the work completed by the production teams and the QC accomplished on the work completed by the production teams.

7.3.3 Data Archiving and Management

Hardcopy data (field- and/or laboratory-related) will be transcribed into the project's database and stored in the project files after undergoing QC review. Data recorded on electronic devices (e.g., Palm devices, tablet computers, data loggers, etc.) will be downloaded daily and archived to secure storage [e.g., compact disk/digital video disk (CD/DVD), dedicated portable hard drive, SharePoint site, file transfer protocol (ftp) site, etc.]. Digital cameras will be downloaded daily and the photographs archived to secure storage

Project data will need to be:

- Shared across geographical and temporal boundaries
- On a secure site (password protected) where they are backed up and archived regularly with no inputs from the users required.
- Accessible by authorized users.
- Assigned permissions to permit only certain activities to be performed (e.g., a user may have read only access to a file but not be able to download or print the document).

- Set up with individual user notification rules so that an e-mail is sent when data have been posted or changed based on user preferences (e.g., immediate, once daily or once weekly).

A project-specific SharePoint site (http://websps1.battelle.org/sites/ADAK2008QA/default.aspx) has been established to manage, track, retrieve and store all documents pertinent to the project.

The project manager (PM) will test and manage the data exchange activity and authorize access to data as required by the MEC QAPP Worksheets 11, Project Quality Objectives and 29, Project Documents and Records. The PM will also verify all required data are collected, no additional data are needed and any inaccuracies have been corrected. The PM is to verify with the Remedial Project Manager (RPM) which personnel continue to require access to the SharePoint or ftp site.

Microsoft® Excel and Word are typically used to store all data collected for the project including DGM information, reacquisition and intrusive results, QC findings, MEC and MDEH accountability and treatment history. The reacquisition team records information in electronic format in the global positioning system (GPS) data logger and in logbooks. The intrusive teams record information in electronic format in the GPS data logger, on dig sheets, and in logbooks.

The electronic and paper form data are merged and transcribed daily into a temporary data base. The logbook pages are photocopied daily in the event of loss or damage. The UXO Quality Control Specialist (UXOQCS) will review the database weekly to verify accuracy, consistency, standardization, completeness and compatibility. After the UXOQCS review, the temporary database is incorporated into the project master database file and posted to the main project SharePoint.

Geophysical data will be processed in accordance with the procedures in SOP 03.

7.4 QUALITY CONTROL

The Data Management will meet the QC metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. The QC team will review the database weekly to verify accuracy, consistency, standardization, completeness and compatibility. Any data the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the Senior UXO Supervisor (SUXOS) and QA. QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the data management task along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Data Management	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bear skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. All personnel tasked to collect and manage data will maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXO Safety Officer, Senior UXO Supervisor or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The personnel tasked with collecting data will use a variety of equipment to collect data, managing the data will primarily done on computers and using the internet to transmit the data to the project team.

Safety equipment required during data collection includes the following:

- First-aid kit
- Level D Personal Protection Equipment
- Inclement weather gear as needed.

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2, will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1:
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE
N44255-12-C-3003

DATA MANAGEMENT

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST

Item	Ref.	Inspection Point	Yes	No	N/A	Comments
1	**SOP 13 Workers' Statement**	Have all personnel involved with data collection and management read this SOP?				*(P)*
2	**SOP 13, Sec. 7.3.1**	Was DGM data validated by QC tests?				*(P), (I), (F)*
3	**SOP 13, Sec. 7.3.1**	Were blind seed item detection demonstrated in the DGM data?				*(P), (I), (F)*
4	**SOP 13, Sec. 7.3.1**	Were reacquired targets pinpointed and was the new coordinate logged using RTK DGPS?				*(P), (I), (F)*
5A	**SOP 13, Sec. 7.3.1**	Were intrusive investigation results documented for every target anomaly location?				*(P), (I), (F)*
5B	**SOP 13, Sec. 7.3.1**	Were areas inaccessible to data collection photographically documented?				*(P), (I), (F)*
5C	**SOP 13, Sec. 7.3.1**	Has the QC team documented their verification of frag pits, abandoned cultural anomalies, holes that cannot be sufficiently dewatered, anomaly source below removal depth, all no finds, and their post intrusive hole checks?				*(P), (I), (F)*
6	**SOP 13 Sec. 7.3.2**	Did photographs of MEC and MDEH contain descriptive data of the item and the location found?				*(P), (I), (F)*
7	**SOP 13, Sec. 7.3.3**	Were paper copies of data accurately transcribed into the data base and correctly filed?				*(P), (I), (F)*
8	**SOP 13, Sec. 7.3.3**	Was digital data collected and entered into the data base?				*(P), (I), (F)*
9	**SOP 13, Sec. 7.3.3**	Are digital cameras downloaded daily and the images archived to secure storage?				*(P), (I), (F)*

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**
10	**SOP 13, Sec. 7.3.3**	Does the project PM test and manage the data exchange activity?				*(P), (I), (F)*
11	**SOP 13, Sec. 7.3.3**	Did the PM verify all required data was collected, no additional data is needed and any inaccuracies in the collected data are corrected?				*(I), (F)*
12	**SOP 13, Sec. 7.3.3**	Are the electronic and paper form data merged and transcribed daily into a temporary data base??				*(P), (I), (F)*
13	**SOP 13, Sec. 7.3.3**	Are logbooks photocopied daily?				*(P), (I), (F)*
14	**SOP 13, Sec. 7.3.3**	Does the QC team review the data base weekly to verify accuracy, consistency, standardization, completeness and compatibility?				*(P), (I), (F)*
15	**SOP 13 Sec 7.3.3**	Is the temporary data base incorporated into the project master database file and posted to the main project SharePoint only after the UXOQCS weekly review?				*P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

SOIL SAMPLING

SOP 14

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions Constituent Quality Assurance Project Plan (MC QAPP)
- Accident Prevention Plan (APP)
- DON, 2007. Project Procedures Manual, U.S. Navy ERP, IDW Management, I-A-6
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- Operator's Manual(s) and Manufacturer's Publications

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
bgs	below ground surface
CRREL	Cold Regions Research and Engineering Laboratory
DDESB	Department of Defense Explosives Safety Board
DOD	Department of Defense
DOT	Department of Transportation
EZ	exclusion zone
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
OJT	On the Job Training
OSHA	Occupational Safety and Health Administration
PPE	Personnel Protection Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Remedial Action Areas
RTK-DGPS	Real-Time Kinematic Differential Global Positioning System
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOTII	UXO Technician II
UXOSO	UXO Safety Officer

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ATTACHMENT: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct field soil sampling of breached munitions areas using Cold Region Research and Engineering Laboratory (CRREL) Seven-Point Sample Wheel approach during the activities at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct soil sampling operations.

Developed by:

James Walden
Project Quality Control Manager

19 February 2013
Date

Reviewed by:

Manok Synakorn
Project Manager

19 February 2013
Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

Robert Crownover
Director of Safety and Quality

2/19/2013
Date

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this SOP is to provide USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform soil sampling operations on sites contaminated with munitions constituents (MC).

7.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct of soil sampling operations during the activities within the identified RAAs on the former NAF, Adak. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.3 SAMPLING PROCEDURES

7.3.1 Sampling Team Composition

The Soil Sampling Team will consist of two qualified personnel, as a minimum. These personnel will include the following:

- Field Engineer/Sampling Technician
- UXO Technicians II (UXOTII) (UXO escort)

The UXOTII will provide munitions and explosives of concern (MEC) avoidance support and assist with the soil collection task as directed by the Field Engineer/Sampling Technician.

7.3.2 Sampling

The UXOTII will escort the sampler during the collection of the composite subsamples. At each location where breached munitions, staining, or odors indicate the potential presence of MCs, the analytical approach will be to remove MC pieces if visual assessment indicates that MCs are present. An administrative control level of explosives in the soil will be used to demonstrate explosive soil conditions. Once the munition is removed, the SUXOS will determine the area is safe for soil sampling activities. This is a qualitative visual inspection to determine if it is safe to disturb the soil. The sampling technician will proceed with collecting samples only after the area is deemed to be safe for sampling.

Once the UXO technician has verified that no metal is detected and that no explosive safety hazard exists, sampling activity will proceed. The CRREL seven-point sampling wheel design will be used to collect soil composites for all field test kit screening and laboratory analysis. This design is based on a 4-ft (1.2-m) diameter circle with each of the seven subsamples collected equi-distant around the circumference of the circle (see Figure 1).

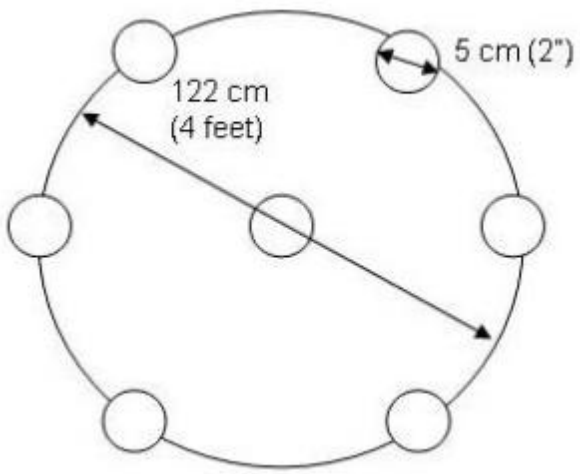

Figure 1: CRREL Seven-Point Sample Wheel Diagram

The sampling wheel will be biased to include areas of highest apparent MC concentrations. Each of the seven subsamples consists of a soil sample with a 2-in (5-cm) diameter collected to 2-in (5-cm) bgs. The resulting seven subsamples will be placed in a re-sealable plastic bag to create one composite. This sampling process will result in one composite sample for each 4-ft (1.2-m) diameter area where MC contamination is suspected.

Typical Procedures

Below is a list of general sampling procedures:

- A photograph of the undisturbed area will be taken.
- The exact sample location will be determined using a Real-Time Kinematic Differential Global Position System (RTK DGPS) with accuracy of ±0.5-ft (15-cm) (see SOP 2).
- The field sampling technician will don a new pair of disposable nitrile gloves immediately before collecting the soil samples at each location.
- Documentation in the logbook will be initiated (SOP 21).
- Rocks and debris will be cleared from the RAA with a clean spade, spoon, etc. to the top of the sampling interval.
- A seven-point sample composite will be collected as described below. Large pebbles and sticks should not be included but small vegetation should be included.
- The soil from each of the seven sub-samples will be placed in a heavy-duty re-sealable plastic bag and mixed well.
- Definitive sample concentrations for each RAA will be determined in at a fixed laboratory using U.S. EPA Method 8330B. The off-site laboratory will conduct sample processing (air drying, grinding, sieving, and sub-sampling).

The total number of samples to be collected during MC operations cannot be predicted. If MCs are identified at a site, the number of samples required will be based on the size of the area and the need to conduct step-out sampling.

7.3.3 Sample Packaging and Shipping

Sample collection will require specific sampling containers along with collection procedures, documentation and packing and shipment from Adak Island to offsite laboratories (RTI) for waste characterization. Shipment from Adak requires careful coordination and sample handling to ensure that the samples reach the offsite laboratory in good condition, within holding times, and within temperature requirements. It is of utmost importance to ensure that sample jars are cushioned sufficiently to minimize the potential for breakage of glass in transit. In addition, the sampler must ensure that enough gel-ice is packed with the samples to keep the temperature cool in transit. It may also be required that an intermediary handler intercepts the sample cooler mid-way (e.g., in Anchorage) to replenish the supply of gel ice to better ensure sample temperatures are not compromised and to ensure the package gets routed properly to the laboratory and does not get held up during the trip. It is also important that, should samples be considered U.S. Department of Transportation (USDOT) hazardous materials for transit, the Adak representative with Alaska Airlines is coordinated with in advance to ensure a hazardous material qualified agent is available, and to ensure the shipment is properly declared for transport on passenger aircraft.

Before packing, all samples will be individually labeled and noted in the field logbook by the sampler. Samples will be stored in a sample refrigerator prior to placement in the cooler for shipment or kept on ice to ensure the temperature remains within the requirements. Labels will be completed with all required information. The samples will be assigned individual numbers in accordance with the sample identification procedures outlined in the MC QAPP. The sample numbers will be used to complete the chain-of-custody forms.

- Place each sample in a plastic Ziploc bag and align the label so it can be easily read. Seal the bag. Place a signed custody seal on each bag.
- Place individual samples into the cooler on cushioning material so that each container has some clearance on all sides.
- Place cushioning materials around and on top of the sample jars to minimize breakage potential.
- Cover the headspace inside the cooler with sufficient frozen Blue Ice packs (or equivalent).
- Place the chain-of-custody form in a sealed plastic Ziploc bag and place in the cooler.
- Close and latch the cooler. Wrap the cooler and lid with at least two turns of strapping or duct tape. Affix signed custody seals over the edge of the lid and the top of the cooler body at front and rear.
- Label coolers with up arrows and if the samples are regulated USDOT hazardous materials, label the cooler and mark the shipping papers with information to comply with USDOT requirements for shipment by air (labeling of shipping papers for DOT hazardous materials shipments must be done by a DOT hazardous materials trained person).

The Field Sampling Lead will notify the laboratory of approximately when and how many samples will arrive and will arrange for any necessary coordination for the samples in transit. The samples must be kept under refrigeration (or packed with Blue Ice or equivalent) between sampling and analysis processing. The sample containers will be checked on arrival at the laboratory for breakage.

7.3.4 Equipment Decontamination

Sampling equipment must be decontaminated to prevent cross contamination of samples. An equipment decontamination area will be established and decontamination performed as follows:

- Set up decontamination area, including buckets, plastic sheeting, scrub brushes, sprayers.
- Set up “clean” area upwind of decontamination area for air drying of equipment.

- Fill one 5-gallon bucket with detergent and potable tap water.
- Fill a second 5-gallon bucket with potable tap water only.
- Fill new/clean spray bottles with deionized water.
- Scrub all sampling equipment to remove gross contamination.
- Wash equipment in detergent.
- Rinse with potable tap water.
- Rinse with deionized water.
- Rinse a second time with deionized water.
- Air dry.

Decontamination wastewaters will be accumulated and stored in closed-head (bung-top) drums and will be marked “Decontamination Water from (source)”. Disposable items (sampling gloves, paper towels, etc.) will be containerized in garbage bags or 5-gallon plastic buckets with lids for proper disposal (see SOP 15 Investigation-Derived Waste Handling).

7.4 QUALITY CONTROL

The Soil Sampling teams will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any soil sampling tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS and Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

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8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the soil sampling tasks along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Soil Sampling	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be sampled. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

Equipment may be required by the Sampling Team includes the following:

- MC QAPP
- Camera
- Field logbook
- Disposable nitrile gloves
- Sampling spade or spoon
- Shovel
- Sieves
- Grinders
- Ziploc® bags

- Sample Labels (including DOT shipping labels if required)
- Indelible black-ink pens
- Coolers
- Blue Ice® (or equivalent)
- Duct tape
- Vermiculite (or equivalent)
- Garbage bags
- Chain-of-custody forms (including DOT shipper's declaration if required)
- Custody seals
- Potable tap water
- Deionized water
- Laboratory-grade detergent (i.e., Liqui-Nox®, or equivalent phosphate-free detergent)
- 5-gallon buckets
- Spray bottles
- Scrub brushes
- Plastic sheeting
- Garden and hand spray bottles (plastic)
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE
N44255-12-C-3003

SOIL SAMPLING

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**
1	**SOP 14 Workers' Statement**	Have all Soil Sampling Team Members read this SOP?				*(P)*
2	**SOP 14, Sec. 8.1**	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				*(P), (I), (F)*
3	**SOP 14, Sec. 7.3.2**	Did the UXO Technician check the sampling location with the handheld all-metals detector to anomalies before sampling?				*(P), (I), (F)*
4	**SOP 14, Sec. 7.3.2**	Were any visible pieces of potential explosive or MC material collected and removed from the sampling location?				*(P), (I), (F)*
5	**SOP 14, Sec. 8.1**	Was the exclusion zone (EZ) established and the TSD for the RAA observed?				*(P), (I), (F)*
6	**SOP 14, Sec. 7.3.2**	Were CRREL seven-point sampling procedures followed?				*(P), (I), (F)*
7	**SOP 14, Sec. 7.3.3**	Were the samples individually labeled and noted in the field logbook before packaging?				*(P), (I), (F)*
8	**SOP 14, Sec. 7.3.3**	Were individual sample numbers assigned to each sample?				*(P), (I), (F)*
9	**SOP 14, Sec. 7.3.3**	Was a signed custody seal affixed to each sip-lock bag?				*(P), (I), (F)*
10	**SOP 14, Sec. 7.3.3**	Was each sample surrounded by cushioning material in the cooler?				*(P), (I), (F)*
11	**SOP 14, Sec. 7.3.3**	Were Blue-ice packs (or equivalent) placed in the cooler headspace?				*(P), (I), (F)*

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**
12	**SOP 14, Sec. 7.3.3**	Was a completed chain-of-custody form placed in a sip-lock plastic bag and inside of the cooler?				*(P), (I), (F)*
13	**SOP 14, Sec. 7.3.3**	Was the closed cooler wrapped with at least two wraps of strapping or duct tape?				*(P), (I), (F)*
14	**SOP 14, Sec. 7.3.3**	Were signed custody seals affixed over the edge of the lid and top of the cooler body front and rear?				*(P), (I), (F)*
15	**SOP 14, Sec. 7.3.3**	Did the Filed Sampling /lead notify the laboratory of approximately when and how many samples will arrive and arrange for any necessary coordination for the samples in transit?				*(P), (I), (F)*
16	**SOP 14, Sec. 7.3.4**	Was sampling equipment properly decontaminated?				*(P), (I), (F)*
17	**SOP 14 Sec. 7.3.4**	Were decontamination fluids containerized for disposal as Investigative-derived waste (IDW)?				*(P), (I), (F)*
18	**SOP 8, Sec. 7.3.4**	Was all other IDW containerized for disposal?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

INVESTIGATION-DERIVED WASTE HANDLING

SOP 15

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions Constituents Quality Assurance Project Plan (MC QAPP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
IDW	Investigation-Derived Waste
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NOSSA	Naval Ordnance Safety and Security Activity
NTCRA	Non-Time Critical Removal Action
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance

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ATTACHMENT 1: QUALITY CONTROL CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct the investigation-derived waste handling procedures during the NTCRA effort at the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct the investigation-derived waste handling operations.

Developed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Reviewed by:

19 February 2013

James Walden
Project Quality Control Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform the Investigation-Derived Waste (IDW) handling procedures during operations within the identified Remedial Action Areas (RAAs) on the former Naval Air Facility (NAF), Adak.

7.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct of IDW handling procedures during the activities within the identified RAAs on the former NAF, Adak. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.3 PROCEDURES

Used PPE and used disposable sampling equipment from munitions constituents (MC) sampling operations may consist of used sampling scoops, bailers, used gloves, etc. The majority of used PPE and sample equipment will be considered to be contaminated with MC and to have come into direct contact with potential MC-contaminated soil.

This debris will require proper waste characterization for disposal based on site conditions and the levels of MC in soil samples. However, it is anticipated that this waste stream will be characterized as non-hazardous waste, suitable for off-site disposal at a Subtitle D landfill or an approved municipal solid waste landfill.

Decontamination waters from personnel or equipment used during sampling will be kept to a minimum to the extent possible by the use of disposable sampling equipment and PPE that will not require decontamination. This will also limit or eliminate having to collect source or rinsate blanks that require laboratory analysis. If generated, decontamination wastewaters will be sampled and analyzed for proper characterization and disposal based on the suspected or known contaminants (e.g., MC, corrosivity from use of acid decontamination, etc.). The disposal facility may have additional sampling requirements; these will be identified before sampling.

It is anticipated that decontamination waters, if generated, will all be non-hazardous waste. Decontamination wastewaters will be accumulated and stored in closed-head (bung-top) drums and will be marked “Decontamination Water from (source)”. Disposable items (sampling gloves, paper towels, etc.) will be containerized in garbage bags or 5-gallon plastic buckets with lids for proper disposal

IDW containers will be stored at the designated project temporary storage sites or at authorized alternative locations pending the disposal decision from the Navy and USA.

7.4 QUALITY CONTROL

The IDW handling tasks will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any IDW handling tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to Senior UXO Supervisor (SUXOS) and Quality Assurance. The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix below lists the existing and potential hazards associated with handling IDW, along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
IDW Handling	Slips, Trips or Falls, Muscle Strain	Climbing; debris, holes, or crevasses obstructed from view by vegetation, handling waste containers.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times Utilize proper lifting techniques when lifting or moving IDW containers.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team separation distance (TSD) as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft (13.1-m) based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03 and RAA-04, 44-ft (13.4-m) based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXO Safety Officer, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP). Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO technician providing MEC avoidance escort services will be equipped with the following:

- Containers
- Labels
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D PPE
- Material handling gear, if required
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
QUALITY CONTROL CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE
N44255-12-C-3003

SOIL SAMPLING

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**
1	**SOP 14 Workers' Statement**	Have all personnel tasked with handling IDW read this SOP?				*(P)*
2	**SOP 14, Sec. 8.1**	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				*(P), (I), (F)*
3	**SOP 14, Sec. 7.3**	Was sampling equipment properly decontaminated?				*(P), (I), (F)*
4	**SOP 14 Sec. 7.3**	Were decontamination wastewaters accumulated and stored in closed-head (bung-top) drums and will be marked "Decontamination Water from (source)"?				*(P), (I), (F)*
5	**SOP 14, Sec. 7.3**	Disposable items (sampling gloves, paper towels, etc.) will be containerized in garbage bags or 5-gallon plastic buckets with lids for proper disposal?				*(P), (I), (F)*
6	**SOP 14, Sec. 7.3**	Are IDW containers will be stored at the designated project temporary storage sites or at authorized alternative locations pending the disposal decision from the Navy and USA				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

LABORATORY SOP FOR 8033B

SOP 16

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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American Association for Laboratory Accreditation

Accredited DoD ELAP Laboratory

A2LA has accredited

RTI LABORATORIES, INC.

Livonia, MI

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 4.2 of the DoD Quality System Manual for Environmental Laboratories (QSM); accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION
CORPORATE SEAL 1978
DISTRICT OF COLUMBIA
A2LA

Presented this 13th day of November 2012.

President & CEO
For the Accreditation Council
Certificate Number 0570.03
Valid to October 31, 2014

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

RTI LABORATORIES, INC.
31628 Glendale
Livonia, Michigan 48150
Charles O'Bryan 734-422-8000 ext. 215
cobryan@rtilab.com

ENVIRONMENTAL

Valid To: October 31, 2014 Certificate Number: 0570.03

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 4.2 of the DoD Quality Systems Manual for Environmental Laboratories) accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

ICP/MS, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Methylene Blue Active Substances, Microbiology, Misc.- Electronic Probes (pH, O_2), Oxygen Demand, Hazardous Waste Characteristics Tests, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, Total Organic Carbon, Turbidity

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Metals			
Aluminum	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Antimony	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Arsenic	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Barium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Beryllium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Boron	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Cadmium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Calcium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Chromium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Cobalt	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Copper	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Iron	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Lead	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Magnesium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Manganese	EPA 200.8	EPA 200.8/6020A	EPA 6020A

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Mercury	EPA 245.1	EPA 245.1/1631/7470A	EPA 7471A
Molybdenum	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Nickel	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Potassium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Selenium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Silicon	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Silver	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Sodium	EPA 200.8	EPA 200.8/6020	EPA 6020
Thallium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Tin	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Titanium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Uranium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Vanadium	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Zinc	EPA 200.8	EPA 200.8/6020A	EPA 6020A
Preparation Methods	- - - - - - - - - -	EPA 3020	EPA 3050
Nutrients			
Ammonia (as N)	SM4500 NH_3-D	SM4500 NH_3-D	- - - - - - - - - -
Kjeldahl Nitrogen	EPA 351.2	EPA 351.2	- - - - - - - - - -
Nitrate (as N)	EPA 300.0	EPA 300.0/9056	EPA 9056
Nitrate-nitrite (as N)	EPA 300.0	EPA 300.0/9056	EPA 9056
Nitrite (as N)	EPA 300.0	EPA 300.0/9056	EPA 9056
Orthophosphate (as P)	EPA 300.0/ SM4500 P F	EPA 300.0/9056 SM4500 P-F	EPA 9056
Total Phosphorus	SM4500 P-F	SM4500 P-F	- - - - - - - - - -
Demands			
Biochemical Oxygen Demand	SM5210 B	SM5210 B	- - - - - - - - - -
Carbonaceous BOD	SM5210 B	SM5210 B	- - - - - - - - - -
Chemical Oxygen Demand	EPA 410.4	EPA 410.4	- - - - - - - - - -
Total Organic Carbon	SM5310 B	SM5310 B	EPA 9060
Wet Chemistry			
Alkalinity	SM2320 B	EPA 310.1	- - - - - - - - - -
Chloride	EPA 300.0	EPA 300.0/9056	EPA 9056
Chlorine (residual)	SM4500-Cl I	SM4500 Cl-I	
Cyanide	SM4500 CN-E	SM4500 CN-E EPA 9012B	EPA 9012B
Available Cyanide	ASTM D6888	ASTM D6888	- - - - - - - - - -
Fluoride	EPA 300.0	EPA 300.0/9056	EPA 9056
Hardness	EPA 200.8	EPA 200.8/6020	EPA 6020
Hexavalent Chromium	- - - - - - - - - -	SM 4500 CR-B EPA 7196	EPA 7196/3060
pH	SM4500-H^+ B	SM4500-H^+ B EPA 9040C/9041A	EPA 9045C

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Oil and Grease	EPA 1664A	EPA 1664A	EPA 9071B
Phenols	EPA 420.1	EPA 420.1/9065	EPA 9065
Total Residue	SM2540 B	SM2540 B	----------
Filterable Residue	SM2540 C	SM2540 C	----------
Nonfilterable Residue	SM2540 D	SM2540 D	----------
Specific Conductance	SM2510 B	SM2510 B	----------
Sulfate	EPA 300.0	EPA 300.0/9056	EPA 9056
Surfactants	SM5540 C	SM5540 C	----------
Turbidity	SM2130 B	SM2130 B	----------
Purgeable Organics (volatiles)			
Acetone	----------	EPA 624/8260B	EPA 8260B
Acetonitrile	----------	EPA 624/8260B	EPA 8260B
Acrolein	----------	EPA 624/8260B	EPA 8260B
Acrylamide	----------	EPA 624/8260B	----------
Acrylonitrile	----------	EPA 624/8260B	EPA 8260B
Benzene	----------	EPA 624/8260B	EPA 8260B
Bromobenzene	----------	EPA 624/8260B	EPA 8260B
Bromodichloromethane	----------	EPA 624/8260B	EPA 8260B
Bromoform	----------	EPA 624/8260B	EPA 8260B
Bromomethane	----------	EPA 624/8260B	EPA 8260B
2-Butanone	----------	EPA 624/8260B	EPA 8260B
n-Buytlbenzene	----------	EPA 624/8260B	EPA 8260B
sec-Butylbenzene	----------	EPA 624/8260B	EPA 8260B
tert-Butylbenzene	----------	EPA 624/8260B	EPA 8260B
Carbon Disulfide	----------	EPA 624/8260B	EPA 8260B
Carbon Tetrachloride	----------	EPA 624/8260B	EPA 8260B
Chlorobenzene	----------	EPA 624/8260B	EPA 8260B
Chloroethane	----------	EPA 624/8260B	EPA 8260B
2-Chloroethyl Vinyl Ether	----------	EPA 624/8260B	EPA 8260B
Chloroform	----------	EPA 624/8260B	EPA 8260B
Chloromethane	----------	EPA 624/8260B	EPA 8260B
Chlorotoluene	----------	EPA 624/8260B	EPA 8260B
Dibromochloromethane	----------	EPA 624/8260B	EPA 8260B
1,2-Dibromo-3-Chloropropane (DBCP)	----------	EPA 624/8260B	EPA 8260B
Dibromomethane	----------	EPA 624/8260B	EPA 8260B
1,2 Dibromomethane (EDB)	----------	EPA 624/8260B	EPA 8260B
1,4-Dichloro-2-butane	----------	EPA 624/8260B	EPA 8260B
1,2-Dichlorobenzene	----------	EPA 624/8260B	EPA 8260B
1,3-Dichlorobenzene	----------	EPA 624/8260B	EPA 8260B
1,4-Dichlorobenzene	----------	EPA 624/8260B	EPA 8260B
Dichlorodifluoromethane	----------	EPA 624/8260B	EPA 8260B
1,1-Dichloroethane	----------	EPA 624/8260B	EPA 8260B
1,2-Dichloroethane	----------	EPA 624/8260B	EPA 8260B
1,1-Dichloroethene	----------	EPA 624/8260B	EPA 8260B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
cis-1,2-Dichloroethene	----------	EPA 624/8260B	EPA 8260B
trans-1,2-Dichloroethene	----------	EPA 624/8260B	EPA 8260B
1,2-Dichloropropane	----------	EPA 624/8260B	EPA 8260B
1,3-Dichloropropane	----------	EPA 624/8260B	EPA 8260B
2,2-Dichloropropane	----------	EPA 624/8260B	EPA 8260B
1,1-Dichloropropene	----------	EPA 624/8260B	EPA 8260B
cis-1,3-Dichloropropene	----------	EPA 624/8260B	EPA 8260B
trans-1,3-Dichloropropene	----------	EPA 624/8260B	EPA 8260B
Diethyl Ether	----------	EPA 624/8260B	EPA 8260B
Ethanol	----------	EPA 624/8260B	EPA 8260B
Ethyl Benzene	----------	EPA 624/8260B	EPA 8260B
Ethyl Methacrylate	----------	EPA 624/8260B	EPA 8260B
Gas Range Organics (GRO)	----------	EPA 8015B	EPA 8015B
2-Hexanone	----------	EPA 624/8260B	EPA 8260B
Hexachlorobutadiene	----------	EPA 624/8260B	EPA 8260B
Isopropylbenzene	----------	EPA 624/8260B	EPA 8260B
1,4-Isopropyltoluene	----------	EPA 624/8260B	EPA 8260B
Iodomethane	----------	EPA 624/8260B	EPA 8260B
Methylene Chloride	----------	EPA 624/8260B	EPA 8260B
Methyl Ethyle Ketone (MEK)	----------	EPA 624/8260B	EPA 8260B
Methyl Isobutyl Ketone	----------	EPA 624/8260B	EPA 8260B
4-Methyl-2-pentanone	----------	EPA 624/8260B	EPA 8260B
Naphthalene	----------	EPA 624/8260B	EPA 8260B
n-Propylbenzene	----------	EPA 624/8260B	EPA 8260B
Polynuclear Aromatic Hydrocarbons (PAHs)	----------	EPA 625/8270D	EPA 8270D
Styrene	----------	EPA 624/8260B	EPA 8260B
1,1,1,2-Tetrachloroethane	----------	EPA 624/8260B	EPA 8260B
1,1,2,2-Tetrachloroethane	----------	EPA 624/8260B	EPA 8260B
Tetrachloroethene	----------	EPA 624/8260B	EPA 8260B
Toluene	----------	EPA 624/8260B	EPA 8260B
Total Petroleum Hydrocarbons (TPH)	----------	EPA 1664A	EPA 1664A
1,1,1-Trichloroethane	----------	EPA 624/8260B	EPA 8260B
1,1,2-Trichloroethane	----------	EPA 624/8260B	EPA 8260B
Trichloroethene	----------	EPA 624/8260B	EPA 8260B
Trichlorofluoromethane	----------	EPA 624/8260B	EPA 8260B
1,2,3-Trichloropropane	----------	EPA 624/8260B	EPA 8260B
1,2,4-Trimethylbenzene	----------	EPA 624/8260B	EPA 8260B
1,3,5-Trimethylbenzene	----------	EPA 624/8260B	EPA 8260B
Trihalomethanes	----------	EPA 624/8260B	EPA 8260B
Vinyl Chloride	----------	EPA 624/8260B	EPA 8260B
Xylenes, Total	----------	EPA 624/8260B	EPA 8260B
1,2-Xylene	----------	EPA 624/8260B	EPA 8260B
1,3-Xylene	----------	EPA 624/8260B	EPA 8260B
1,4-Xylene	----------	EPA 624/8260B	EPA 8260B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Methyl tert butyl ether (MTBE)	----------	EPA 8260B	EPA 8260B
Methylcyclohexane	----------	EPA 8260B	EPA 8260B
Cyclohexane	----------	EPA 8260B	EPA 8260B
Carbon Dioxide	RSKSOP-175	RSKSOP-175	----------
Ethane	RSKSOP-175	RSKSOP-175	----------
Ethylene	RSKSOP-175	RSKSOP-175	----------
Methane	RSKSOP-175	RSKSOP-175	----------
Preparation Methods	----------	EPA 5030B	EPA 5035
Extractable Organics (semivolatiles)			
Acenaphthene	----------	EPA 625/8270D	EPA 8270D
Acenaphthylene	----------	EPA 625/8270D	EPA 8270D
Acetophenone	----------	EPA 625/8270D	EPA 8270D
4-Aminobiphenyl	----------	EPA 625/8270D	EPA 8270D
Aniline	----------	EPA 625/8270D	EPA 8270D
Anthracene	----------	EPA 625/8270D	EPA 8270D
Benzaldehyde	----------	EPA 8270D	EPA 8270D
Benzidine	----------	EPA 625/8270D	EPA 8270D
Benzoic Acid	----------	EPA 625/8270D	EPA 8270D
Benzo (a) Anthracene	----------	EPA 625/8270D	EPA 8270D
Benzo (b) Fluoranthene	----------	EPA 625/8270D	EPA 8270D
Benzo (k) Fluoranthene	----------	EPA 625/8270D	EPA 8270D
Benzo (ghi) Fluoranthene	----------	EPA 625/8270D	EPA 8270D
Benzo (a) Pyrene	----------	EPA 625/8270D	EPA 8270D
Benzyl Alcohol	----------	EPA 625/8270D	EPA 8270D
Benzyl Chloride	----------	EPA 625/8270D	EPA 8270D
Bis (2-chloroethoxy) Methane	----------	EPA 625/8270D	EPA 8270D
Bis (2-chloroethoxy) Ether	----------	EPA 625/8270D	EPA 8270D
Bis (2-chloroisopropyl) Ether	----------	EPA 625/8270D	EPA 8270D
Bis (2-ethylhexyl) Phthalate	----------	EPA 625/8270D	EPA 8270D
4-Bromophenylphenyl) Phthalate	----------	EPA 625/8270D	EPA 8270D
Butyl Benzyl Phthalate	----------	EPA 625/8270D	EPA 8270D
2-sec-Butyl-4,6-dinitrophenol	----------	EPA 625/8270D	EPA 8270D
Caprolactum	----------	EPA 8270D	EPA 8270D
4-Chloroaniline	----------	EPA 625/8270D	EPA 8270D
4-Chloro-3-methylphenol	----------	EPA 625/8270D	EPA 8270D
1-Chloronaphthalene	----------	EPA 625/8270D	EPA 8270D
2-Chloronaphthalene	----------	EPA 625/8270D	EPA 8270D
2-Chlorophenol	----------	EPA 625/8270D	EPA 8270D
4-Chlorophenyl Phenyl Ether	----------	EPA 625/8270D	EPA 8270D

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Chrysene	----------	EPA 625/8270D	EPA 8270D
Cresols	----------	EPA 625/8270D	EPA 8270D
2-Cyclohexyl-4,6-dinitrophenol	----------	EPA 625/8270D	EPA 8270D
Dibenzo (a,h) Anthracene	----------	EPA 625/8270D	EPA 8270D
Dibenzofuran	----------	EPA 625/8270D	EPA 8270D
1,2-Dichlorobenzene	----------	EPA 625/8270D	EPA 8270D
1,3-Dichlorobenzene	----------	EPA 625/8270D	EPA 8270D
1,4-Dichlorobenzene	----------	EPA 625/8270D	EPA 8270D
3,3'-Dichlorobenzidine	----------	EPA 625/8270D	EPA 8270D
2,4-Dichlorophenol	----------	EPA 625/8270D	EPA 8270D
2,6-Dichlorophenol	----------	EPA 625/8270D	EPA 8270D
Diethyl phthalate	----------	EPA 625/8270D	EPA 8270D
2,4-Dimethylphenol	----------	EPA 625/8270D	EPA 8270D
Dimethyl Phthalate	----------	EPA 625/8270D	EPA 8270D
Di-n-butyl Phthalate	----------	EPA 625/8270D	EPA 8270D
Di-n-octyl Phthalate	----------	EPA 625/8270D	EPA 8270D
Dinitrobenzene	----------	EPA 625/8270D	EPA 8270D
2,4-Dinitrophenol	----------	EPA 625/8270D	EPA 8270D
2,4-Dinitrotoluene	----------	EPA 625/8270D	EPA 8270D
2,6-Dinitrotoluene	----------	EPA 625/8270D	EPA 8270D
Diphenylamine	----------	EPA 625/8270D	EPA 8270D
DRO	----------	EPA 8015B	EPA 8015B
Fluoroanthene	----------	EPA 625/8270D	EPA 8270D
Fluorene	----------	EPA 625/8270D	EPA 8270D
Hexachlorobenzene	----------	EPA 625/8270D	EPA 8270D
Hexachlorobutadiene	----------	EPA 625/8270D	EPA 8270D
Hexachlorocyclopentadiene	----------	EPA 625/8270D	EPA 8270D
Hexachloroethane	----------	EPA 625/8270D	EPA 8270D
Indeno (1,2,3-cd) Pyrene	----------	EPA 625/8270D	EPA 8270D
Isophorone	----------	EPA 625/8270D	EPA 8270D
2-Methyl-4,6-Dinitrophenol	----------	EPA 625/8270D	EPA 8270D
2-Methylphenol	----------	EPA 625/8270D	EPA 8270D
4-Methylphenol	----------	EPA 625/8270D	EPA 8270D
Naphthalene	----------	EPA 625/8270D	EPA 8270D
2-Nitroaniline	----------	EPA 625/8270D	EPA 8270D
3-Nitroaniline	----------	EPA 625/8270D	EPA 8270D
4-Nitroaniline	----------	EPA 625/8270D	EPA 8270D
Nitrobenzene	----------	EPA 625/8270D	EPA 8270D
2-Nitrophenol	----------	EPA 625/8270D	EPA 8270D
4-Nitrophenol	----------	EPA 625/8270D	EPA 8270D
N-Nitrosodi-n-propylamine	----------	EPA 625/8270D	EPA 8270D
N-Nitrosodiphenylamine	----------	EPA 625/8270D	EPA 8270D
2, 2-oxybis(1-chloropropane)	----------	EPA 625/8270D	EPA 8270D
Pentachlorobenzene	----------	EPA 625/8270D	EPA 8270D
Pentachloronitobenzene	----------	EPA 625/8270D	EPA 8270D

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
Pentachlorophenol	----------	EPA 625/8270D	EPA 8270D
Phenanthrene	----------	EPA 625/8270D	EPA 8270D
Phenol	----------	EPA 625/8270D	EPA 8270D
Pyrene	----------	EPA 625/8270D	EPA 8270D
Styrene	----------	EPA 625/8270D	EPA 8270D
Tetrachlorobenzenes	----------	EPA 625/8270D	EPA 8270D
1,2,4,5-Tetrachlorobenzene	----------	EPA 625/8270D	EPA 8270D
2,3,4,5-Tetrachlorophenol	----------	EPA 625/8270D	EPA 8270D
2,4,6-Tribromophenol	----------	EPA 625/8270D	EPA 8270D
1,2,4-Trichlorobenzene	----------	EPA 625/8270D	EPA 8270D
2,4,5-Trichlorophenol	----------	EPA 625/8270D	EPA 8270D
2,4,6-Trichlorophenol	----------	EPA 625/8270D	EPA 8270D
Preparation Methods	----------	EPA 3510	EPA 3545/3550
Pesticides/Herbicides/PCBs			
Aldrin	----------	EPA 608/8081A	EPA 8081A
alpha-BHC	----------	EPA 608/8081A	EPA 8081A
beta-BHC	----------	EPA 608/8081A	EPA 8081A
delta-BHC	----------	EPA 608/8081A	EPA 8081A
gamma-BHC	----------	EPA 608/8081A	EPA 8081A
Chlordane (technical)	----------	EPA 608/8081A	EPA 8081A
2,4-D	----------	EPA 8151A Modified	EPA 8151A Modified
Dalapon	----------	EPA 8151A Modified	EPA 8151A Modified
2,4-DB	----------	EPA 8151A Modified	EPA 8151A Modified
4,4'-DDD	----------	EPA 608/8081A	EPA 8081A
4,4'-DDE	----------	EPA 608/8081A	EPA 8081A
4,4',-DDT	----------	EPA 608/8081A	EPA 8081A
Dicamba	----------	EPA 8151A Modified	EPA 8151A Modified
Dichloroprop	----------	EPA 8151A Modified	EPA 8151A Modified
Dieldrin	----------	EPA 608/8081A	EPA 8081A
Dinoseb	----------	EPA 8151A Modified	EPA 8151A Modified
Endosulfan I	----------	EPA 608/8081A	EPA 8081A
Endosulfan II	----------	EPA 608/8081A	EPA 8081A
Endonsulfan Sulfate	----------	EPA 608/8081A	EPA 8081A
Endrin	----------	EPA 608/8081A	EPA 8081A
Endrin Aldehyde	----------	EPA 608/8081A	EPA 8081A
Endrin Ketone	----------	EPA 608/8081A	EPA 8081A
Heptachlor	----------	EPA 608/8081A	EPA 8081A
Heptachlor Epoxide	----------	EPA 608/8081A	EPA 8081A
MCPA	----------	EPA 8151A Modified	EPA 8151A Modified
MCPP	----------	EPA 8151A Modified	EPA 8151A Modified
Methoxychlor	----------	EPA 608/8081A	EPA 8081A
PCB-1016 (Arochlor)	----------	EPA 608/8082	EPA 8082
PCB-1221	----------	EPA 608/8082	EPA 8082
PCB-1232	----------	EPA 608/8082	EPA 8082
PCB-1242	----------	EPA 608/8082	EPA 8082
PCB-1248	----------	EPA 608/8082	EPA 8082
PCB-1254	----------	EPA 608/8082	EPA 8082

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste
PCB-1260	----------	EPA 608/8082	EPA 8082
PCB-1262	----------	EPA 608/8082	EPA 8082
PCB-1268	----------	EPA 608/8082	EPA 8082
2,4,5-T	----------	EPA 8151A Modified	EPA 8151A Modified
2,4,5-TP	----------	EPA 8151A Modified	EPA 8151A Modified
Toxaphene	----------	EPA 608/8081A	EPA 8081A
Conductivity	----------	EPA 9050A	----------
Corrosivity	----------	EPA 9040C	SW 846 Ch7/9040C/9045C
Nitroguanidine	----------	EPA 8330B	EPA 8330B
1,3,5-Trinitrobenzene	----------	EPA 8330B	EPA 8330B
1,3-Dinitrobenzene	----------	EPA 8330B	EPA 8330B
2,4,6-Trinitrotoluene	----------	EPA 8330B	EPA 8330B
3,5-Dinitroaniline	----------	EPA 8330B	EPA 8330B
2,4-Dinitrotoluene	----------	EPA 8330B	EPA 8330B
2,6-Dinitrotoluene	----------	EPA 8330B	EPA 8330B
2-Amino-4,6-dinitrotoluene	----------	EPA 8330B	EPA 8330B
2-Nitrotoluene	----------	EPA 8330B	EPA 8330B
3-Nitrotoluene	----------	EPA 8330B	EPA 8330B
4-Amino-2,6-dinitrotoluene	----------	EPA 8330B	EPA 8330B
4-Nitrotoluene	----------	EPA 8330B	EPA 8330B
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	----------	EPA 8330B	EPA 8330B
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	----------	EPA 8330B	EPA 8330B
Nitrobenzene	----------	EPA 8330B	EPA 8330B
Nitroglycerin	----------	EPA 8330B	EPA 8330B
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	----------	EPA 8330B	EPA 8330B
PETN	----------	EPA 8330B	EPA 8330B
Ignatibility	----------	----------	EPA 1010/1030
Paint Filter Liquids Test	----------	----------	EPA 9095A
Nitroglycerine	----------	EPA 8330B	EPA 8330B
Synthetic Precipitation Leaching Procedure (SPLP)	----------	----------	EPA 1312
Toxicity Characteristic Leaching Procedure	----------	----------	EPA 1311
Preparation Methods	----------	EPA 3510	EPA 3545/3550
White Phosphorus	----------	EPA 7580	EPA7580

Analyte	Air
1,1,1-Trichloroethane	EPA TO-15
1,1,2,2-Tetrachloroethane	EPA TO-15
1,1,2-Trichloro-1,2,2-trifluoroethane	EPA TO-15
1,1,2-Trichloroethane	EPA TO-15

Analyte	Air
1,1-Dichloroethane	EPA TO-15
1,1-Dichloroethene	EPA TO-15
1,2,4-Trichlorobenzene	EPA TO-15
1,2,4-Trimethylbenzene	EPA TO-15
1,2-Dibromoethane	EPA TO-15
1,2-Dichlorobenzene	EPA TO-15
1,2-Dichloroethane	EPA TO-15
1,2-Dichloropropane	EPA TO-15
1,3,5-Trimethylbenzene	EPA TO-15
1,3-Butadiene	EPA TO-15
1,3-Dichlorobenzene	EPA TO-15
1,4-Dichlorobenzene	EPA TO-15
1,4-Dioxane	EPA TO-15
2-Butanone	EPA TO-15
2-Hexanone	EPA TO-15
2-Propanol	EPA TO-15
4-Methyl-2-pentanone	EPA TO-15
Acetone	EPA TO-15
Benzene	EPA TO-15
Benzyl chloride	EPA TO-15
Bromodichloromethane	EPA TO-15
Bromoform	EPA TO-15
Bromomethane	EPA TO-15
Carbon disulfide	EPA TO-15
Carbon tetrachloride	EPA TO-15
Chlorobenzene	EPA TO-15
Chlorodibromomethane	EPA TO-15
Chloroethane	EPA TO-15
Chloroform	EPA TO-15
Chloromethane	EPA TO-15
cis-1,2-Dichloroethene	EPA TO-15
cis-1,3-dichloropropene	EPA TO-15
Cyclohexane	EPA TO-15
Dichlorodifluoromethane	EPA TO-15
Ethanol	EPA TO-15
Ethyl acetate	EPA TO-15
Ethylbenzene	EPA TO-15
Heptane	EPA TO-15
Hexachlorobutadiene	EPA TO-15
m,p-Xylene	EPA TO-15
Methylene chloride	EPA TO-15
n-Hexane	EPA TO-15
o-Xylene	EPA TO-15
Propylene	EPA TO-15
Styrene	EPA TO-15
tert-Butyl Methyl Ether	EPA TO-15
Tetrachloroethene	EPA TO-15
Tetrahydrofuran	EPA TO-15

Analyte	Air
Toluene	EPA TO-15
trans-1,3-dichloropropene	EPA TO-15
Trichloroethene	EPA TO-15
Trichlorofluoromethane	EPA TO-15
Vinyl acetate	EPA TO-15
Vinyl chloride	EPA TO-15
Xylenes, Total	EPA TO-15
PCBs as Aroclors	
Aroclor 1016	EPA TO-4/EPA TO-10
Aroclor 1221	EPA TO-4/EPA TO-10
Aroclor 1232	EPA TO-4/EPA TO-10
Aroclor 1242	EPA TO-4/EPA TO-10
Aroclor 1248	EPA TO-4/EPA TO-10
Aroclor 1254	EPA TO-4/EPA TO-10
Aroclor 1260	EPA TO-4/EPA TO-10
Total PCBs	EPA TO-4/EPA TO-10
Pesticides	
4,4′-DDD	EPA TO-4/EPA TO-10
4,4′-DDE	EPA TO-4/EPA TO-10
4,4′-DDT	EPA TO-4/EPA TO-10
Aldrin	EPA TO-4/EPA TO-10
alpha-BHC	EPA TO-4/EPA TO-10
beta-BHC	EPA TO-4/EPA TO-10
gamma-BHC	EPA TO-4/EPA TO-10
Chlordane, total	EPA TO-4/EPA TO-10
Dieldrin	EPA TO-4/EPA TO-10
Endosulfan I	EPA TO-4/EPA TO-10
Endosulfan II	EPA TO-4/EPA TO-10
Endosulfan sulfate	EPA TO-4/EPA TO-10
Endrin	EPA TO-4/EPA TO-10
Endrin aldehyde	EPA TO-4/EPA TO-10
Endrin ketone	EPA TO-4/EPA TO-10
Heptachlor	EPA TO-4/EPA TO-10
Heptachlor epoxide	EPA TO-4/EPA TO-10
Hexachlorobenzene	EPA TO-4/EPA TO-10
Methoxychlor	EPA TO-4/EPA TO-10
Toxaphene	EPA TO-4/EPA TO-10
4,4′-DDD	EPA TO-4/EPA TO-10

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STANDARD OPERATING PROCEDURE

ANALYSIS OF EXPLOSIVES BY HPLC

Analyte:	**Explosives**
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SOP#: 8330B_122910_R2

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1.0 Scope and Application:

1.1 Introduction

RTI Laboratories, Inc. has prepared this document to detail the Standard Operating Procedure (SOP) for the analysis of explosives in aqueous and solid samples. Compounds applicable to the method are listed in Table 3.

A detailed description of the instrumentation, calibration, run parameters and quality control procedures is included in this SOP. For definition of terms not specifically defined in this document refer to RTI QAP Section 16.

1.2 Summary of Method

1.2.1 To determine content of various explosives, an extract is injected into an HPLC system and separated on a determinative column. The separated components are analyzed via UV detection. Compounds are identified by comparison of the peak retention time (RT) to the RT standards. Quantification is performed by comparison of the compound response to an established calibration curve

2.0 Safety Precautions

2.1 Waste materials submitted for analyses may contain hazardous components. Uncharacterized waste samples should be handled in a manner that minimizes exposure and personal contact.

2.2 Chemicals used should be regarded as a potential health risk. Sample preparation and analysis is performed in a manner designed to minimize exposure using routine good laboratory practices.

2.3 Acetonitrile may be fatal if swallowed, inhaled or absorbed through the skin. Affects the cardiovascular system, central nervous system, liver and kidneys. Flammable liquid and vapor. May cause irritation to skin, eyes and respiratory tract.

3.0 Sample Requirements and Sample Handling Procedures

3.1 Samples are received in accordance with RTI Laboratories, Inc. Standard Operating Procedure for Sample Receipt and Custody (SRC001-A). Appropriate U. S. Environmental Protection Agency (EPA) sample handling procedures and sample preservation recommendations are followed.

3.1.1 Aqueous samples are collected in clean 1L amber bottles and maintained on ice at 4 degrees C following collection. Holding time is 7 days from the time of collection.

3.1.2 Soil, sludge and solid samples are collected in pre cleaned wide mouth glass jars and stored at 4 degree C. Holding time is 14 days from the time of collection.

3.1.3 Sample volume minimum requirements: 800 mL, aqueous – 40 g, solids.

3.1.4 All samples and sample extracts are stored at 4 degrees C in the dark.

3.1.5 Extracts have a holding time of 40 days from preparation.

4.0 MDL, Linear Range, Accuracy and Precision

4.1 The method detection limit (MDL) is statistically defined at the 99% confidence level according to 40 CFR Part 136 App. B. Seven replicates containing all of the analytes of interest at a concentration level of 1-5 times the estimated D.L. are analyzed and the standard deviation is calculated. The Student's T Value for the 7 replicates (3.143) is multiplied by the standard deviation of the analyte to calculate the MDL. MDLs are updated on major instrument changes and are kept on file in the Laboratory. MDLs and reporting limits are incorporated into the applicable test code in the Omega LIMS.

4.2 The LOD (limit of detection) is determined by spiking reagent water at 1-4 times the MDL and prepared using the same procedure as samples. Analytes must be present at levels 3 times or greater than the blank response (greater than 3 times the signal to noise ratio). The concentration used is the LOD for that analyte. LOD determinations must be performed quarterly.

4.3 The LOQ (limit of quantification) is determined by spiking reagent water at the reporting limit (RL/CRQL) and prepared in the same manner as samples. Analyte recovery must be within 20% of the expected concentration. The concentration used and successfully recovered is the LOQ for that analyte. LOQ determinations must be performed quarterly.

4.4 Initially accuracy and precision at the LOQ is determined by spiking 4 aliquots of reagent water at the reporting limit (RL/CRQL) and prepared using the same procedure used for samples. The average recovery must be within 20% of the expected value and the %RSD must be less than 15%.

4.5 LOD/LOQ determinations that do not meet the specifications above require repeat analysis, adjustment to the spiking levels and/or reporting limits, repeating the MDL determination at adjusted concentrations if required and repeat LOD/LOQ determinations.

4.6 The accuracy and precision for this method are determined by analyzing four laboratory control samples (LCS). The average percent recovery, standard deviation, and the relative standard deviation are calculated for each analyte. Quality control limits, mean recovery values and RPD results are incorporated in the Omega LIMS.

5.0 Interferences

5.1 Tetryl decomposes rapidly in water/methanol solutions and with heat.

5.2 Interferences can arise from carry over due to high sample concentrations or contamination from reagents and/or glassware. Blanks are analyzed to ensure system cleanliness in both instances. All glassware must be scrupulously cleaned before use. Glassware-cleaning procedures are specified in the QAP. Glassware should be heated in a muffle furnace at 400 degrees C for 15 to 30 minutes, or solvent rinsed prior to use. High purity solvents are used for preparation and analysis.

6.0 Apparatus and Materials

6.1 HPLC system (LC-5): Agilent 1100 Series Degasser G1322A, Agilent 1100 Series QauntPump G1311A, Agilent 1100 Series ALS G1313A, Agilent 1100 Series Column Compartment G1316A, Agilent 1100 Series DAD G1315A, Chemstation for LC 3D Rev.B.01.03, Windows XP Professional and Omega LIMS.

6.2 Volumetric Flasks, 5mL; 10mL; 25mL; and 1 Liter – Class A.

6.3 Primary column: Dionex Acclaim E1 Explosives Column (part #064305) with guard cartridge.

6.4 Secondary column: Dionex Acclaim E2 Explosives Column (part # 064309) with guard cartridge.

6.5 Balance capable of weight +/-0.0001g

6.6 Vortex mixer

6.7 Magnetic stirrer

6.8 PTFE magnetic stir bars

6.9 Disposable 0.45µm PTFE cartridge filters

6.10 Pasteur piptes

6.11 2mL amber autosampler vials

6.12 11mm Teflon/Silicon aluminum crimp seal caps

6.13 20mL scintillation vials

6.14 40mL vials with PTFE-lined cap

6.15 10 mesh sieve

6.16 Graduated cylinders – 10mL, 25mL and 1L

6.17 Ultrasonic water bath.

6.18 2oz. wide-mouthed jars.

6.19 10mL disposable syringes.

6.20 Centrifuge.

6.21 10 mesh sieves.

6.22 Puck and ring grinder. - Essa

6.23 Top-loading balance.

6.24 Platform shaker

7.0 Reagents and Standards

7.1 Acetonitrile, HPLC-grade

7.2 Methanol, HPLC-grade

7.3 Organic-free reagent water

7.4 Calcium chloride, ACS Reagent grade

7.5 Ottawa sand.

7.6 LCS – Solid reference material obtained from Absolute Standards - 100 g.

7.7 5g/L Calcium chloride solution. Prepared by dissolving 5g calcium chloride in ~800mL organic-free reagent water in a 1L volumetric flask. After it dissolves, dilute to 1L with organic-free reagent water.

7.8 NaCl, either delivered in glass bottles or muffled at 400 C for an hour and stored in a glass bottle.

7.9 All standards, surrogates and spikes are stored in the dark at 4 degrees C.

7.10 Primary Standards:

7.10.1 Method 8330 Explosives Mix, 1.0mg/mL (AccuStandard: M-8330-R)
7.10.2 PETN, 1.0mg/mL (Absolute: 79250)
7.10.3 Nitroglycerine, 1.0mg/L (AccuStandard: M-8330-ADD-1-10X)

7.11 Secondary Standards:

7.11.1 Method 8330 Explosives Mix, 1.0mg/mL (Ultra Scientific: NAIM-833E)
7.11.2 PETN, 0.1mg/mL (AccuStandard: M-8330-ADD-2)
7.11.3 Nitroglycerin, 1000µg/mL (Restek: 31498)

7.12 Surrogate Standard:
7.12.1 4-Nitroaniline, (Absolute Standards: 70227)

7.13 All reagents and standards prepared must be logged in the appropriate standards/reagents log labeled with a minimum:

7.13.1 Identity of the material
7.13.2 Concentration of the solution
7.13.3 Date prepared
7.13.4 Initials of analyst preparing the solution
7.13.5 Expiration date.

8.0 Preparation of Standards and Spikes

8.1 Instrument Blank Intermediate 4-Nitroaniline (0.2µg/mL) - Dilute 2µL 4-nitroaniline (7.12.1) to 10mL with acetonitrile. Store at 4 degrees C in the dark. To make Working Instrument Blank Standard, dilute 0.5mL of Intermediate with 0.5mL $CaCl_2$ Solution (Section 7.7) .

8.2 Initial Calibration Stock Intermediate Standard – Store at 4 degrees C in the dark.

Standard	Volume added	Final volume	Concentration
Nitroglycerin (Section 7.10.3)	20µL	10mL with acetonitrile	2µg/mL
PETN (Section 7.10.2)	50µL		5.0µg/mL
8330 Mix (Section 7.10.1)	10µL		1.0µg/mL
4-Nitroaniline (Section 7.12.1)	10µL		1.0µg/mL

8.3 Initial Calibration Standards– Store at 4 degrees C in the dark.

Standard Conc	Initial Cal Stock (Section 7.7) (µL)	Acetonitrile (µL)	$CaCl_2$ Solution (Section 7.7) (µL)
0.010µg/mL	10	490	500
0.025µg/mL	25	475	500
0.050µg/mL	50	450	500
0.100µg/mL	100	400	500
0.250µg/mL	250	250	500
0.500µg/mL	500	0	500

8.4 Initial Calibration Verification/Continuing Calibration Verification Intermediate Standard – Store at 4 degrees C in the dark.

Standard	Volume added	Final Volume	Concentration
Nitroglycerin (Section 7.11.3)	20µL	10mL with acetonitrile	2.0µg/mL
PETN (Section 7.11.2)	200µL		2.0µg/mL
8330 Mix (Section 7.11.1)	10µL		1.0µg/mL
4-Nitroaniline (Section 7.12.1)	10µL		1.0µg/mL

8.5 Initial Calibration Verification/Continuing Calibration Verification Working Standard-ICV/CCV standards are prepared fresh before use.

Standard Concentration	ICV/CCV Intermediate (µL)	Acetonitrile (µL)	$CaCl_2$ Solution (Section 7.7) (µL)
0.2-0.4 µg/mL	200	300	500

8.6 Matrix Spike Solution for Aqueous Samples (use 1.0mL/sample) – Store at 4 degrees C in the dark.

Standard	Volume added	Final Volume	Concentration
Nitroglycerin (7.11.3)	200µL	100mL with acetonitrile	2.0µg/mL
PETN (7.10.2)	200µL		2.0µg/mL
8330 Mix (7.11.1)	100µL		1.0µg/mL

8.7 Matrix Spike Solution for Solid Samples (use 1.0mL/sample) – Store at 4 degrees C in the dark.

Standard	Volume added	Final Volume	Concentration
Nitroglycerin (7.11.3)	200µL	25mL with acetonitrile	8.0µg/mL
PETN (7.10.2)	200µL		8.0µg/mL
8330 Mix (7.11.1)	100µL		4.0µg/mL

8.8 Surrogate Spiking Solution for Aqueous Samples (1.0µg/mL).

8.6.1 Dilute 100µL 4-nitroaniline (7.12.1) to 100mL with acetonitrile. Use 1.0mL per sample. Store at 4 degrees C in the dark.

8.9 Surrogate Spiking Solution for Solid Samples (4.0µg/mL).

8.7.1 Dilute 400µL 4-nitroaniline (7.12.1) to 100mL with acetonitrile. Use 1.0mL per sample.

8.10 The correlation coefficient of the calibration curve (at least 5 points) must be >0.995 for each compound to continue with the analysis of samples. If this criterion is not met the calibration standards must be re-analyzed or new standards prepared and analyzed until an acceptable cc is obtained.

8.11 Initial calibration verification standard must be run immediately after calibration. The standard is prepared from a different source than the calibration standards at a concentration corresponding to the mid-point of the curve. The ICV standard must be within +/-20% of the expected concentration.

8.12 Continuing calibration verification standards are analyzed at the mid-point of the calibration at the beginning of each analytical sequence, after every 10 samples and at the end of the analytical sequence. The measured concentration of each compound in the standard must be within +/-20% of the expected value.

9.0 Sample Preparation

9.1 See appropriate preparatory SOP for SPE extraction of aqueous samples.

9.2 Optional procedure - Aqueous extraction using the “salting out” method: for use only on approval by the Laboratory Manager, Director or QA Director

9.2.1 Add 251.3g sodium chloride to a 1L volumetric flask.

9.2.2 Measure 770mL of sample using a 1L graduated cylinder and transfer to the 1L volumetric flask.

9.2.3 Add a magnetic stir bar to the flask and mix the contents at maximum speed on a magnetic stirrer until the sodium chloride is completely dissolved.

9.2.4 Add appropriate matrix and surrogate spikes.

9.2.5 Add 164mL acetonitrile while the solution is being stirred and stir for an additional 15 minutes.

9.2.6 Turn off the stirrer and allow the phases to separate for 10 minutes.

9.2.7 Remove the (upper) acetonitrile layer (should be ~8mL) with a pipet and transfer to a 100mL volumetric flask.

9.2.8 Add an additional 10mL acetonitrile to the sample in the 1L volumetric flask.

9.2.9 Stir for an additional 15 minutes, allow to stand for 10 minutes.

9.2.10 Collect the acetonitrile layer and combine with the previous extract in the 100mL flask.

9.2.11 Add 84 mL of the saturated sodium chloride solution to the 100mL flask.

9.2.12 Add a magnetic stir bar and stir the solution on a magnetic stirrer for 15 minutes.

9.2.13 Allow to stand for 10 minutes and carefully transfer the acetonitrile layer to a 10 mL graduated cylinder. Minimize the transfer of the aqueous layer as much as possible.

9.2.14 Add an additional 1.0 mL acetonitrile to the 100mL flask. Stir for 15 minutes, allow to stand for 10 minutes and transfer the acetonitrile to the 10 mL graduated cylinder.

9.2.15 Record the final volume of the extract to the nearest 0.1 mL. Dilute the extract with this volume of organic-free reagent water.

9.3 Preparation of solid samples – **Prior to processing samples the grinding procedure must be evaluated to ensure that particle size is being reduced to <75um by passing representative portions of a ground sample through a 200 mesh sieve.**

9.3.1 Place entire solid sample on a tray, spread and air dry at room temperature (<25 degrees C). Do not expose the samples to direct sunlight.

9.3.1.1 Allow samples to dry 1-3 days depending on matrix – sand samples will dry in 1 day while clay samples will take up to 3 days to dry.

9.3.1.2 Record date time and ambient temperature daily while samples are drying.

9.3.1.3 When sample appears dry place tray on scale and record weight.

9.3.1.4 Re-weigh samples after 8 hours. If weight change is less than 4% samples are considered at constant weight.

9.3.1.5 If weight change exceeds 4% allow sample to dry overnight and re-weigh.

9.3.1.6 Repeat steps 9.3.1.4 and 9.3.1.5 until constant weight is obtained (<4% change).

9.3.1.7 Dried samples can be stored at room temperature (<25 degrees C).

9.3.2 The entire dried sample less large pebbles, rocks and sticks must be sieved through a 10-mesh sieve. Agglomerates (especially clay) must be broken up with a gloved hand or forced through the sieve by pressing the material on the sieve with a gloved hand. Vegetation is physically shredded while sieving.

9.3.3 Pulverize the entire sieved sample in quantities of 200 – 500g for 60 seconds in the ring puck mill (Sec. 6.21).

NOTE: For NC based propellant based residues 5 60 second grinding intervals are required with 2 minute cool down periods between grind cycles.

9.3.4 After each sample, process a grinding blank (Ottawa sand) and prepare in the same manner as samples.

9.3.5 Process a LCS with each batch of samples through the entire grinding and sub-sampling steps.

9.3.6 Spread the entire sample out onto a clean pan so that it is only 1-2cm thick. Randomly chose 30 increments from the entire depth to obtain a 10 g sub sample. For each batch a sample that is expected to contain the highest concentration of analytes is prepare in triplicate by sub sampling three 10 g portions of the ground material.

9.3.7 Place the 10g sample into a pre-cleaned 2oz. wide-mouthed jar.

9.3.8 Composite the individual grinding blanks and remove a 10g aliquot.

9.3.9 Add appropriate matrix and surrogate spikes.

9.3.10 Add appropriate volume of acetonitrile to produce a final volume of 20mL, cap with a PTFE-lined cap, vortex-swirl it for one minute.

9.3.11 Place sample in a on a platform shaker for 18 hours.

9.3.12 After the sample has extracted, allow to settle for 30 minutes.

9.3.13 Using a 10mL disposable syringe, remove 8.0mL of the supernatant liquid.

9.3.14 Attach a 0.45µm syringe filter to the syringe. Pass the extract through the filter, discarding the first milliliter.

9.3.15 Collect the remaining extract in a 8mL amber vial and cap with a Teflon-lined cap.

9.3.16 Prior to analysis all sample and QC extracts are diluted 1:1 by adding 0.5mL of $CaCl_2$ Solution (Section 7.7) to 0.5mL extract in a 2mL amber auto sampler vials.

10.0 Diagram/Table

10.1 Reserved.

11.0 Analytical Procedure

11.1 Method, run, and integration parameters are stored in the respective instrumentation according to manufacturers procedures.

11.2 A new sample list is created for each batch of samples.

11.3 Data interpretation, qualitative identification is made when sample peak falls within the established RT window. Qualitative identifications must meet the method criteria before positive identification can be realized. These identifications are drawn from USEPA SW-846 Method 8000 – eluting within 0.05min of RT of the standard compound.

11.4 All compound identification must be confirmed by the results for the second column. The compound must be within the RT window on both compounds for positive identification.

11.5 Sample results are reported from the primary analytical column unless the RPD result from values obtained on each column exceeds 40% in the absence of overlapping peaks causing an erroneously high result on one column. In these instances the higher result is reported and the disparity is note in the comments field in the LIMS analytical sequence table for inclusion on the report case narrative.

11.6 A typical analytical sequence should proceed as below.

11.6.1 ICB
11.6.2 Initial calibration *
11.6.3 CCV (±20%)or ICV (±30%)
11.6.4 CRQL
11.6.5 LCS
11.6.6 Method Blank
11.6.7 10 samples
11.6.8 CRQL
11.6.9 CCV
11.6.10 10 samples
11.6.11 MS and MSD
11.6.12 Reagent Blank (CCB)
11.6.13 CRQL
11.6.14 CCV

*NOTE: Initial calibration is required on method initiation and subsequently on failure of the CCV acceptance criteria.

11.7 Set instrument parameters according to table 1 below.

TABLE 1
Liquid Chromatograph Parameters Primary Column

Typical LC-5 Parameters:	**Settings:**
Flow Rate(Injection Loop)	1.0 ml/min(100 µl)
UV wavelength	254 nm and 210 nm, Bw 4, peak width >0.05 min (1s), Slit width 4nm
Isocratic 39/61 Methanol/Water @ 34°C	Primary Column: Acclaim Explosives E1 (section6.3)

TABLE 2
Liquid Chromatograph Parameters Confirmation Column

Typical LC-5 Parameters:	**Settings:**
Flow Rate(Injection Loop)	1.0 ml/min(100 μl)
UV wavelength	254 nm and 210 nm, Bw 4, peak width >0.05 min (1s), Slit width 4nm
Isocratic 48/52 Methanol/Water @ 30°C	Secondary Column: Acclaim Explosives E2 (section6.4)

11.8 Compound identification and quantification

118.1 Compound identification is based on the retention time (RT) of the eluting peak in comparison to calibration standard.

11.8.2 Initial identification is a compound that elutes within 0.05 min. of the RT of the standard compound. The 0.05 criteria is programmed into the data system method.

11.8.3 All compound identification must be confirmed by the results for the second column. The compound must be within the RT window on both compounds for positive identification

11.8.4 Co-eluting compounds must be resolved on one of the columns.

11.8.5 Analyst experience in evaluating chromatographic data and identifying compounds in the presence of interfering components is important in final compound identification.

11.8.6 Identified compounds are quantified from the linear regression curve generated by the data system during initial calibration.

11.8.7 Sample results are reported from the primary analytical column (Sec. 6.4) unless the RPD result from values obtained on each column exceeds 40% in the absence of overlapping peaks causing an erroneously high result on one column. In these instances the higher result is reported and the disparity is note in the comments field in the LIMS analytical sequence table for inclusion on the report case narrative.

11.8.8 Compounds exhibiting concentrations above the upper calibration level are diluted into the calibration range. If insufficient sample is available for dilution (i.e. both water sample vials already used) the concentration is flagged as estimated (“E”).

11.8.9 Compound concentrations that are below the laboratory reporting limit or lowest calibration point but positively identified above the MDL are flagged as estimated ("J").

11.9 Manual integration guidelines and procedures

11.9.2 Situation may arise whereby the quantification provided by the data system is inappropriate. This can occur due to co-elution, baseline noise or matrix interference.

11.9.3 When manual integration of a compound is necessary the following guidelines must be followed.

11.9.3.1 Manual quantification is performed by integrating the area of the peak for the compound.

11.9.3.2 The integration will only include the area attributable to the compound of interest.

11.9.3.3 The area integrated shall not include baseline background noise.

11.9.3.4 The area integrated shall not extend beyond the point where the sides of the peak intersect with the baseline.

11.9.3.5 Manual integration must not be used solely to meet quality control criteria.

11.9.3.6 Manual integration must not be used as a substitute for corrective action on the GC system.

11.9.3 Instances of manual integration are flagged with a "U" by the data system. This is sufficient for routine integrations in obvious cases of peak interference and when not required to be reported as part of the contracted laboratory report. Other cases of manual integrations require review and approval by the Laboratory Manager or QA Director and are documented in the corresponding instrument Excel file and in the LIMS analytical sequence sample comments (when necessary).

12.0 Details of Calibration and Calculations

12.1 Final results are calculated as specified in section 14.

12.2 The CCV must be analyzed at the frequency specified in Section 13 and the concentration must be within 20% of the known value for confirmation of instrument calibration.

12.3 Linear Regression: y = ax + b

Where: y = Instrument response (peak area)
a = Slope of the line
x = Concentration of the calibration standard
b = The intercept

12.4 % RSD

Average Rf = (Rf1+Rf2+Rf3+Rf4+Rf5)/5

Std. Dev. = SQRT [(sumx2 - sum(x)2/n)/(n-1)]

%RSD = Std. Dev./Average Rf x 100

12.5 Percent Difference

$$\% \text{ Diff} = \frac{Ce - Cf}{Ce} \times 100$$

Where: Ce = Expected concentration
Cf = Concentration found

12.6 Relative Percent Difference (RPD)

RPD = (| R1 – R2 | / ((R1 + R2)/2)) * 100

Where: R1 = First result, R2 = Second result

13.0 Quality Assurance/Quality Control (QA/QC) Requirements

13.1 Aqueous Samples - Prepare a method blank for each batch of samples using DI water.

13.1.1 Acceptance Criteria: **< ½ RL**

13.1.2 Corrective Action: Determine the source and eliminate (see interferences). Re-analyze samples as necessary.

13.2 Aqueous Samples - Prepare a laboratory control sample (LCS) and LCS duplicate (LCSD) for each batch of twenty or less samples by adding 1.0 ml of the Matrix Spiking Solution to 1L of DI water in a 1L amber bottle for each.

13.2.1 Acceptance Criteria: **QSM 4.2 percent recovery limits.**

13.2.2 Corrective Action: For results outside of acceptance limits determine source of the problem. Re-analyze LCS and samples if sufficient volume is supplied. Flag and narrate data if re-analysis is not possible.

13.3 Aqueous Samples - Prepare a matrix spike (MS) and matrix spike duplicate (MSD) for each batch of twenty or less samples by adding 1.0 ml of the Matrix Spiking Solution to the QC sample bottle when sufficient sample volume is supplied.

13.3.1 Acceptance Criteria: **Percent recovery acceptance ranges are set to LCS limits.**

13.3.2 Corrective Action: For results outside of lab established control limits attempt to determine source of the problem (matrix interferences/poor injection/instrument problems). Re-analyze and/or flag data.

13.4 Aqueous Samples - Duplicate Sample (DUP) – Prepared if sufficient volume is supplied with each batch of samples. Not required if MSD is prepared.

13.4.1 Acceptance Criteria (RPD) **<20 %** or within laboratory established statistical control limits.

13.4.2 Corrective Action: Evaluate sample homogeneity and flag data if necessary.

13.5 Soil Samples – A grinding blank is processed through the grinding and sub-sampling steps for each batch and after each sample using clean Ottawa sand (Sec. 7.5). Batch grinding blanks prepared for each sample are composited and analyzed as the batch method blank.

13.5.1 Acceptance Criteria: **< ½ RL**

13.5.2 Corrective Action: If the acceptance criteria is exceeded all samples in the batch are flagged with a B qualifier..

13.6 Soil Samples -A LCS from the standard reference material (Sec. 7.6) is processed through the entire grinding and sub-sampling procedure for each batch of samples.

13.6.1 Acceptance Criteria: **Within Calculated Control Limits**

13.6.2 Corrective Action: Investigate and correct problem and flag data. Repeat instrument analysis if appropriate.

13.7 Soil Samples - A MS and MSD is prepared by spiking a sample post grinding for each batch of samples.

13.7.1 Acceptance Criteria: **Within LCS Limits, RPD <20%**

13.7.2 Corrective Action: Evaluate, investigate and flag data. Repeat instrument analysis if appropriate.

13.8 Soil Samples – Sample Triplicate: From a sample expected to contain the highest concentrations of analytes three 10g aliquots are taken from the ground sample and analyzed individually.

13.8.1 Acceptance Criteria: **%RSD <20% for results >RL.**

13.8.2 Corrective Action: Investigate the grinding process to ensure sufficient sample particle size reduction is occurring. Flag and Narrate data.

13.9 Retention Time Windows

13.9.1 Retention time windows will be established and maintained for all components.

13.9.2 RT windows are determined by analyzing three control samples over a 72-hour time frame.

13.9.3 The average and standard deviation of the three determinations are calculated and the window is defined as the Mean (average) +/- 3 times the standard deviation.

13.9.4 The retention time windows are re-calculated whenever a new column is installed.

13.9.5 The GC data system does not allow for compound specific RT windows. The widest window (0.05 min.) is programmed into the applicable method and applied to all compounds.

13.10 Surrogate Control Limits

13.10.1 For each sample matrix the first 30 surrogate recoveries are used to establish control limits based on the Mean recovery +/- 3 times the standard deviation. These limits are updated annually or sooner if the control chart reveals a bias trend.

13.10.2 For samples and QC samples in which the surrogate recovery falls outside the established control limits, the following is required.

13.10.3 Check calculations for errors.

13.10.4 Check instrument performance

13.10.5 Re-analyze extract- if acceptable no other actions are required.

13.10.6 Re-extract and re-analyze the samples or flag the data as estimated concentration if sample cannot be re-analyzed or if matrix interferences are obvious and cannot be cleaned up using the methods defined in the appropriate cleanup SOP's.

14.0 Data Reporting Requirements

14.1 Sample results are reported as µg/L (aqueous samples) and µg/kg (solid samples).

14.2 Sample results are reported as µg/L for water and µg/kg for soil as dry weight.

µg/kg dry wt. = µg/kg wet wt.*100/percent solids

14.3 Raw instruments results are entered directly into the Omega LIMS system using excel spreadsheets, direct instrument interface or manually. All calculations to derive final result (including dry weight conversions) are performed automatically by the LIMS. Sample preparation information and percent moisture results are entered into the appropriate section of the LIMS prior to instrument data and are automatically factored into the final results.

14.4 Confirm that there are no QC flags or qualifiers in this sequence. If present, investigate and repeat or reanalyze as necessary. See section 9.2 of the QAP for more detail on qualifiers.

15.0 Preventative Maintenance and Routine Cleaning

15.1 At the beginning of each instrument start up monitor the system for large fluctuations in pressure. Pressure should be 900 – 1600 psi. The system is checked for leaks if low pressures are observed. High pressure situations require back flushing the system with methanol for 1 hour.

15.2 All maintenance is recorded in the Omega LIMS for the applicable instrument.

16.0 Waste Management and Pollution Prevention

16.1 Pollution Prevention

16.1.1 Reagents are purchased and quantities used to reflect anticipated usage and minimize disposal of expired or unused chemicals.

16.1.2 Chemicals are handled in a manner that minimizes the potential for release or spill of the material.

16.2 Waste Management

16.2.1 Acidic materials (pH<2) are treated as hazardous waste and placed in the appropriate waste drum for disposal.

16.2.3 Disposal of materials is addressed in the laboratory QAP (Section 5.6).

17.0 References

17.1 EPA Test Methods for Evaluating Solid Waste. Laboratory Manual Physical/Chemical Methods, Nov 1986, Revision 2 December 1996. Method 8330A, 8330B.

17.2 RTI Laboratories, Inc. Quality Assurance Plan.

17.3 RTI Laboratories, Inc. SOP SRC001-A, Sample Receipt and Custody.

17.4 RTI Laboratories, Inc. Chemical Hygiene Plan.

17.5 RTI Laboratories, Inc. Employee Handbook.

18.0 Target Analyte List

Analyte	Retention Time (min.)Primary Column E1	Retention Time (min.) Secondary Column E2	Quantification Range (ug/L)
HMX	5.52	7.39	0.01-2.5
4-Nitroaniline	8.50	9.36	0.01-1.0
RDX	9.16	11.81	0.01-2.5
1,3,5-Trinitrobenzene	14.22	12.51	0.01-1.0
1,3-Dinotrobenzene	18.82	15.61	0.01-1.0
Nitrobenzene	21.56	17.04	0.01-1.0
Nitroglycerine	23.60	22.98	0.01-1.0
Tetryl	24.76	23.02	0.02-1.0
2,4,6-Trinitrobenzene	27.37	21.64	0.01-1.0
4-Amino-2,6-dinitrotoluene	32.49	36.66	0.01-1.0
4-Amino-4,6-dinitrotoluene	34.00	38.46	0.01-1.0
2,6-Dinitrotoluene	35.00	25.48	0.01-1.0
2,4-Dinitrotoluene	35.77	26.5	0.01-1.0
2-Nitrotoluene	42.53	29.33	0.01-1.0
3-Nitrotoluene	46.44	34.45	0.01-1.0
4-Nitrotoluene	49.76	32.03	0.01-1.0
PETN	51.95	51.06	0.05-1.0

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

FIELD TEST KIT FOR TNT AND RDX

SOP 17

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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MODERNWATER

Ensys™ RDX Soil Test Kit

7085000

Important Notice

The range of the test is between 1 and 30 ppm RDX/HMX. The relative standard deviation is 10%. The least detectable concentration is 0.8 ppm (RDX).

Each MWI EnSys® RDX Soil Test System contains enough material to perform twenty complete tests.

The RDX Soil Test is divided into four phases. The instructions and notes should be reviewed before proceeding with the test.

The test system should be used only under the supervision of a technically qualified individual who is capable of understanding any potential health and environmental risks of this product as identified in the product literature. The components must only be used for the analysis of soil samples for the presence of RDX/HMX. After use, the kits must be disposed of in accordance with applicable federal and local regulations.

Test Principles

Controls, Samples, and color-change reagents are added to cuvettes. The concentration of **RDX** in an unknown **Sample** is determined by evaluating how much color develops.

Precautions

- Recovery of the RDX from some soil samples is most consistent when the soil samples are air dried prior to extraction and testing.
- Do **NOT** use reagents or components from one Test System with reagents or components from another Test System.
- Do **NOT** use the Test System after its expiration date.
- The sample **MUST** be analyzed within 60 minutes of the color incubation step.
- Wear protective gloves and eye wear.
- Store kit at room temperature (less than 80° F) and out of direct sunlight.
- If acetone comes into contact with eyes, wash thoroughly with cold water and seek immediate medical attention.
- Operate test at temperatures greater than 4°C/40°F and less than 39°C/100°F.
- It is recommended that a control be run each day. See p. 6 for instructions.
- **Nitrates and Nitrites cause false positive results with the RDX test. Therefore, it is necessary to evaluate the soil for these compounds prior to sample analysis. See p. 7 for instructions.**

- MWI's EnSys® RDX Soil Test System is designed for use with either of Hach models DR/2000, DR/2010, or the newer DR/2800 spectrophotometers. Protocols for use of these instruments are provided in this User's Guide. Ensure the instrument protocol followed is appropriate for the instrument being used.
- The Hach DR/2000 is designed to turn off after a few minutes of inactivity. Press the "READ/ENTER" key every few minutes to prevent DR/2000 from turning off. If DR/2000 turns off, use Reference cuvette to rezero. Newer Hach models have an override "constant on" feature that allows the machine to run indefinitely. Refer to the Instrument Operation: Spectrophotometer Setup section of the HACH DR/2000, DR/2010, and DR/2800 User's Manuals.
- **If you are using the RDX soil test kit in conjunction with the TNT soil test kit, the sample extract generated with the TNT test may be used for the RDX test. (Skip steps 2a-3e of the RDX test if this scenario applies).**

Materials Provided

- 1 Ampoule Cracker
- 60 Syringe Filters
- 20 Wooden Spatulas
- 20 10 cc Syringes
- 20 5 cc Syringes
- 20 50 mL Reaction Vials with H_2O
- 20 Extraction Jars
- 1 Bulb Pipette
- 1 50 mL Conical Tube
- 20 13 mL Zinc Tubes in foil pouches
- 20 13 mL Tubes
- 20 Acetic Acid Bulb Pipettes
- 1 RDX Control Ampoule
- 20 30 cc Syringes
- 20 Weigh Boats
- 20 NitriVer Pillows

Materials Required but not Supplied

- 2 Matched Hach Cuvettes
- 2 Cuvette Stopper Plugs
- Paper Towels
- Disposable gloves
- Acetone
- Calculator
- Scissors
- Waste Container
- Hach DR/2000, DR/2010, or DR/2800
- Balance

Assay Procedure

Phase I Test Preparation

(Read all instructions before proceeding with the test)

1. Clean Cuvettes

   1a. Fill 2 Hach matched cuvettes with approximately 5 mL water.
   1b. Cap each with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds. **NOTE: Stopper plugs can be found in the accessory kit.**
   1c. Empty into waste container.
   1d. Fill cuvettes with approximately 5 mL acetone.
   1e. Cap each with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds.
   1f. Empty into waste container.
   1g. Repeat acetone wash (steps 1d-1f).
   1h. Wipe outside of cuvette with paper towels. Take care to especially clean the side labeled 10 mL or 25 mL and the side opposite.

Phase II Sample Extraction and Preparation

(Read all instructions before proceeding with the test)

READ BEFORE PROCEEDING

Sample should be mixed to ensure a homogeneous sample.

2. Weigh Sample

   2a. Place an unused weigh boat on pan balance.
   2b. Press ON/MEMORY button on pan balance. Balance will beep and display 0.0.
   2c. Weigh out 10±0.1 grams of soil.
   2d. If balance turns off prior to completing weighing, use empty weigh boat to retare, then continue.

3. EXTRACT RDX

   3a. Measure 50 mL acetone in the 50 mL graduated conical tube.
   3b. Pour acetone into the extraction jar.
   3c. Using wooden spatula, transfer 10 grams of soil from weigh boat into the extraction jar.
   3d. Recap extraction jar tightly and shake vigorously for three minutes.
   3e. Allow to settle for five minutes.

Phase III Sample Analysis

(Read all instructions before proceeding with the test)

NOTE: If nitrates/nitrites are present, follow instructions in bold type, if not, ignore.

ANALYZE SAMPLE

   4a. Using the 10cc syringe slowly draw up exactly 5.5 mL of sample extract being careful to exclude air bubbles. (8-10 mL if nitrate/nitrite interferents are present)
   4b. (If nitrate/nitrite interferents are present, attach Alumina-A cartridge to syringe filter discarding single drops of filtrate into a waste container until 5 mL of extract remain. Dropwise, add the remaining 5 mL of filtrate into the 13 mL tube.) Attach the syringe filter securely to the syringe and dispense into 13 mL tube **(for samples**

only, do not filter control). Cut open tip of Acetic Acid bulb pipet and expel contents into 13 mL tube. Cap & shake. Repeat steps 4a – 4b for remaining samples.

4c. Cut open one end of a NitriVer pillow and pour it into a 50 mL Reaction Vial containing water. Prepare a vial for each sample. (Do not let the NitriVer powder/water solution stand longer than 10 minutes before adding sample.)

4d. Tap a 13 mL pre-measured zinc tube one to two times on a flat surface to ensure that the zinc is settled on the bottom. Assemble a syringe filter onto the 5 cc syringe and remove plunger. QUICKLY pour the acetic acid and sample or control solution from the 13 mL tube into the 13 mL pre-measured zinc tube and cap. Invert twice. Allow the sample to be exposed to the zinc for EXACTLY 15 seconds.

4e. While holding syringe (with filter attached) over Reaction Vial, pour the solution from the 13 mL tube into it.

4f. Replace the plunger and filter the solution into the 50 mL Reaction Vial. Cap and shake for 30 seconds. **Repeat 4d-4f for remaining samples.**

4g. Allow this reaction to incubate for 15 minutes while color develops.

4h. Proceed to Phase 4 **during** incubation.

Phase IV Interpretation

(Read all instructions before proceeding with the test)

READ BEFORE PROCEEDING

Designate a "Reference" and "Sample" cuvette.

5. SPECTROPHOTOMETER PREPARATION

5a. Choose the instructions below that correspond to the correct instrument:

5a1. Proceed to Step 5b. if using the DR/2000 or DR/2010.

5a2. Proceed to Step 5k. if using the DR/2800.

5b. Turn on the instrument.

5b1. The DR/2000 will read "SELF-TEST" followed by "Method?". Select Method "0" and press "READ/ENTER" key.

5b2. The DR/2010 will read "Self-Test V.xx", then "Enter Program #". Press the [Shift] key (do not hold) and then the [ABS/8] key. Note: Select Program # "0" may also be used to select absorbance mode on the DR/2010.

5c. Rotate the wavelength dial until the small display shows 510 nm.

5d. Fill both cuvettes with acetone to the 25 mL line.

5e. Insert "Reference" cuvette into cell holder with the side marked "25 mL" on the right.

5f1. Close light shield of the DR/2000 and press "CLEAR/ZERO" key to establish the reference. The display will read "WAIT" and then "0.000 Abs".

5f2. Close light shield of the DR/2010 and press the [ZERO] key. The display will read "Zeroing…" then "0.000 Abs".

5g. Remove the "Reference" cuvette and place the "Sample" cuvette in the cell holder.

5h. On the DR/2000 press the "READ/ENTER" key or on the DR/2010 press the [READ] key, record the absorbance on the worksheet as "$Abs_{background}$".

5i. If reading is greater than 0.002 in magnitude (+ or -), clean cuvettes and redo steps 5b – 5h.

5j. Empty acetone from "Sample" cuvette into waste container.

OR

5k. Turn on the instrument by pressing the round button in the back of the instrument. It will cycle through a "Self-Check" mode. NOTE: Be sure the cell holder compartment is closed.
5l. Touch "Main Menu" and select Single Wavelength.
5m. Choose "λ" and use the alphanumeric keypad to set the wavelength to 510 nm.
5n. Fill both cuvettes with acetone to the 10 mL or 25 mL line. (Depending on your cuvette size)
5o. Place the "Reference" cuvette into the cell holder with volume marked side facing to the left.
5p. Place the protective cover over the open cell holder compartment and press down tightly if using the 25 mL cuvette, simply slide the lid closed if using the 10 mL cuvette.
5q. Press the "ZERO" key, the display will read "Zeroing", then 0.000 Abs.
5r. Remove the "Reference" cuvette and place the "Sample" cuvette in the cell holder, press "Read" and record the reading as $Abs_{background}$ on the worksheet.
5s. If reading is greater than 0.002 in magnitude (+ or -), clean cuvettes and redo steps 5l – 5r.
5t. Empty acetone from "Sample" cuvette into waste container.

6. FILTER SAMPLE

6a. Disassemble a 30cc syringe and attach a syringe filter.
6b. After incubation, shake reacted sample vigorously and pour into barrel of 30cc syringe. Insert plunger. Press firmly and expel contents into the HACH cuvette up to the volume line (10 or 25 mL).

7. READ SAMPLE

7a. Place the "Sample" cuvette in the cell holder.
7b. Press the "READ/ENTER" or "READ" key and record the absorbance on the worksheet.
7c. Clean cuvette between samples using procedure in steps 1a – 1h.

8. INTERPRETATION OF RESULTS

8a. Subtract 0.014 value from the sample absorbance values.
8b. Divide this value by 0.0225 and record on the worksheet. This value is the RDX concentration of the sample in parts per million.

$$[RDX]\ (ppm) = \frac{Abs - 0.014}{0.0225}$$

NOTE: For sample concentrations greater than 30 ppm, the sample extract should be diluted with acetone and reanalyzed.
Remember to multiply the result by the dilution factor in order to determine the correct concentration.

Minimum Detection Levels

RDX	0.8 ppm
HMX	2.4 ppm
PETN	1.0 ppm
Nitroglycerine	8.9 ppm
Nitroguanadine	10.1 ppm
Nitrocellulose	42.2 ppm

Control (QA/QC) Check

(Read all instructions before proceeding with the test)
The RDX control is optional but it is recommended that it be run daily.
PREPARE CONTROL

1. Measure 50 mL acetone in a graduated 50 mL conical tube.
2. Pour into extraction jar.
3. Open RDX control ampoule by slipping ampoule cracker over top, and then breaking tip at scored neck.
4. Transfer entire contents of RDX control ampoule into extraction jar using empty bulb pipette.
5. Cap extraction jar and shake.

****REPEAT STEPS 4a - 7c (skipping the filtering step in step 4b as noted) on pages 3 – 5 to Analyze Control****

- Record the absorbance on the worksheet as "$Abs_{control}$".

NOTE: Absorbance must be between 0.174 and 0.274 for the test to be in specification.

- If test is not in specification, clean "Sample" cuvette, and then redo steps 4a – 7c using the remaining liquid in the extraction jar.
- If test is in specification, clean "Sample" cuvette before proceeding with samples.

****If kept tightly capped, the control can be used again for additional QC runs.**

Background – Nitrate/Nitrites Test

(Read all instructions before proceeding with the test)

- **Site representative samples must be run prior to analysis for RDX to ensure that Nitrate/Nitrite interferents (i.e., fertilizers, degraded explosives, etc.) are not present. Please call Technical Services at (800) 544-8881.**
- These interferents cause a color reaction with the test identical to RDX and will lead to false positives.
- If Nitrates/Nitrites are present, Alumina-A cartridges **MUST** be utilized (refer to step 4b). These will quickly and easily remove the interferents from the soil extract during the extra filtration steps.

READ BEFORE PROCEEDING

Sample should be mixed to ensure homogeneous sample.

1. Repeat steps 2a – 4c on pages 3 – 4.
2. Omit steps 4d – 4e (Zinc syringe is not used in testing for Nitrates/Nitrites).
3. Proceed with steps 4f – 7c
   a) Record the absorbance on the worksheet as "Abs Nitrate/Nitrite".
   b) If the absorbance is <0.05, the samples are free of Nitrates/Nitrites and the samples can be tested.
   c) If the absorbance is >0.05, then the Alumina-A cartridges must be utilized to remove Nitrate/Nitrite interferents.

On-Site Quality Control/Quality Assurance Recommendations
MWI EnSys® Test System

PLEASE READ THE FOLLOWING BEFORE PROCEEDING WITH FIELD TESTING.

Sampling

The result of your screening test is only as valid as the sample that was analyzed. Samples should be homogenized thoroughly to ensure that the 10 grams you remove for field testing is representative of the sample as a whole. All other applicable sample handling procedures should be followed as well.

Prior to Testing Samples

Carefully follow the instructions in the User's Guide included with every test kit. This is the key element in obtaining accurate results. In addition, store your unused kits at room temperature and do not use them past their expiration date (see label on each test kit).

INTERNAL TEST QC

One control is provided with each kit to provide internal test system quality control. Test runs resulting in a number that falls outside of the specified range should be repeated to ensure valid conclusions.

QA/QC

The validity of field test results can be substantially enhanced by employing a modest, but effective QA/QC plan. MWI recommends that you structure your QA/QC plan with the elements detailed below. These have been developed based on the data quality principles established by the U.S. Environmental Protection Agency.

A. Sample Documentation
   a. Location, depth
   b. Time and date of collection and field analysis

B. Field Analysis Documentation – provide raw data, calibration, any calculations, and final results of field analysis for all samples screened (including QC samples).

C. Method Calibration – this is an integral part of MWI tests; an RDX control analysis should be performed daily (see the instructions in the User's Guide).

D. Method Blank – field analyze fresh acetone.

E. Site-Specific Matrix Background Field Analysis – collect and field analyze uncontaminated samples from site matrix to document matrix effect.

F. Duplicate Sample Field Analysis – field analyze duplicate sample to document method repeatability; at least one every 20 samples should be analyzed in duplicate.

G. Confirmation of Field Analysis – provide confirmation of the quantitation of the analyte via an EPA approved method different from the field method on at least 10% of the samples; provide chain of custody and documentation such as gas chromatograms, mass spectra, etc.

H. Performance Evaluation Sample Field Analysis (optional, but strongly recommended) – field analyze performance evaluation sample daily to document method/operator performance.

I. Matrix Spike Field Analysis (optional) – field analyze matrix spike to document matrix effect on analyte measurement.

J. Nitrate/Nitrite Test – this is an integral part of the MWI EnSys® RDX Test; it is performed at least once for each site.

Ordering Information

Description	Catalog Number
RDX EnSys® Soil Test System	7085000
EnSys Explosives Rental Accessory Kit	6999700
Alumina-A Cartridge	6021200

Technical Assistance

To Place an Order or Receive Technical Assistance, please call, fax, or email MWI at:

Call toll-free **877-637-6426**
Or 302-669-6900 Phone
*77-766-3944 FAX

Validation Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot. Modern Water ("MWI") does not guarantee that the results with the RDX Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

Warranties and Liabilities

MWI warrants the Products manufactured by it will be free of defects in materials and workmanship when used in accordance with the applicable instructions for a period equal to the shorter of one year from date of shipment of the Product(s) or the expiration date marked on the Product packaging. Application protocols published by SDI are intended to be only guidelines for the Buyers of the Products. Each Buyer is expected to validate the applicability of each application protocol to their individual applications. **MWI MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

MWI's sole obligation with respect to the foregoing warranties shall be, at its option, to either replace or to refund the purchase price of the Product(s) or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies MWI promptly of any such defect. **MWI SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM ECONOMIC LOSS OR PROPERTY DAMAGES SUSTAINED BY BUYER OR ANY CUSTOMER FROM THE USE OF THE PRODUCT(S).**

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RDX Soil Test – Abbreviated Procedure

Step	Procedure
1	• Clean Cuvettes • Zero the spectrophotometer at 510 nm
2	• Add 10 g soil and 50 mL acetone to extraction jar • Shake 3 min, let settle
3	• Draw up 5.5 mL extract, filter into 13 mL tube (If NO_3/NO_2 contaminants present: 8-10 mL of extract, filtered slowly through Alumina-A cartridge) • Open bulb pipet, add Acetic Acid to 13 mL tube, mix • Add NitriVer to 50 mL Reaction Vial • Pour from 13 mL Tube into 13 mL pre-measured zinc tube • Invert 2X (15 second exposure time) • Pour into 5cc syringe with filter attached • Filter into 50 mL Reaction Vial • Shake 30 seconds • Incubate 15 minutes
4	• Read Abs at 510 • Calculate RDX concentration • [RDX] ppm = (Abs – 0.014)/0.0225

RDX SOIL TEST KIT WORKSHEET

1) $ABS_{background}$ _____ 2) $ABS_{control}$ _____ 3) $ABS_{nitrate/nitrite}$ _____

SAMPLE #	**ABSORBANCE**	**RDX Concentration, PPM** **Abs – 0.014** **0.0225**

MODERNWATER

Ensys™ TNT Soil Test Kit

7002000

Important Notice

The range of the test is between 1 and 30 ppm TNT/TNB/DNT. The relative standard deviation is 8%. The least detectable concentration is 0.7 ppm (TNT).

The test system should be used only under the supervision of a technically qualified individual who is capable of understanding any potential health and environmental risks of this product as identified in the product literature. The components must only be used for the analysis of soil samples for the presence of TNT. After use, the kits must be disposed of in accordance with applicable federal and local regulations.

Test Principles

Controls, Samples, and color-change reagents are added to cuvettes. The concentration of **TNT** in an unknown **Sample** is determined by evaluating how much color develops.

Precautions

- For some matrices, air drying the soil samples may result in better TNT recovery or more reproducible data.
- A slightly modified protocol should be used if the primary analyte of concern is DNT. Please refer to the modification outlined on page 6.
- It is recommended that a control be run each day. See page 8 for instructions.
- WMI's EnSys® TNT Soil Test System is designed for use with either of Hach models DR/2000, DR/2010, or the newer DR/2800 spectrophotometers. Protocols for use of these instruments are provided in this User's Guide. Ensure the instrument protocol followed is appropriate for the instrument being used.
- The Hach DR/2000 is designed to turn off after a few minutes of inactivity. Press the "READ/ENTER" key every few minutes to prevent DR/2000 from turning off. If DR/2000 turns off, use Reference cuvette to rezero. Newer Hach models have an override "constant on" feature that allows the machine to run indefinitely. Refer to the Instrument Operation: Spectrophotometer Setup section of the HACH DR/2000, DR/2010, and DR/2800 User's Manuals.
- **If you are using the TNT soil test kit in conjunction with the RDX soil test kit, it is important to save your sample extracts. They will be used in the RDX test. Remember to cap the extracts tightly after use.**

Materials Provided

- 1 Ampoule Cracker
- 20 Syringe Filters
- 20 Wooden Spatulas
- 20 Extraction Jars
- 1 Bulb Pipette

- 1 Developer Solution
- 1 50 mL Graduated Conical Tube
- 1 TNT Control Ampoule
- 20 30 cc Syringes
- 20 Weigh Boats

Materials Required but not Supplied

- 2 Matched Hach Cuvettes
- 2 Cuvette Stopper Plugs
- Paper Towels
- Disposable gloves
- Acetone
- Calculator
- Waste Container
- Hach DR/2000, DR/2010, or DR/2800
- Balance

Assay Procedure

1. Clean Cuvettes
   1a. Fill 2 Hach matched cuvettes with approximately 5 mL water.
   1b. Rinse each cuvette stopper plug with clean water. **NOTE: Stopper plugs can be found in the accessory kit.**
   1c. Cap each cuvette with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds.
   1d. Empty into waste container.
   1e. Fill cuvettes with approximately 5 mL acetone.
   1f. Cap each with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds.
   1g. Empty into waste container.
   1h. Repeat acetone wash (steps 1e-1g).
   1i. Wipe outside of cuvette with paper towels. Take care to especially clean the side labeled 10 mL or 25 mL and the side opposite.

READ BEFORE PROCEEDING

Designate a "Reference" and "Sample" cuvette.

2. SPECTROPHOTOMETER PREPARATION
   2a. Choose the instructions below that correspond to the correct instrument:
      2a1. Proceed to Step 2b. if using the DR/2000 or DR/2010.
      2a2. Proceed to Step 2k. if using the DR/2800.
   2b. Turn on the instrument.
      2b1. The DR/2000 will read "SELF-TEST" followed by "Method?". Select Method "0" and press "READ/ENTER" key.
      2b2. The DR/2010 will read "Self-Test V.xx", then "Enter Program #". Press the [Shift] key (do not hold) and then the [ABS/8] key. Note: Select Program # "0" may also be used to select absorbance mode on the DR/2010.

2c. Rotate the wavelength dial until the small display shows 540 nm.
2d. Fill both cuvettes with acetone to the 10 mL or 25 mL line.
2e. Insert "Reference" cuvette into cell holder with the side marked "10 mL" or "25 mL" on the right.
2f1. Close light shield of the DR/2000 and press "CLEAR/ZERO" key to establish the reference. The display will read "WAIT" and then "0.000 Abs".
2f2. Close light shield of the DR/2010 and press the [ZERO] key. The display will read "Zeroing…" then "0.000 Abs".
2g. Remove the "Reference" cuvette and place the "Sample" cuvette in the cell holder.
2h. On the DR/2000 press the "READ/ENTER" key or on the DR/2010 press the [READ] key, record the absorbance on the worksheet as "$Abs_{background}$".
2i. If reading is greater than 0.002 in magnitude (+ or -), clean cuvettes and redo steps 2b – 2h.
2j. Empty acetone from "Sample" cuvette into waste container.

OR

2k. Turn on the instrument by pressing the round button in the back of the instrument. It will cycle through a "Self-Check" mode. NOTE: Be sure the cell holder compartment is closed.
2l. Touch "Main Menu" and select Single Wavelength.
2m. Choose "λ" and use the alphanumeric keypad to set the wavelength to 540 nm.
2n. Fill both cuvettes with acetone to the 10 mL or 25 mL line. (Depending on your cuvette size)
2o. Place the "Reference" cuvette into the cell holder with volume marked side facing to the left.
2p. Place the protective cover over the open cell holder compartment and press down tightly if using the 25 mL cuvette, simply slide the lid closed if using the 10 mL cuvette.
2q. Press the "ZERO" key, the display will read "Zeroing", then 0.000 Abs.
2r. Remove the "Reference" cuvette and place the "Sample" cuvette in the cell holder, press "Read" and record the reading as $Abs_{background}$ on the worksheet.
2s. If reading is greater than 0.002 in magnitude (+ or -), clean cuvettes and redo steps 2l – 2r.
2t. Empty acetone from "Sample" cuvette into waste container.

Phase II Sample Extraction and Preparation

(Read all instructions before proceeding with the test)

READ BEFORE PROCEEDING

Sample should be mixed to ensure a homogeneous sample.

3. Weigh Sample
   3a. Place an unused weigh boat on pan balance.
   3b. Press ON/MEMORY button on pan balance. Balance will beep and display 0.0.
   3c. Weigh out 10±0.1 grams of soil.
   3d. If balance turns off prior to completing weighing, use empty weigh boat to retare, then continue.

4. EXTRACT TNT
   4a. Measure 50 mL acetone in the 50 mL graduated conical tube.
   4b. Pour acetone into the extraction jar.
   4c. Using wooden spatula, transfer 10 grams of soil from weigh boat into the extraction jar.
   4d. Recap extraction jar tightly and shake vigorously for three minutes.
   4e. Allow to settle for five minutes.

5. FILTER SAMPLE
   - 5a. Place tip of 30 cc syringe into liquid above the sediment layer in the extraction jar and draw up 25 mL of the sample.
   - 5b. Screw the syringe filter onto the end of the syringe.
   - 5c. Press the plunger firmly and dispense the sample into the "Sample" cuvette.

Phase III Sample Analysis

(Read all instructions before proceeding with the test)

6. READ SAMPLE
   - 6a. Place the "Sample" cuvette in the cell holder.
   - 6b. Press the "READ/ENTER" or "READ" key and record the absorbance on the worksheet as "$Abs_{initial}$".
   - 6c. Remove the "Sample" cuvette from the cell holder.
   - 6d. Add 1 drop Developer Solution.
   - 6e. Cap the "Sample" cuvette and shake vigorously for 3 seconds.

DNT Analysis Note:

For analysis of samples containing DNT, and/or where DNT concentration is of concern, samples must be allowed to develop for 10 minutes before reading sample absorbance. This will not affect color development for other nitroaromatics.

   - 6f. Remove the cuvette stopper and place the "Sample" cuvette in the cell holder.
   - 6g. Press the "READ/ENTER" or "READ" key and record the absorbance on the worksheet as "Abs_{sample}".
   - 6h. Clean cuvette between samples using procedure in steps 1a – 1i.

Phase IV Interpretation

(Read all instructions before proceeding with the test)

7. INTERPRETATION OF RESULTS
   - 7a. Multiply the "$Abs_{initial}$" value for each sample by 4. Enter these values on the worksheet.
   - 7b. Subtract this value from the "Abs_{sample}" values for each sample and record on the worksheet.
   - 7c. Divide the adjusted sample value by 0.0323 and record on the worksheet. This value is the TNT concentration of the sample in parts per million.

$$[TNT]\ (ppm) = \frac{Abs_{sample} - (Abs_{initial} \times 4)}{0.0323}$$

NOTE: For sample concentrations greater than 30 ppm, the sample extract should be diluted with acetone and reanalyzed.
Remember to multiply the result by the dilution factor in order to determine the correct concentration.

Control (QA/QC) Check

(*Read all instructions before proceeding with the test*)

The TNT control is optional but it is recommended that it be run daily.

PREPARE CONTROL

1. Measure 50 mL acetone in a graduated 50 mL conical tube.
2. Pour into extraction jar.
3. Open TNT control ampoule by slipping ampoule cracker over top, and then breaking tip at scored neck.
4. Transfer entire contents of TNT control ampoule into extraction jar using bulb pipette.
5. Cap extraction jar and shake vigorously for 3 seconds.

Analyze the Control

6. Place tip of 30 cc syringe in extraction jar and draw up 25 mL.
7. Attach syringe filter and dispense into "Sample" cuvette.
8. Add 1 drop of developer solution.
9. Cap the cuvette and shake vigorously for 3 seconds.
10. Remove the cuvette stopper and place in the cell holder.
11. Press "READ/ENTER" or "READ" key and record the absorbance on the worksheet as "$Abs_{control}$".

NOTE: Absorbance must be between 0.307 and 0.373 for the test to be in specification.

- If test is not in specification, clean "Sample" cuvette, and then redo steps 6 – 11 using the remaining liquid in the extraction jar.
- If test is in specification, clean "Sample" cuvette before proceeding with samples.

****If kept tightly capped, the control can be used again for additional QC runs.**

Quality Control

PLEASE READ THE FOLLOWING BEFORE PROCEEDING WITH FIELD TESTING.

System Description

Each MWI Ensys® TNT Soil Test System contains enough material to perform twenty complete tests.
The TNT Soil Test is divided into four phases. The instructions nad notes should be reviewed before proceeding with the test.

Validation Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot.

MWI does not guarantee that the results with the TNT Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

How it Works

Controls, Samples, and color-change reagents are added to cuvettes. The concentration of TNT in an unknown sample is determined by evaluating how much color is developed.

Quality Control

Standard precautions for maintaining quality control:

- Do not use reagents or components from one Test System with reagents or components from another Test System.
- Do not use the Test System after its expiration date.
- The sample must be analyzed immediately after adding the Developer Solution.
- Results may not be valid if the spectrophotometer reading for Control is outside of the range of 0.307 – 0.373.

Storage and Handling Precautions

- Wear protective gloves and eye wear.
- Store kit at room temperature and out of direct sunlight (less than 80°F).
- If acetone comes into contact with eyes, wash thoroughly with cold water and seek immediate medical attention.
- Operate test at temperatures greater than 4°C/40°F and less than 39°C/100°F.
- After use, dispose of kit components in accordance with applicable federal and local regulations.

On-Site Quality Control/Quality Assurance Recommendations
MWI EnSys® Test System

PLEASE READ THE FOLLOWING BEFORE PROCEEDING WITH FIELD TESTING.

Sampling

The result of your screening test is only as valid as the sample that was analyzed. Samples should be homogenized thoroughly to ensure that the 10 grams you remove for field testing is representative of the sample as a whole. All other applicable sample handling procedures should be followed as well.

Prior to Testing Samples

Carefully follow the instructions in the User's Guide included with every test kit. This is the key element in obtaining accurate results. In addition, store your unused kits at room temperature and do not use them past their expiration date (see label on each test kit).

INTERNAL TEST QC

One control is provided with each kit to provide internal test system quality control. Test runs resulting in a number that falls outside of the specified range should be repeated to ensure valid conclusions.

QA/QC

The validity of field test results can be substantially enhanced by employing a modest, but effective QA/QC plan. MWI recommends that you structure your QA/QC plan with the elements detailed below. These have been developed based on the data quality principles established by the U.S. Environmental Protection Agency.

A. Sample Documentation

a. Location, depth
b. Time and date of collection and field analysis

B. Field Analysis Documentation – provide raw data, calibration, any calculations, and final results of field analysis for all samples screened (including QC samples).

C. Method Calibration – this is an integral part of MWI tests; a TNT control analysis should be performed daily (see the instructions in the User's Guide).

D. Method Blank – field analyze fresh acetone.

E. Site-Specific Matrix Background Field Analysis – collect and field analyze uncontaminated samples from site matrix to document matrix effect.

F. Duplicate Sample Field Analysis – field analyze duplicate samples to document method repeatability; at least one every 20 samples should be analyzed in duplicate.

G. Confirmation of Field Analysis – provide confirmation of the quantitation of the analyte via an EPA approved method different from the field method on at least 10% of the samples; provide chain of custody and documentation such as gas chromatograms, mass spectra, etc.

H. Performance Evaluation Sample Field Analysis (optional, but strongly recommended) – field analyze performance evaluation sample daily to document method/operator performance.

I. Matrix Spike Field Analysis (optional) – field analyze matrix spike to document matrix effect on analyte measurement.

Ordering Information

Description	Catalog Number
TNT EnSys® Soil Test System	7002000
EnSys Explosives Rental Accessory Kit	6999700

Technical Assistance

To Place an Order or Receive Technical Assistance, please call, fax, or email Modern Water Inc. at:

Call toll-free **855-637-6426**
Or 302-669-6900 Phone
302-456-6782 FAX
Modernwater.com

Validation Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot.

Modern Water Inc. ("MWI") does not guarantee that the results with the TNT Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

Warranties and Liabilities

MWI warrants the Products manufactured by it will be free of defects in materials and workmanship when used in accordance with the applicable instructions for a period equal to the shorter of one year from date of shipment of the Product(s) or the expiration date marked on the Product packaging. Application protocols published by MWI are intended to be only guidelines for the Buyers of the Products. Each Buyer is expected to validate the applicability of each application protocol to their individual applications. **MWI MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

MWI's sole obligation with respect to the foregoing warranties shall be, at its option, to either replace or to refund the purchase price of the Product(s) or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies MWI promptly of any such defect. **MWI SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM ECONOMIC LOSS OR PROPERTY DAMAGES SUSTAINED BY BUYER OR ANY CUSTOMER FROM THE USE OF THE PRODUCT(S).**

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3098500.4, August 2012

TNT Soil Test – Abbreviated Procedure

Step	Procedure
1	• Clean Cuvettes • Zero the spectrophotometer at 540 nm
2	• Add 10 g soil and 50 mL acetone to extraction jar • Shake 3 min, let settle • Draw up 25 mL extract, filter into cuvette
3	• Read $Abs_{initial}$, record • Add 1 drop developer solution, shake • Read Abs_{sample}, record
4	• Multiply $Abs_{initial}$ by 4 • Subtract from Abs_{sample} • Divide by 0.0323 • [TNT] ppm = $Abs_{sample} - (Abs_{initial} x4)/0.0323$

TNT SOIL TEST KIT WORKSHEET

1) $ABS_{background}$ _____ **2) $ABS_{control}$ _____**

1	2	3	4	5	6
SAMPLE #	**$Abs_{initial}$**	**Abs_{sample}**	**$Abs_{initial}$ x4**	**Abs_{final} (Col 3 – Col 4)**	**TNT Conc (PPM) (Col 5/0.0323)**

1. TITLE PAGE

FINAL

STANDARD OPERATING PROCEDURE

FOR

WASTE SOIL CONTAINERIZATION AND DISPOSAL

SOP 18

NON-TIME CRITICAL REMOVAL ACTION

OPERABLE UNIT B-2

FORMER NAVAL AIR FACILITY
ADAK, ALASKA

USA ENVIRONMENTAL, INC.

February 2013

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2. REFERENCES

- Naval Ordnance Safety and Security (NOSSA) Instruction 8023.11B
- Munitions Constituents Quality Assurance Project Plan (MC QAPP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
DOT	Department of Transportation
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NTCRA	Non Time Critical Removal Action
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Areas
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

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ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct waste soil containerization and shipment for the soils characterized as non-hazardous / hazardous requiring removal and disposal from the former Naval Air Facility (NAF), Adak, Alaska. By their signatures, the undersigned certify that this SOP is approved for implementation at Adak and will be used to direct waste soil containerization operations during the Non-Time Critical Removal Action (NTCRA) field work.

Developed by:

19 February 2013

Manok Synakorn
Project Manager

Date

Reviewed by:

19 February 2013

James Walden
Project Quality Control Manager

Date

Validated by:

Tony Tennyson
UXO Safety Officer

Date

Approved by:

2/19/2013

Robert Crownover
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_____ _____

Rick Arsenault / Larry Mazerac Date
Senior UXO Supervisor

6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

Worker's Name	Date	Supervisor's Name	Date

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7. PROCEDURES

7.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform waste soil containerization of those soils determined by waste characterization to be removed from the site and disposed of in accordance with all State and Federal regulations. These soils may be generated and require removal as a result of the NTCRA operations within the identified Remedial Action Areas (RAAs) on the former Naval Air Facility (NAF), Adak.

7.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct of soil containerization for shipment and disposal off a site potentially contaminated with munitions constituents (MC). This SOP is not a stand-alone document and should be used together with the Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP), MC QAPP, other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

7.3 OPERATIONAL PROCEDURES

Waste soil containerization activities include the segregation of soils requiring containerization and ultimate removal from the site. Initial segregation will be by placement of suspect soils on lined stockpiles that are covered or tarped for protection. Subsequent loading into containerization will be accomplished either manually (hand shovels) or by mechanical (mini excavator) means. Soil containerization will be limited by the volume generated during operations. The volume of the soil to be removed dictates the containerization method. For soil volumes up to one cubic yard, a new 55 gallon Department of Transportation (DOT) approved drum will be utilized. Loading of the drum(s) will either be accomplished by hand or mechanical means. Upon completion of drum loading, each drum will be appropriately sealed and labeled.

If more than 20 cubic yards of soil is required to be removed, a covered roll off will be utilized as the waste container. Accumulation of waste soils may be accomplished by drum filling and movement of drums to a common area (location to be determined in the field) for final containerization and staging prior to securing, and ultimate removal and disposal off Adak Island.

Containerization requires careful coordination and handling to ensure that the waste soils are properly containerized, sealed, and packed for transport to the disposal facility. It is also important that containerization is in accordance with DOT hazardous materials for transit. Coordination with the USA disposal contractor representative (AGVIQ, LLC.) is conducted in advance to ensure a hazardous material qualified transport is available, and to ensure the shipment is properly declared for transport on a vessel. Prior to shipment from the site each load will be manifested under Government authorized signature for transported under said manifest that remains with the shipment until disposal as documentation of the transit and disposition of the material.

Typical Procedures

Before containerization, all soil required for the container will be identified. Field documentation will be taken as to the origin of the soils date and time of containerization. The container will be individually labeled and cataloged in the field logbook by the loading personnel. Drum containers will be stored on pallets and staged in a secure area prior to final removal and shipment off of Adak. Labels will be

completed with all required information. The containers will be assigned individual numbers in accordance with the container identification procedures outlined in the MC QAPP. The container numbers will be used to complete the shipment and manifest tracking forms.

- Load each drum carefully and individually, do not dual load drums.
- Place soil into the container so that each container has some clearance on all sides to facilitate ease of movement once loaded.
- Do not overfill or compact soil in containers. Leave an appropriate head space to allow for thermal expansion or contraction.
- Place the container documentation forms in a sealed plastic Ziploc bag and attached to drum/ or use a common filing method, with each drum labeled with indelible marker clearly labeled on the outside of the drum. Each container is to have a discrete distinct label or name.
- Label containers with up arrows and as regulated DOT hazardous materials label the container and mark the shipping papers with information to comply with DOT requirements for shipment by sea/air (labeling of shipping papers for DOT hazardous materials shipments must be done by a DOT hazardous materials trained person).

The soil containerization Lead will notify the transport/disposal contractor of approximately when and how many containers are to be shipped and when they will arrive and will arrange for any necessary coordination for the containerized soils in transit. Prior to shipment, the held excavated soil will be consolidated and a soil sample of the content inside the drum is sent to a fixed laboratory for characterization using EPA Method 8330B. The laboratory characterization data will be placed in the container and prepared for offsite disposal.

7.4 QUALITY CONTROL

The waste soil containerization and disposal tasks will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any waste soil containerization and disposal tasks the QC team determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to Senior UXO Supervisor and Quality Assurance (QA). The QA will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

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8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the waste soil containerization and disposal tasks along with methods to mitigate the hazards.

Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Waste Soil Containerization and Disposal	Slips, Trips or Fall, Muscle Strain s	Climbing; debris, holes, or crevasses obstructed from view by vegetation, handling waste containers.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times. Utilize proper lifting techniques when lifting or moving IDW containers	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keeping the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects (black flies and mosquitoes); contact with cow parsnip and rats.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed Do not touch cow parsnip, it can cause severe blistering; see the APP for descriptive information Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance (TSD) between teams for the RAA (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the RAA prior to commencing any activities in the RAA.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the RAA. All personnel will be aware of the signs of cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects. Avoid contact of the bare skin with cow parsnip. If contact does occur, wash the area with soap and water; apply a hydrocortisone cream to reduce the swelling and itching. Avoid exposing the infected area to the sun as well.

The potential for encountering MPPEH is high. The UXO-qualified escort will conduct a detector-aided survey of the access route into the RAA and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. Maintain the team TSD as follows:

- In RAA-02, RAA-05/ALDA-01, and RAA-05/ALSW-01, 43-ft based on the K40 distance for the 81-mm mortar, M43A1
- In RAA-01, RAA-03, and RAA-04, 44-ft based on the K40 distance for the 75-mm projectile, M48

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXO Safety Officer, Senior UXO Supervisor or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Safety and Health Plan (SSHP).

9. DIAGRAMS

Site maps of the RAAs are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

10. EQUIPMENT

The UXO technician providing MEC avoidance escort services will be equipped with the following:

- MC QAPP
- Indelible black-ink pens

- Field logbook
- Container labels
- Drums or approved sealable containers
- Manifests
- Shovels or mini excavator
- Drum handling equipment
- Tarps or Visqueen
- Ropes and sand bags to secure stock piles if required
- Sample labels (including DOT shipping labels if required)
- Chain-of-custody forms (including DOT shipper's declaration if required)
- Custody seals
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D Personal Protective Equipment
- Material handling gear, if required
- Hard hat as needed
- Hearing protection as needed
- Inclement weather gear as needed

11. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in the Site Safety and Health Plan (SSHP), Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles.

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ATTACHMENT 1.
QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

N44255-12-C-3003

SOIL SAMPLING

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST

Item	Ref.	Inspection Point	Yes	No	N/A	Comments
1	**SOP 18 Workers' Statement**	Have all personnel tasked with handling IDW read this SOP?				*(P)*
2	**SOP 18, Sec. 8.1**	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				*(P), (I), (F)*
3	**SOP 18, Sec. 7.3**	Were waste soils initially segregated and placed in lined stockpiles that are covered for protection?				*(P), (I), (F)*
4	**SOP 18 Sec. 7.3**	Are soil volumes up to one cubic yard containerized in new DOT approved 55-gallon drums?				*(P), (I), (F)*
5	**SOP 18, Sec. 7.3**	Is an appropriate amount of head space left in each drum to allow for thermal expansion?				*(P), (I), (F)*
6	**SOP 18, Sec. 7.3**	Is a covered roll off container used for soil quantities exceeding 20 cubic yards?				*(P), (I), (F)*
7	**SOP 18, Sec. 7.3**	Are container documentation forms in a sealed plastic Ziploc bag and attached to drum/container, or use a common filing method, with each drum/container clearly labeled with indelible marker on the outside of the drum/container?				*(P), (I), (F)*
8	**SOP 18, Sec. 7.3**	Does each drum/container have a discrete distinct label or name?				*(P), (I), (F)*
9	**SOP 18, Sec. 7.3**	Are drums/containers marked with up arrows and as regulated DOT hazardous materials label the container and mark the shipping				*(P), (I), (F)*

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**
		papers with information to comply with DOT requirements for shipment by sea/air?				
10	**SOP 18, Sec. 7.3**	Were DOT hazardous materials drums/containers completed by a DOT hazardous materials trained individual?				*(P), (I), (F)*
11	**SOP 18, Sec. 7.3**	Did the soils containerization Lead notify the transport/disposal contractor of approximately when and how many containers are to be shipped, when they will arrive, and arrange for any necessary coordination for the containerized soils in transit?				*(P), (I), (F)*

FINDINGS	
Item	**Comments**

Conducted By: _____ **Reviewed By:** _____

FINAL

APPENDIX B. MUNITIONS CONSTITUENTS QUALITY ASSURANCE PROJECT PLAN (MC QAPP)

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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ACRONYMS

1,3,5-TNB	1,3,5-Trinitrobenzene
1,3-DNB	1,3-Dinitrobenzene
ADEC	Alaska Department of Environmental Conservation
AOC	Area of Concern
AOPC	Area of Potential Concern
APP	Accident Prevention Plan
bgs	below ground surface
BRAC	Base Realignment and Closure
CA	Corrective Action
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm	centimeter
COC	Chain of Custody
CRREL	Cold Regions Research and Engineering Laboratory
CSM	Conceptual Site Model
DFW	Definable Feature of Work
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
DoD	U.S. Department of Defense
DQI	Data Quality Indicator
DQO	Data Quality Objective
EDD	Electronic Data Deliverable
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
FCR	Field Change Request
FS	Feasibility Study
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HPLC	high performance liquid chromatography
ID	Identification
in	inch, inches
kg	kilogram, kilograms
LCS	Laboratory Control Sample
LDC	Laboratory Data Consultant
MC	Munitions Constituents
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
mg	milligram, milligrams
mm	millimeter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MU	Mobile Unit

NA	not applicable
NAF	Naval Air Facility
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NB	Nitrobenzene
NELAP	National Environmental Laboratory Accreditation Program
NFA	No Further Action
NG	Nitroglycerin
NIRIS	Naval Installation Restoration Information Solution
NOSSA	Naval Ordnance Safety and Security Activity
NOSSAINST	NOSSA Instruction
NTCRA	Non-Time Critical Removal Action
NTR	Navy Technical Representative
NW	Northwest
OU	Operable Unit
PA	Preliminary Assessment
PAL	Project Action Limit
PARCC	precision, accuracy, representativeness, comparability, sensitivity, and completeness
PE	Performance Evaluation
PETN	Pentaerythritol Tetranitrate
PM	Project Manager
PMO	Program Management Office
PMP	Project Management Professional
PMP	Project Management Professional
PQCM	Project Quality Control Manager
PrgM	Program Manager
PS	Project Superintendent
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
QSM	Quality Systems Manual
RAA	Remedial Action Area
RAO	Removal Action Objective
RDX	Cyclotrimethylene Trinitramine, Hexahydro-1,3,5-Trinitro-1,3,5-trazine
RG-01	Rifle Grenade Range 01
RI	Remedial Investigation
RL	Reporting Limit
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RSL	Regional Screening Level
RTI	RTI Laboratories, Inc.

RTK	Real Time Kinematic
SI	Site Investigation
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
TAC	The Aleut Corporation
TBD	To Be Determined
Tetryl	Methyl-2,4,6-trinitrophenylnitramine
TNT	Trinitrotoluene
U.S. EPA	U.S. Environmental Protection Agency
UFP	Uniform Federal Policy
USA	USA Environmental
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer

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MC QAPP WORKSHEETS

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Figure 10-1: General Location of RAAs 33

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1.0 MC QAPP WORKSHEET #1 – TITLE AND APPROVAL PAGE
(UFP-QAPP Manual Section 2.1)

Final

Munitions Constituents Quality Assurance Project Plan

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Naval Air Facility Adak
Adak Island, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Contract No. N44255-12-C-3003

Review Signatures:

19 February 2013
Manok Synakorn/USA Project Manager Date

19 February 2013
James Walden/USA Project QC Manager Date

Approval Signatures:

19 Feb 2013
Justin Peach/Navy Remedial Project Manager Date

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2.0 MC QAPP WORKSHEET #2 – MC QAPP IDENTIFICATION INFORMATION

(UFP-QAPP Manual Section 2.2.4)

Site Name / Project Name:	Remedial Action Areas (RAA) 02, 03 and 04 / Non-Time Critical Removal Action (NTCRA) at Operable Unit (OU) B-2
Site Location:	Adak Island, Adak
Site Number:	EO093
Operable Unit:	OU B-2
Contractor Name:	USA Environmental, Inc. (USA)
Contact Number:	(813) 343-6380
Contract Title:	NTCRA at OU B-2, Former Naval Air Facility (NAF) Adak, Alaska
Work Assignment Number:	Contract No. N44255-12-C-3003

1. This Munitions Constituents (MC) Quality Assurance Project Plan (QAPP) was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP) (U.S. Environmental Protection Agency [U.S. EPA], 2005) and U.S. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (U.S. EPA, 2002), Naval Sea Systems Command (NAVSEA) OP 5, Volume 1, seventh revision (NAVSEA, 2008) and Naval Ordnance Safety and Security Activity (NOSSA) Instruction (NOSSAINST) 8020.15C dated 10 January 2011.
2. Identify regulatory program: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
3. This MC QAPP is project-specific for the NTCRA at OU B-2 RAA-02, RAA-03, and RAA-04.
4. List dates of scoping sessions that were held: A scoping session for the Draft OU B-2 NTCRA Work Plans was executed on 29 November 2011 under another independent contract, Battelle Contract No. N62473-07-D-4013, Task Order No 023. As a result, the Draft version of the MC QAPP (Battelle 2012) was developed based on the agreed to project scope. Upon receipt of concurrence from the EPA and the Alaska Department of Environmental Conservation (ADEC), a Regulatory Concurrence Letter will be included with the Final Munitions and Explosives of Concern (MEC) QAPP in Appendix J.
5. List dates and titles of any MC QAPP documents written for previous site work that are relevant to the current investigation.
   - USA Environmental, Inc.; Final Remedial Investigation Report for OU B-2 Sites, Former NAF Adak, Adak Island, AK, May 2012
   - USA Environmental, Inc.; Final Feasibility Study Report for OU B-2 Sites, Former NAF Adak, Adak, Island, AK, March 2012
   - Battelle Memorial Institute; Draft Sampling and Analysis Plan (Field Sampling Plan and Munitions and Explosives of Concern Quality Assurance Project Plan), Non-Time Critical Removal Action for the Operable Unit B-2 Areas of Concern, Former Naval Air Facility Adak, Adak Island, Alaska, January 2012
6. The project stakeholders and lead organization for this NTCRA at OU B-2 includes:
   - Lead Agency – Naval Facilities Engineering Command Northwest (NW) [Justin Peach, Navy Remedial Project Manager (RPM)]
   - Navy 3rd Party Quality Assurance (QA) Contractor – Battelle Memorial Institute [Les Clarke, Project Manager (PM)]
   - Stakeholders – U.S. EPA Region 10 (Christopher Cora), United States Fish and Wildlife Service (USFWS) (Merry Maxwell), The Aleut Corporation (TAC) (Melvin Smith), and ADEC (Guy Warren).

- MEC Contractor – USA Environmental, Inc., 720 Brooker Creek Blvd., Suite 204, Oldsmar, FL 34677 (Manok Synakorn, PM)

7. All QAPP element groups and required information are applicable to this NTCRA at Adak OU B-2. All 37 worksheets are used in the main body of this MC QAPP.

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3.0 MC QAPP WORKSHEET #3 – DISTRIBUTION LIST

(UFP-QAPP Manual Section 2.3.1)

Name of MC QAPP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	Document Control Number (Optional)
Justin E. Peach, PG, PE	Navy RPM	NAVFAC NW	(360) 396-0082	justin.peach@navy.mil	
John Pittz	Navy Technical Representative (NTR)	NAVFAC NW	(360) 396-0005	john.pittz@navy.mil	
Kenneth Bowers	Navy Quality Assurance Officer	NAVFAC NW	(757) 322-8341	Kenneth.a.bowers@navy.mil	
Les Clarke, PMP	Navy QA Contractor	Battelle	(303) 955-2953	clarkef@battelle.org	
Kim Ostrowski	Base Environmental Coordinator	Base Realignment and Closure (BRAC) Program Management Office (PMO)	(619) 532-0909	kimberly.ostrowski@navy.mil	
Christopher Cora	U.S. EPA Project Manager	U.S. EPA Region 10	(206) 553-1478	cora.christopher@epa.gov	
Tom Hall	U.S. EPA Region 10 Technical Contractor	TechLaw	(501) 753-7987	thall@techlawinc.com	
Guy Warren	ADEC Project Manager	ADEC	(907) 269-7528	guy.warren1@alaska.gov	
Jim Pastorick	ADEC Consultant	UXO Pro	(703) 548-5300	jim@uxopro.com	
Merry Maxwell	Alaska Marine National Wildlife Refuge Manager	USFWS	(907) 226-4675	merry_maxwell@fws.gov	
Melvin Smith	Land Manager	The Aleut Corp.	(907) 561-4300	msmith@aleutcorp.com	
George Spencer	Program Manager (PgM)	USA	(813) 343-6358	gspencer@usatampa.com	
Manok Synakorn	Project Manager (PM)/ Engineer	USA	(813) 343-6380	msynakorn@usatampa.com	
Teresa Rottero	Project Chemist	USA	(813) 997-2105	trottero@usatampa.com	

Name of MC QAPP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	Document Control Number (Optional)
Cheryl Riordan	Project Safety Manager	USA	(757) 689-4737	criordan@usatampa.com	
Al Crandall	Project Geophysicist	USA	(813) 343-6362	acrandall@usatampa.com	
James Walden	Project Quality Control Manager (PQCM)	USA	(813) 343-6374	jwalden@usatampa.com	
Ric MacNeil	Site Geophysicist	USA	(813) 767-0674	rmacneil@usatampa.com	
Jose Garcia	Quality Control (QC) Geophysicist	USA	(210) 380-3208	joeriversg@hotmail.com	
Craig Murray	Data Processing Manager	Parsons	(303) 764-8868	Craig.murray@parsons.com	
Scott Crandall	Field Engineer/ Sampling Technician	USA	(727) 403-7705	scrandall@usatampa.com	
Frank Magner	Project Superintendent	USA	(315) 568-4658	fjmeoduxo@aol.com	
Rick Arsenault	Senior Unexploded Ordnance Supervisor (SUXOS) I	USA	(831) 236-9604	Arsenault.rick@yahoo.com	
Larry Mazerac	SUXOS II	USA	(850) 447-3862	lmazerac@hotmail.com	
Jose Garcia	UXO Quality Control Specialist (UXOQCS)	USA	(210) 380-3208	joeriversg@hotmail.com	
Tony Tennyson	UXO Safety Officer (UXOSO) I	USA	(906) 450-5260	hdbadboy5@hotmail	
Jason Birchfield	UXO Safety Officer (UXOSO) II	USA	(210) 426-1080	c4user2@yahoo.com	
David Howell	Laboratory PM	RTI	(540) 422-1532	dhowell@rtilab.com	
Tim Fitzpatrick	Data Validation PM	Laboratory Data Consultant (LDC)	(619) 818-6898	tfitzpatrick@lab-data.com	
Tom Spitler	Data Manager	USA	(907) 577-2410	achaax@gmail.com	

4.0 MC QAPP WORKSHEET #4 – PROJECT PERSONNEL SIGN-OFF SHEET

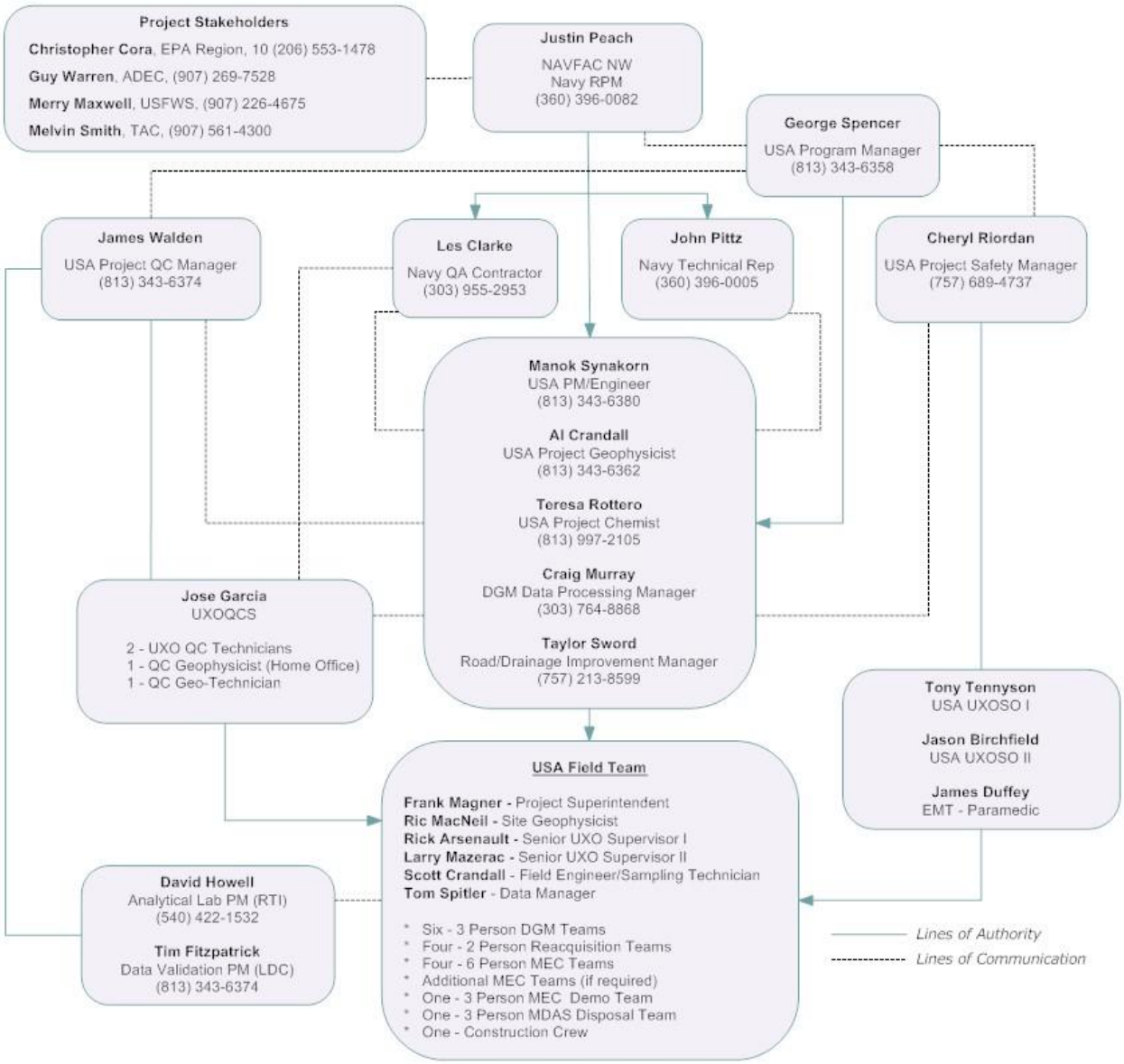
(UFP-QAPP Manual Section 2.3.2)

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	MC QAPP Section(s) to be Reviewed	Date MC QAPP Read
George Spencer	USA/PrgM	(813) 343-6358	_____/ gspencer@usatampa.com	All	
Manok Synakorn	USA/PM/Engineer	(813) 343-6380	_____/ msynakorn@usatampa.com	All	
James Walden	USA/Project Quality Control Manager (PQCM)	813) 343-6374	_____/ jwalden@usatampa.com	All	
Teresa Rottero	USA/Project Chemist	(813) 997-2105	_____/ trottero@usatampa.com	All	
Scott Crandall	USA/Field Engineer/ Sampling Technician	(813) 403-7705	_____/ scrandall@usatampa.com	All	
Frank Magner	USA/Project Superintendent	(315) 568-4658	_____/ fjmeoduxo@aol.com	All	
Rick Arsenault	USA/SUXOS I	(831) 236-9604	_____/ Arsenault.rick@yahoo.com	All	
Larry Mazerac	USA/ SUXOS II	(850) 447-3862	_____/ lmazerac@hotmail.com	All	

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	MC QAPP Section(s) to be Reviewed	Date MC QAPP Read
Jose Garcia	USA/ UXOQCS	(210) 380-3208	_____/ joeriversg@hotmail.com	All	
Tony Tennyson	USA/ UXOSO I	(906) 450-5260	_____/ hdbadboy5@hotmail	All	
Jason Birchfield	USA/ UXOSO II	(210) 426-1080	_____/ c4user2@yahoo.com	All	

5.0 MC QAPP WORKSHEET #5 – PROJECT ORGANIZATIONAL CHART

(UFP-QAPP Manual Section 2.4.1)



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6.0 MC QAPP WORKSHEET #6 – COMMUNICATION PATHWAYS

(UFP-QAPP Manual Section 2.4.2)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
Routine Daily Communications	USA	Frank Magner, Project Superintendent (PS)	(315) 568-4658/ fjmeoduxo@aol.com	Daily, verbal, e-mail or phone, SUXOS to RPM/Munitions Project Manager.
Daily Safety and Operations Briefing	USA USA USA USA USA	Frank Magner (PS) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II)	(315) 568-4658/fjmeoduxo@aol.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com	Daily, verbal, SUXOS/UXOSO to on-site project team members including Navy representatives.
Daily Production Report (includes daily QC and safety reports)	USA USA USA USA USA	Frank Magner (PS) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II) Jose Garcia (UXOQCS)	(315) 568-4658/fjmeoduxo@aol.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com (210) 380-3208, joeriversg@hotmail.com	Daily, electronic submittal to RPM/Munitions PM.
Onsite/real time MC QAPP minor modifications	USA USA	Frank Magner (PS) Manok Synakorn (PM)	(315) 730-2074/ fjmeoduxo@aol.com (813) 343-6380/ msynakorn@usatampa.com	USA Field Team Leader will communicate by telephone or e-mail with the Navy RPM regarding issues that may result in deviations from the approved MC QAPP. USA Field Team Leader will inform the Navy RPM via telephone or e-mail about the decision taken and circumstances for the deviation within 48 hours for non-critical (minor) deviations. (Non-critical deviations are defined as those which will not impact the project objectives). Verbal communications will be documented and followed up with a field change request (FCR).

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
Stop Work Order	USA USA USA USA USA USA	Frank Magner (PS) Manok Synakorn (PM) Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II) Jose Garcia (UXOQCS)	(315) 568-4658/ fjmeoduxo@aol.com (813) 343-6380/ msynakorn@usatampa.com (831) 236-9604/arsenault.rick@yahoo.com (850) 447-3862/lmazerac@hotmail.com (906) 450-5260/hdbadboy5@hotmail.com (210) 426-1080/c4user2@yahoo.com (210) 380-3208, joeriversg@hotmail.com	The SUXOS, UXOQCS and UXOSO will have the authority to stop work if non-compliance to field QC procedures, as specified in the MC QAPP, or breach of safety procedures, as specified in the Site Safety and Health Plan (SSHP) or Explosives Safety Submission (ESS), are noted. The SUXOS will communicate with the USA PM and NTR informing them: (i) of stop work order, (ii) circumstances under which the order was given, and (iii) the anticipated time when the field work will resume. USA PM will communicate with Navy RPM about the stop work order, circumstances under which the order was given, corrective action(s) being implemented and anticipated time-frame within which the field work will resume. To expedite resumption of field activities, the communication will be via telephone or e-mail. All stop work orders will be communicated within 24 hours to the SUXOS, UXOSO, RPM, USA PM and NTR. All communications will be documented in the project records.
Regular communication with NAVFAC	USA USA	Manok Synakorn (PM) George Spencer (PrgM)	(813) 343-6380/ msynakorn@usatampa.com (813) 343-6358/ gspencer@usatampa.com	Communication via mail to obtain written/formal approval of the planning documents (e.g.,

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure (Timing, pathway to and from, etc.)
Northwest RPM				MC QAPP, MC QAPP amendments) and communication via phone and e-mail to discuss project status and any issues.
Sample Quality Issue (e.g., broken sample bottles, incorrect preservation) and laboratory QC issues	RTI	David Howell (Laboratory PM)	(540) 422-1532/ dhowell@rtilab.com	The Laboratory PM will notify the USA Project Chemist who will notify the USA PM by e-mail within 24 hour hours. The Laboratory PM will follow up with the USA Project Chemist by phone within 48 hours. The USA PM will initiate a corrective action.
Significant issues (e.g., delays / changes in field work)	USA USA	Manok Synakorn (PM) George Spencer (PgM)	(813) 343-6380/ msynakorn@usatampa.com (813) 343-6358/ gspencer@usatampa.com	USA PM will communicate with Navy RPM regarding any issues that may result in delays or changes in the field work. An example is the breakdown of sampling equipment and weather conditions. USA PM will consult with the Navy RPM by phone within 24 hours to discuss the length of anticipated delay and changes recommended to minimize the delay. Any corrective actions taken will be documented in a corrective action report.

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7.0 MC QAPP WORKSHEET #7 – PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

(UFP-QAPP Manual Section 2.4.3)

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
Responsibilities and qualifications for personnel listed in Worksheet #7 of the munitions and explosives of concern (MEC) QAPP are not repeated here. The positions listed below are specific to the needs of the sampling and analysis program.				
Justin E. Peach, PG, PE	RPM	NAVFAC Northwest	See MEC QAPP	
John Pittz	Navy NTR	NAVFAC	See MEC QAPP	
Les Clarke	Navy QA Contractor	Battelle	See MEC QAPP	
Manok Synakorn	PM	USA	See MEC QAPP	
James Walden	PQCM	USA	See MEC QAPP	
Rick Arsenault	SUXOS	USA	See MEC QAPP	
Jose Garcia	UXOQCS	USA	See MEC QAPP	
Tony Tennyson	UXOSO I	USA	See MEC QAPP	
Jason Birchfield	UXOSO II	USA	See MEC QAPP	
Alan Crandall	Project Geophysicist	USA	See MEC QAPP	
Teresa Rottero	Project Chemist	USA	• Executing the MC QAPP • Oversight of the analytical laboratory • Oversight of the data validation contractor	
Tim Fitzpatrick	Data Validation PM	LDC	• Responsible for third party data validation • Generates data validation reports for submittal • Communicates with Project Chemist to address any project sampling and analytical issues that may impact data quality based on data validation activities	
David Howell	Laboratory PM	RTI	• Overseeing tasks within the analytical laboratory • Monitoring the quality of laboratory operations • Communicating issues to the Project Chemist • Resolving issues and providing resolution documents	
Various	UXO Technicians	USA	• See MEC QAPP	
Frank Magner	Field Team	USA	• Coordinate sample collection activities	

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
	Leader		• Ensure sampling technicians have all required training • Coordinate communication of field issues • Review field documentation for completeness	
Scott Crandall	Sampling Technicians	USA	• Collect samples in accordance with the field sampling procedures • Prepare COC and analytical request forms • Properly package and ship the samples to the analytical laboratory	
Tom Spitler	USA Data Manager	USA	• Submitting field information data for upload into the Navy's database • Checking electronic data for completeness (e.g., all required fields are entered) • Submitting formatted data to the Navy in accordance with the requirements set forth in NAVFAC Northwest's *Standard Operating Procedure (SOP) for Navy Environmental Information Transfer, Version 4.0* (or subsequent updates)	
Les Clark	Navy QA Contractor	Battelle	• Establishing and maintaining the Quality Program • Overseeing program QC, including remediation and chemical data acquisition • Working directly with the contractor and NAVFAC NW to ensure implementation of the Program QC Plans	

8.0 MC QAPP WORKSHEET #8 – SPECIAL PERSONNEL TRAINING REQUIREMENTS

(UFP-QAPP Manual Section 2.4.4)

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/ Certificates
General Project Operations	Site orientation, general work rules, administrative activities	SUXOS	Mobilization	All site personnel	Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) Tony Tennyson (UXOSO I) Jason Birchfield (UXOSO II) Jose Garcia, UXOQCS	Project files held by USA in Field Office and Corporate Office in Oldsmar, FL
	Accident Prevention Plan, SSHP, Radiological Materials Management Plan	UXOSO				
	MC QAPP/SOPs	UXOQCS				
	Hazardous Waste Operations and Emergency Response (HAZWOPER) First Aid and cardiopulmonary resuscitation	Vendor	Prior to mobilization			
UXO Clearance	UXO Identification and Removal	SUXOS	Prior to field work	UXO support technician(s)	Rick Arsenault (SUXOS I) Larry Mazerac (SUXOS II) and UXO Technicians	Project files held by USA in Field Office and Corporate Office in Oldsmar, FL
Sample Collection	Training on field sampling SOPs	Project Chemist	Prior to field work	Sampling Personnel	Scott Crandall, Sampling Technician	Project files held by USA in Field Office and Corporate Office in Oldsmar, FL
Field Sample Analysis	Training on field analysis kit	Project Chemist	Prior to field work	Sampling Personnel	Scott Crandall, Sampling Technician	Project files held by USA in Field Office and Corporate Office in Oldsmar, FL

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9.0 MC QAPP WORKSHEET #9 – PROJECT SCOPING SESSION PARTICIPANTS SHEET

(UFP-QAPP Manual Section 2.5.1)

Project Name: NTCRA at OU B-2 **Projected Date(s):** FS1 April 2013 and FS2 April 2014 **Project Manager:** Manok Synakorn	**Site Name:** OU B-2 **Site Location:** Former Adak NAF, Adak Island, Alaska

Date of Session: November 29, 2011

Scoping Session Purpose: Discuss and resolve comments on the Draft OU B-2 NTCRA Work Plans

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Ray Kobeski, PE	RPM	Navy	(360) 396-0597	raymond.kobeski@navy.mil	RPM
Christopher Cora	EPA PM	EPA	(206) 553-1478	cora.christopher@epa.gov	EPA RPM
Guy Warren	ADEC PM	ADEC	(907) 269-7528	guy.warren1@alaska.gov	ADEC RPM
JoAnn Grady	Meeting Facilitator	Grady and Associates	(907) 321-3213	joanngrady@gmail.com	Facilitator
Eugene Mikell	ADEC Consultant	UXOPro	n/a	eugene@uxopro.com	ADEC Consultant
Tom Hall	EPA Consultant	TechLaw	(501) 753-7987	thall@techlawinc.com	EPA Consultant
Karla Braesemle	EPA Consultant	TechLaw	n/a	kbraesemle@techlawinc.com	EPA Consultant
Les Clarke	Navy QA Contractor	Battelle	(303) 955-2953	clarkef@battelle.org	Navy Consultant
Eric Zentner	Recorder	Boreal Communications	n/a	ejzentner@gmail.com	Recorder

Comments/Decisions: A scoping session for the Draft OU B-2 NTCRA Work Plans was executed on 29 November 2011 under another independent contract, Battelle Contract No. N62473-07-D-4013, Task Order No. 023. As a result, the Draft version of the MEC QAPP (Battelle 2012) was developed based on the agreed to project scope. Scoping Sessions meeting notes are provided in Appendix J of the MEC QAPP.

Action Items: See attached Draft notes from the meeting in Appendix J. Upon receipt of concurrence from the EPA and ADEC, a Regulatory Concurrence Letter will be included with the Final MEC QAPP in Appendix J.

Consensus Decisions: See attached Draft notes from the meeting in the Final MEC QAPP, Appendix J.

10.0 MC QAPP WORKSHEET #10 – PROBLEM DEFINITION

(UFP-QAPP Manual Section 2.5.2)

The U.S. EPA's seven-step DQO process was used during the planning stages for this project. Step one of the DQO process is discussed below. Steps 2 through 7 are listed in Worksheet #11.

Step 1. State the Problem

The problem to be addressed by the project: The Step 1 Problem Statement details the problem to be addressed by the project.

Problem Statement:

OU B-2 is a former training ground for military forces. A NTCRA is being conducted to remove MEC and MC. The extent of contamination beneath or near breached munitions and areas with stained or odiferous soil must be evaluated and soil that exceeds the project action limits (PALs) must be excavated, packaged and transported off-island. The location of MC-contaminated areas will only be identified during the MEC remedial process. Soil excavation must proceed until "clean" soils (those with MC concentrations lower than PALs) are encountered. Removal of all MC-contaminated soils in excess of cleanup levels must be demonstrated. Remedial Action Areas (RAAs) in OU B-2 include: RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01. Table 10-1 provides summary information about each of the RAAs. Figure 10-1 shows the site configurations and RAA boundaries.

Table 10-1: RAA Summary Information

Remedial Action Areas	Proposed Activity	RAA Area (acre)
RAA-01	Instrument assisted surface clearance (down to 6-in bgs), vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to the depth of detection.	19.30
RAA-02	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	73.70
RAA-03	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	146.85
RAA-04	Surface Clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 4-ft (1.2-m), with the option to further investigate deeper targets if required by the Navy.	109.97
RAA-05/ALDA-01	Surface Clearance, vegetation removal, mechanically assisted intrusive investigation of targets to a minimum depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	4.70
RAA-05/ALSW-01 *	Monthly Surface Sweep (Surface MEC Removal of Andrew Lake Seawall)	21.38

Notes:

* RAA-05/ALSW-01 is not part of this NTCRA. However, monthly surface sweeps will be conducted on the seawall portions of RAA-05.

The environmental questions being asked:

Are MC present in the RAA at concentrations less than (<) PALs such that human health and the environment are protected to allow reasonably anticipated future land uses (wildlife management, subsistence, and recreation) managed through land use controls?

Observations from any site reconnaissance reports:

See discussion below: "Site Background and Previous Investigations."

A synopsis of secondary data or information from site reports:

See discussion below: "Site Background and Previous Investigations."

The possible classes of contaminants and the affected matrices:

MC in soil.

The rationale for inclusion of chemical and nonchemical analyses:

Previous investigations identified MEC at the site which could potentially result in breaching and MC contamination.

Information concerning various environmental indicators:

See discussion below: "Site Background and Previous Investigations."

Project decision conditions ("If..., then..." statements):

See Worksheet #11, Step 2, Specifying the decision statement.

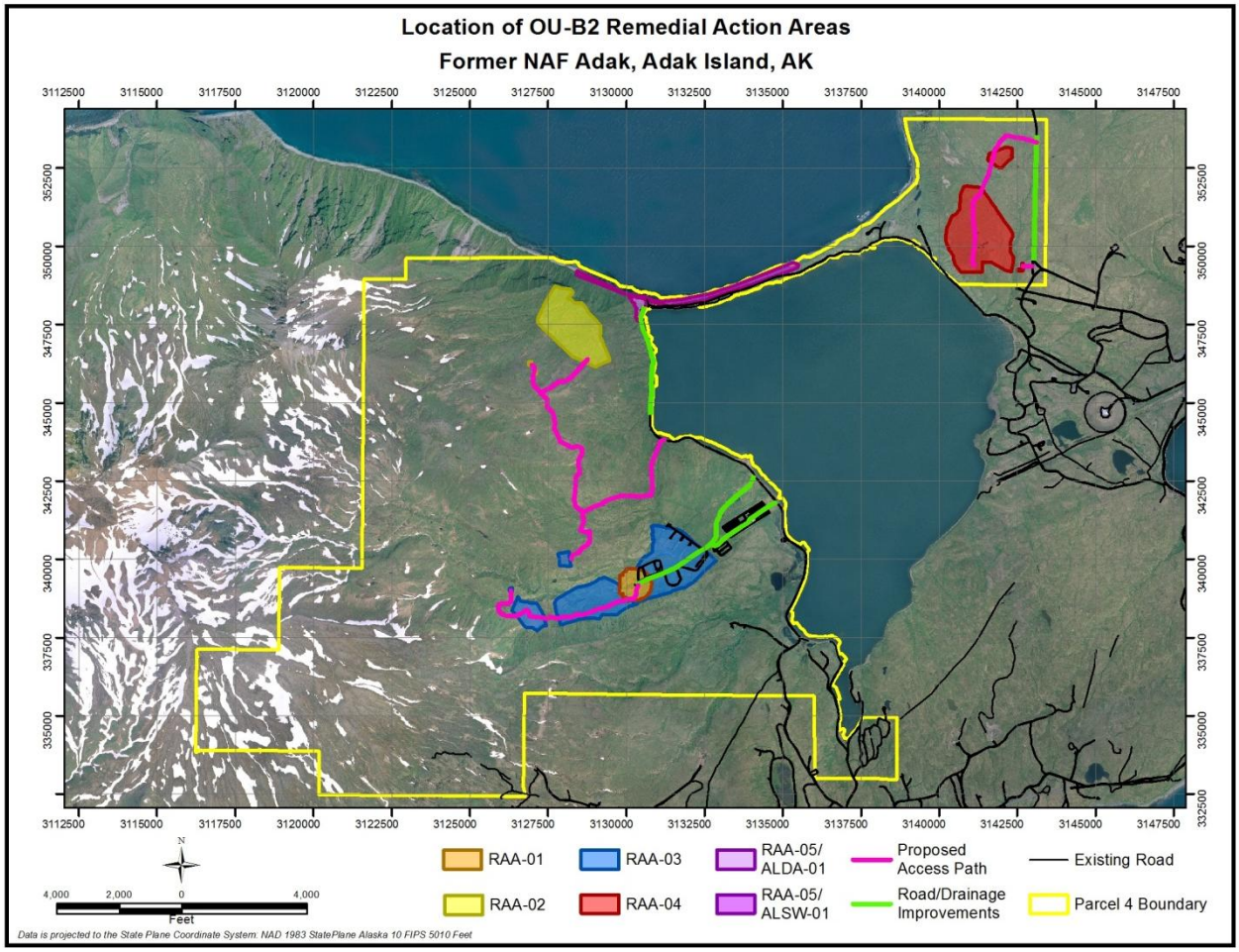

Figure 10-1: General Location of RAAs

Site Background and Previous Investigations:

The former NAF Adak was established in August 1942 in response to the Japanese occupation of Kiska and Attu Islands in the Aleutian Island Chain earlier that year. Originally designated Mitchell Field, by the summer of 1943, approximately 100,000 U.S. Army personnel and 100 ships were stationed on Adak. In 1950, the U.S. Air Force took control of the airfield, renaming it Davis Air Force Base. In 1959, Public Land Order 1949 designated the northern half of the island for use by the Navy for military purposes. The OU B-2 areas like other MEC areas on Adak were used primarily during and just after World War II for military training purposes (for example, as firing ranges and target areas). Some areas dedicated for small arms training and MEC disposal were used until the late 1980s; others became dormant soon after the war. Other areas of Adak were dedicated to infrastructure and support of military operations.

Previous investigations in OU B-2 included initial assessments and preliminary site evaluations conducted between 1986 and 1996 which identified areas potentially contaminated with unexploded ordnance (UXO). In 1997, a UXO survey was conducted by the explosive ordnance disposal Mobile Unit Eleven (MU11) Detachment Northwest, stationed at Naval Air Station Whidbey Island, Washington, as part of the remedial investigation (RI) for OU A. As a result of the 1997 OU A RI, a detailed archive search was begun in 1997 and completed in 1998. The results of this archival search identified 184 areas of potential concern and were used in a site investigation (SI) conducted in 1999.

After the 1999 SI, the Navy and regulatory agencies developed a CERCLA-like process for MEC assessment and remediation on Adak as part of a dispute resolution. It was acknowledged that the equivalent of a very detailed site inspection had already been conducted in the form of the 1999 SI, and that by incorporating the SI data into a preliminary assessment (PA), the initial requirements of the

CERCLA process for a PA/SI could be fulfilled without performing additional site inspection. The PA was performed to identify the areas of potential concern (AOPCs) that required further evaluation or action (Foster Wheeler Environmental, 2000). The first step in this process was the development of a MEC conceptual site model (CSM) for Adak. This CSM was developed based on a review of the existing data, release and physical transport processes, and potential human and ecological receptors associated with OU B. The CSM was intended to encompass all historical ordnance uses on OU B and the expected exposure pathways associated with those uses. In the CSM, the historical Areas of Concern (AOCs) are the primary sources of contamination, but they differ by the way they were used (impact areas, storage areas, open burn/open detonation areas, etc.).

The Project Team developed an AOPC assessment approach (the Level 1 Screen) that built on four screening criteria to categorize an AOPC:

- Likelihood of UXO contamination
- Density of UXO contamination
- Ordnance hazard severity
- Strength of archival and field evidence

The Project Team developed the framework, the interrelationship among the criteria, and the factors relevant to each criterion. Phase 1 of the Level 1 screening process integrated a qualitative evaluation of the assumed or demonstrated likelihood, density, and potential severity of MEC contamination. An analysis of the relative strength of evidence supporting those assumptions was made to determine whether or not each AOPC represented a sufficiently significant hazard to warrant consideration of further action. Further actions included additional investigations, evaluation in the FS, and immediate actions. Those sites that were rated as not posing an unacceptable ordnance-related hazard, as supported by an acceptable level of evidence, were judged to be appropriate for no further action (NFA) and were eliminated from additional screening or consideration for further action. Sites having a low likelihood and density of contamination, and that were known or suspected to contain relatively low-hazard ordnance, were screened as NFA if the assumed CSM was supported by acceptably strong data. Those sites not screened as NFA were advanced to Phase 2 of the Level 1 screening process, where the need for further action (such as investigation or remediation) was evaluated. These included sites known or suspected to have low quantities of low-hazard ordnance, but not having an acceptable strength of data to support the assumed CSM. Some level of additional data collection or visual observation was needed in order to complete the hazard screening for these sites. The non-NFA sites also included sites known or suspected to have higher quantities of ordnance or higher hazard ordnance. These sites were prioritized for further action (either investigation or cleanup), and a determination of the most appropriate form of action was made. Phase 2 of the screening process evaluated AOPCs with respect to the ease of access for assessment, and exposure to ordnance. Sites with very limited access not only would be very difficult to assess, but also would not pose the same level of hazard as an accessible site containing the same type and quantity of ordnance. Sites with lower accessibility were judged to have a lower priority for action than those freely accessible to the public. After this phase of screening, AOPCs having a sufficiently high ranking for further action were evaluated to determine the most appropriate level of activities. This determination was based on the perceived qualitative risk for the AOPC (ordnance hazard ranking) and the relative access for public exposure. These sites became AOCs and were evaluated by using the criteria in the Level 2 Ordnance and Explosives Sampling Methodology for selection of appropriate assessment and/or analysis methodologies for that type of site.

After Phase 2 of the OU B screening process, 183 AOPCs were selected for PA screening. Of this number, 78 were found to meet the requirements for NFA based on historical and physical evidence indicating that the site posed little or no qualitative risk to humans. Twenty-six AOPCs were selected for site inspection because of a lack of evidence with which to assess potential risk. Seventy-seven of the AOPCs screened were referred for RI based on the nature and strength of available field data and/or the documented historical land use. These AOPCs included most of the impact areas on Adak, as well as the range areas at Andrew Lake and most of the sites where ordnance was found during the 1999 SI. One site, Rifle Grenade Range 01 (RG-01) was advanced directly to the feasibility study (FS) stage

based on previous remediation or special circumstances that prevented investigation. Most of the 183 sites discussed above are OU B-1 sites that have already been remediated and/or approved for NFA.

In 2000, an RI/FS was performed to collect and analyze data at sites potentially contaminated with MEC in selected locations of OU B at the former Adak Naval Complex. Specifically, sites were selected that were intended for inclusion in the transfer of more than 43,000 acres to TAC for civilian reuse. These sites were placed in a subgroup called OU B-1. The remaining AOCs were segregated into a second subgroup (OU B-2) for future evaluation and potential transfer. The data collected during this investigation, and from previous investigations, were used to provide input to an Adak-specific Explosives Safety Hazard Assessment designed by the Project Team. The Explosives Safety Hazard Assessment tool analyzes the results of the MEC portion of the RI and determines the potential magnitude of the risk/hazard present.

During 2000-2001 frost heave, temperature, moisture, and surrogate ordnance displacement were measured at four sites on Adak to determine the influence of frost heave on buried surrogate munitions. Soil temperatures at the higher elevation test sites reached a low of -10°C during the study; however, the soil in the test areas did not freeze deeper than 8-in (20.3-cm) below ground surface (bgs). Measurements before and after the winter season on Adak showed no trend of movement due to frost heave action on buried surrogate munitions. Test data indicated that 2000-2001 winter temperatures were typical of those recorded during the past 50 years.

In 2001, assessment and remedial actions for UXO-related contamination were conducted in 19 AOCs, including two AOCs under consideration in the OU B-2 FS. These two sites (C1-01 and RR-03) were sampled at three locations to determine whether ordnance-related chemicals were present in the soil. The sites were selected for sampling based on the discovery of munitions that were breached, allowing the filler to contact the soil immediately surrounding the items. The soil samples collected in these two AOCs were analyzed for 14 ordnance-related constituents, but no detectable levels of the chemicals were found.

Historical records indicate that chemical warfare materials were managed on Adak, but extensive research and on-island field investigations have been conducted and no evidence of chemical warfare materials or residuals has been discovered to date.

In 2002, the Navy commissioned a mobility analysis by the Woods Hole Group for the Andrew Bay offshore area in an effort to gain further understanding of the MEC transport processes at work in the shoreline area and to provide data for the FS. Data reviewed for the study included historical data from explosive ordnance disposal (EOD) beach sweeps; bathymetry; sediment characteristics; wave, current, and tide information; and the EOD dive survey that was conducted in August 2000. The resulting maps of MEC migration probabilities allowed for an assessment of the MEC migration risk throughout Andrew Bay during typical and extreme wave conditions.

In 2002, assessment and remedial actions for UXO-related contamination were conducted in 17 AOCs, including one AOC considered for inclusion in the OU B-2 FS (AOC LJ-02A, which was identified in 2002 as a possible location for JM-01). Previous reports for the general vicinity stated that items potentially have been buried to depths as great as 14-ft (4.3-m) bgs. An EM31 ground conductivity meter was used during the 2004 field season with line spacing of 11.5-ft (3.5-m) at the LJ-02A site. Although no anomalies indicative of trenches were visible in the data, three point source anomalies were identified. A UXO QC team intrusively investigated these targets on July 26, 2004, but no MEC or other items of concern were found.

As a result of past military use, the former 40-mm RG-01 at Andrew Lake was determined to be a potential safety risk to the public, site personnel, and biological receptors. Historical documentation indicated that seven dud-fired, high-explosive 40-mm grenades were present on the range, as well as one 60-mm mortar and one 81-mm mortar. These items were not removed from the range at the time of discovery because of their hazardous nature. On the basis of this anticipated hazard, the Navy began an NTCRA at this site in 2006. Field work in 2006 indicated that the historical documentation significantly underestimated the number of MEC items present in RG-01. In 2006, USA performed the NTCRA on RG-01 and recovered and destroyed a total of 96 live MEC items. During the 2006 field season, one grid was expanded (stepped-out) because of the discovery of MEC near the eastern boundary of the range

and the Adak requirement for a 15-m buffer around MEC. Five additional expansion areas were also identified on the eastern boundary, but because of time constraints, the decision was made to delay the investigation of these grids until the next season. In 2008, USA performed an analog clearance on the five RG-01 expansion areas identified during the 2006 NTCRA prior to follow-on DGM surveys and encountered MEC within the 15-m buffer zone that required an additional analog step-out. A 100 percent DGM survey of accessible areas (slopes < 30 degrees, no obstacles or standing water) at RG-01 was performed after completion of the analog clearance and analog step-outs of grids. During the DGM clearance, MEC was encountered near boundaries of four grids and it was necessary to perform a step-out of the grids to maintain the 15-m buffer around MEC. The additional step-outs were first analog cleared and then DGM surveyed and cleared. MC sampling and testing were performed at the locations of the two breached munitions, in accordance with the approved MC QAPP. One of the locations showed cyclotrimethylene trinitramine (RDX) levels above project screening level but below action level, so additional sampling was performed at the location.

Removal Action Objectives:

The removal action objective (RAO) for OU B-2 is to provide protection to human health and the environment by reducing and mitigating the explosive hazard from MEC located on the surface and in subsurface soil, such that hazards associated with reasonably anticipated future land uses (wildlife management, subsistence, and recreation) will be reduced to a level that can be managed through land use controls.

To meet the requirements in the RAO, personnel will sample potentially MC-contaminated surface or subsurface soil in the vicinity of munitions (identified during intrusive investigation for MEC). (Potentially MC-contaminated soil is defined as soil associated with breached munitions, discoloration or staining adjacent to a MEC, or unusual odors coming from the ground during intrusive investigations).

Personnel will excavate soil for off-island disposal if laboratory analysis confirms that concentrations exceed the PALs defined in Worksheet #15. Once remediated, the excavation site will be re-sampled and submitted for laboratory analysis to confirm that the excavated volume was sufficient to remove MC contamination to concentrations less than the PALs. The excavation and analysis process will continue until laboratory results confirm that soil MC concentrations at the remediated location are less than the PALs. Details are provided in Worksheet #17. Development of PALs for OU B-2 is detailed in Appendix K of the MEC QAPP.

- Human health cleanup levels are the lowest cleanup values for direct contact and inhalation from: State of Alaska Department of Environmental Conservation. AAC 75. Oil and Other Hazardous Substances Pollution Control (April 8, 2012).
- Residential and industrial soil values are from: Region 6 Regional Screening Level (Formerly Human Health Medium-Specific Screening Levels) (November 2012).
- Ecological Cleanup Levels were derived from a compilation of literature values summarized in Appendix B of the NAVFAC MC QAPP for OU B-2 RI. June 6, 2008.

11.0 MC QAPP WORKSHEET #11 – PROJECT QUALITY OBJECTIVES

(UFP-QAPP Manual Section 2.6.1)

As noted in Worksheet #10, U.S. EPA's seven-step data quality objective (DQO) process was used during the planning stages for this project. Steps 2 through 7 of the DQO process for the project are presented below.

Step 2. Identify the Goal of the Study

Specifying the primary study question. The primary study question to be addressed is the following:

Are the concentrations of MC in soil less than the PALs (Worksheet #15) such that it is possible to gain regulatory concurrence that NFA is required in the subject RAAs?

The secondary study questions to be addressed are:

- Do visual indicators (breached munitions or discoloration or staining) adjacent to a MEC or unusual odors coming from the ground during intrusive investigations suggest that the RAAs may have MC contamination?
- Are MCs visible at volume that may endanger response personnel during soil sampling activities and did the Project Supervisor notify the Navy RPM and NTR?
- In areas of potential MC, do soil concentrations exceed the clean-up levels, therefore requiring removal?
- In areas where contaminated soils are excavated, have all contaminated soils been removed that are at concentrations above the cleanup levels (Worksheet #15)?
- Do the concentrations of MC in soil meet all applicable or relevant and appropriate requirements for transportation and disposal as well as disposal site waste acceptance criteria?

Determining the alternative actions. The possible actions that would result from review of the field data include:

- The total number of samples to be collected during MC operations cannot be predicted. Field data from the intrusive investigation operation will be reviewed to identify sampling quantity and locations. Number of samples required will be based on the size and condition of the subject areas and the need to conduct step-out sampling based on field test kits and lab analysis results.

Specifying the decision statement. The decision statement is as follows:

- If MC contamination in any of the RAAs is identified (based on soil staining or odor) and confirmed by laboratory analysis to be present at concentrations greater than the PALs (Worksheet #15), then the contaminated soil will be excavated for off-site disposal.
- If laboratory analysis confirms that MC contamination at any RAA is less than the PALs (Worksheet #15), then NFA is required and the RAA will be released for intended future use with anticipated land use controls.

Step 3. Identify Information Inputs:

Identify the types of information that are needed to resolve the decision statement. To resolve the decision statement, the planning team will need the following data:

- Documentation of breached munitions, staining, or odors that indicate the potential presence of MCs.
- Analytical laboratory data for 17 MC constituents which show whether or not MCs are present at any of the target anomaly locations at concentrations greater than the PALs.
- Screening levels established by ADEC and U.S. EPA Region 10 for the 17 MC constituents.

Step 4. Define the Boundaries of the Study:

The boundaries of the remedial activities are within the defined area of OU B-2: The physical study boundaries are the RAA boundaries plus any required step-outs. The temporal boundaries will be determined by USA and Navy RPM and defined in the final MC QAPP.

Step 5. Develop the Analytical Approach:

At each location where breached munitions, staining, or odors indicate the potential presence of MCs, the analytical approach will be to:

1. Remove MC pieces if visual assessment indicates that MCs are present at volume that may endanger response personnel during soil sampling activities. Removal will continue until the subject area is safe to commence soil sampling activities.
2. Collect a representative composite soil sample using 7-wheel approach from the potentially affected area and analyze by test kits using U.S. EPA Methods 8515 and 8510.
3. If the sample exceeds the PAL (Worksheet #15) for trinitrotoluene (TNT) or RDX, excavate soil from affected area and hold the soil for subsequent disposal. Collect and analyze another composite from sides and bottom of the excavation using the field test kit until clean boundary is found.
4. Once clean boundary is confirmed (< PALs for TNT & RDX), collect a composite soil sample of the clean boundary (sides and bottom of excavation) and submit to a fixed laboratory (RTI) for definitive determination of sample concentration.
5. If laboratory results are > PALs, repeat approaches 2 through 4 above. If laboratory results are < PALs, clean boundary is confirmed and no further sampling is required.
6. Restore the excavated area with clean fill and grass seeds. Characterize the held contaminated soil using fixed laboratory analysis and prepare for offsite disposal.

Detailed sampling procedures are described in Worksheet #17.

Specifying the Action Level.

The PALs are the cleanup goals defined Worksheet #15. Figure 11-1 illustrates the decision process for the evaluation of potential MC at each RAA. The process is summarized in Step 7 (Develop the Plan for Obtaining Data) and detailed in Worksheet #17.

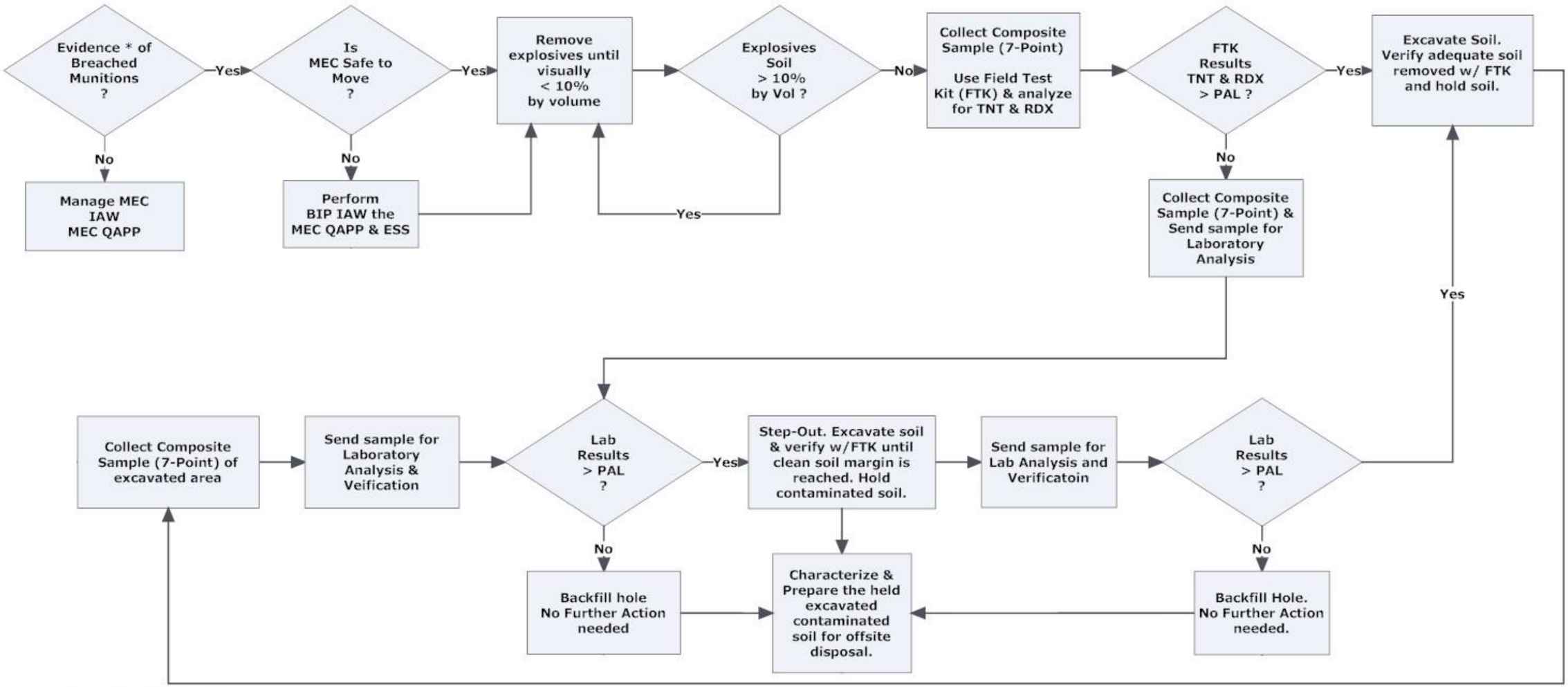

Figure 11-1: Decision Diagram for Removal, Analysis, and Excavation of Potential MCs for the OU B-2 NTCRA

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Specifying the population parameter of interest and the theoretical decision rule. The population parameter of interest is any soil associated with target anomalies derived from the DGM in OU B-2 areas that have potentially MC-contaminated soil. The theoretical decision rule would be stated as follows.

- If all of the target anomalies are investigated and any breached munitions or soil which is discolored, stained or exhibits unusual odor is sampled and where required is remediated to less than the PALs, then the site would be acceptable for its intended land use, provided the anticipated land use controls are implemented and maintained. Otherwise, additional remedial actions must be completed and/or the intended land use must be changed and/or the anticipated land use controls must be modified or changed.

Specifying excavation to depth decision, including find and no find discussions. All of the target anomalies from the DGM data must be reacquired and investigated to the spatial requirement of a 2.5-ft (0.762-m) lateral radius and a surface to 2-ft (0.6-m) or 4-ft (1.2-m) depth bgs (per RAA requirements). No signal at the target location: A no-find for MEC is defined as when no detection signal is generated in the metal detector during reacquisition. When MEC are identified according to the OU B-2 NTCRA MEC QAPP, then soil will be examined for potential MCs.

Secondary questions action requirements. All of the target anomalies from the DGM data must be reacquired and investigated. During the investigation process for each target anomaly, there is a possibility of encountering breached munitions or soil contaminated with MC which will trigger sampling and soil removal if contaminants are discovered.

- *Specifying Munitions Constituents sampling and soil removal*. If breached munitions, discolored soil or unusual odors are detected during intrusive investigations, then USA will collect soil samples to determine if explosives or other contaminants are present as described in Worksheet #17.

Step 6. Specify Performance or Acceptance Criteria:

Worksheet #12 provides the performance criteria to be used for acceptance of the data used in decision making.

Step 7. Develop the Plan for obtaining Data:

If an area indicates potential MC contamination, then field sampling technicians will implement the process shown in Figure 11-1 and detailed in Worksheet #17.

1. Sampling location coordinate data will be collected using a real time kinematic (RTK) differential global positioning system (DGPS) with an accuracy of ±0.5-ft (15-cm). Sampling locations will be reviewed and concurred to by the project team prior to any sampling is conducted. As the quantity samples are unknown at this time, field sampling and analysis will be conducted at the end of each field season to allow sufficient time for coordination and procurement of fled sampling supplies and materials.
2. Field observations and measurements will be documented in dedicated field logs using forms developed for the project (forms will be included in the final MC QAPP developed by USA).
3. For this project, the Army's Cold Regions Research and Engineering Laboratory (CRREL) seven-point sampling wheel design will be used to collect soil composites for both field test kit screening and laboratory confirmatory analysis. However, Incremental or Discrete sampling may be performed if required by the Navy RPM.
    a. This design is based on a 4-ft (1.2-m)-diameter circle. Each of the seven samples is collected equi-distant around the circumference of the circle.
    b. Each of the seven samples consists of a soil subsample (of mineral soil) that is 2-in (5-cm) in diameter and 2-in (5-cm) deep.
    c. The resulting seven samples will be well blended to create one composite.

   d. The sampling wheel will be positioned to include areas of highest apparent concentrations of MC.
   e. This sampling process will result in one composite sample for each 4-ft (1.2-m)-diameter area where MC contamination is suspected.
   f. The total number of samples to be collected during MC operations cannot be predicted. If MCs are identified at a site, the number of samples required will be based on the size of the area and the need to conduct step-out sampling.
4. At each location where breached munitions, staining, or odors indicate the potential presence of MCs, the analytical approach defined in Step 4 above will be followed:
5. On-site screening data will be collected using field using test kits according to U.S. EPA Methods 8515 and 8510.
6. Definitive sample concentrations for each RAA will be determined in at a fixed laboratory using U.S. EPA Method 8330B.

Who will use the data?

The NAVFAC Northwest and the BRAC PMO will be using the interactions and petitions for site closure with the Project Team and Stakeholders. The Team and Stakeholders include, among others, representatives from ADEC, U.S. EPA Region 10, TAC, and the USFWS.

What are the Project Action Limits?

The PALs are defined in Worksheet #15. Appendix K describes the derivation of the PALs, which are based on the following documents:

- State of Alaska Department of Environmental Conservation. AAC 75. Oil and Other Hazardous Substances Pollution Control (April 8, 2012).
- U.S. EPA Region 6 Regional Screening Level (Formerly Human Health Medium-Specific Screening Levels) (November 2012).
- NAVFAC MC QAPP for OU B-2 RI. June 6, 2008. Appendix B.

What will the data be used for?

The NTCRA data will be used to ensure that the selected anomalies and areas of mass anomalies were completely cleared of MC so the property can be utilized for the planned future land use that includes wildlife management, subsistence and recreational activities. The RAO for OU B-2 is to provide protection to human health and the environment by reducing and mitigating the explosive hazard from MC located on the surface and in subsurface soil, such that hazards associated with reasonably anticipated future land uses (wildlife management, subsistence, and recreation) are reduced to a level that can be managed through land use controls (signage and an island-wide education program).

What types of data are needed?

- Locations of the breached munitions. Intrusive investigation data to document breached munitions, discolored soil or unusual odors at the site of excavation
- Documentation of any MC present
- Results of on-site test kit calibration, quality control samples, and soil samples analyses used as a screening decision tool
- Results of analytical laboratory measurements based on U.S. EPA Method 8330B and supporting Level III/IV data packages
  - Quantitative data to confirm test kit results indicating that MC concentrations are greater than action limits

  - Quantitative data to confirm test kit results indicating that MC concentrations are less than action limits
  - Quantitative data to define concentration of soil excavated for off-site disposal
- QC documentation to support the sampling and analysis results
- Documentation of soil excavation and removal
- Results of third party validation which identify analytical issues that could impact the usability of the data.

How "good" do the data need to be in order to support the environmental decision?

- Test kits should be capable of achieving the PALs for RDX and TNT defined in Worksheet #15. These parameters will be used as surrogates for the 17 MCs during on-site testing.
- Field test kit data must be of adequate quality to support rapid remedial action decision-making concerning soil removal (i.e., are MC concentrations above cleanup levels?). False negative data is not health protective, must be avoided, and will lead to increased remedial cost. All quality control requirements defined in Worksheet #12 for test kits using U.S. EPA Methods 8515 and 8510 must be achieved.
- Laboratory data must be of adequate quality to provide definitive MC concentrations at each AOC, support the results of confirmatory sampling and to certify that soil removal in excess of the OU B-2 chemical clean-up levels has been accomplished. All quality control requirements defined in Worksheet #12 for laboratory analysis using Method 8330B must be achieved.

How much data are needed?

All anomalies selected as targets will be investigated to a 2.5-ft (0.762-m) lateral radius and a depth of 2-ft (0.6-m) for RAA-02 and RAA-03 or 4-ft (1.2-m) bgs for RAA-04, measured from the target coordinate location as pinpointed and marked during the reacquisition process. During the investigation process for each target anomaly, there is a possibility of encountering breached munitions or soil contaminated with metal or munitions constituents which will trigger sampling and soil removal if contaminants are discovered.

At each location where there is evidence of breached munitions (soil staining or unusual odors), a seven-point composite sample will be collected and analyzed on-site using a test kit with confirmation of test kit concentrations using fixed laboratory analysis. One composite sample for each 4-ft (1.2-m)-diameter area is considered enough data to detect the presence of MC at concentrations greater than the PALs. Excavation, re-sampling and creating composite samples, and reanalysis by the fixed laboratory will continue until analysis indicates that no MC are detected greater than PALs.

Additional samples will be collected of the excavated soil to determine the concentration of soil generated for off-site disposal. The total number of samples to be collected during MC operations cannot be predicted. If MC are identified at a site, the number of samples required will be based on the size of the area and the need to conduct step-out sampling.

Where, when and how should the data be collected/generated?

- Worksheet #17 provides a narrative of the activities resulting in the data required to achieve the DQOs.
- The schedule is provided in Worksheet #16.
- The data will be collected and recorded in the manner and form described in the SOPs identified in Worksheets #21 and #23.

Who will collect and generate the data? How will the data be reported?

USA will collect and analyze samples during the field activities with test kits and then ship them to an off-site analytical laboratory. The laboratory will generate definitive data using specific analytical methods

and guidelines. USA will assess the quality of the analytical data (verification and validation). Additional information on project personnel is provided in Worksheets #5, #6, and #7. USA will prepare an RI report for the Navy summarizing the project activities, objectives and results.

The Navy RPM will be responsible for submitting the RI report to the regulatory agencies.

How will the data be archived?

As specified in NAVFAC Northwest's SOP for Navy Environmental Information Transfer, Version 4.0, a copy of the hardcopy laboratory data packages will be sent to NAVFAC Northwest data management contractor for temporary storage and processing. The hardcopy data will then be submitted to the National Archive and Records Administration for 50-year storage. The laboratory-generated Naval electronic data deliverable (EDD) containing analytical results will be submitted to URS, Inc., who archives electronic data in the Navy's database, the Navy Installation Restoration Information Solution (NIRIS). USA will archive field sampling records and raw data for five years; project documents such as reports will be archived for 10 years. Data management and archival will be in a limited access storage facility as described in the USA SOPs.

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12.0 MC QAPP WORKSHEET #12 – MEASUREMENT PERFORMANCE CRITERIA

(UFP-QAPP Manual Section 2.6.2)

The tables below identify the data quality indicators (DQIs), measurement performance criteria, and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems.

Matrix Soil
Analytical Group Munitions Constituents
Concentration Level NA

Sampling Procedure[1]	Analytical Method/ SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
See MC QAPP Worksheets #17 and 18	8515	Control Sample	Reference manufacturer's specification manual	Kit ampoule of TNT for calibration	A
		Reagent Blank	"Zero"	Acetone	A
		Site-specific Background Sample	Determination of matrix interference. Evaluate positive results.	Reference area	A
	8510	Control Sample	Reference manufacturer's specification manual	Kit ampoule of RDX for calibration	A
		Reagent Blank	"Zero"	Acetone	A
		Site-specific Background Sample	Determination of matrix interference. Evaluate positive results.	Reference area	A
	8330B	Precision (laboratory)	≤ 20% RPD[3] For matrix evaluation only, therefore is taken post grinding from same ground sample as parent subsample is taken.	Matrix Spike Duplicate (MSD)	A

Matrix Soil
Analytical Group Munitions Constituents
Concentration Level NA

Sampling Procedure[1]	Analytical Method/ SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
See MC QAPP Worksheets #17 and 18	8330B	Accuracy	Compound Specific [as provided in the DoD Quality Systems Manual (QSM)][4] In-house laboratory control limits must demonstrate the laboratory's ability to meet the project's DQOs.	Laboratory Control Sample	A
		Accuracy	Compound Specific (as provided in the DoD QSM)[4] For matrix evaluation only, therefore is taken post grinding from same ground sample as parent subsample is taken. Percent recovery must meet laboratory control sample (LCS) limits.	Matrix Spike	A
		Accuracy	Compound Specific Laboratory control limits (since no limits are provided in the DoD QSM)	Surrogate Compounds	A
		Accuracy	No analytes detected > ½ laboratory quantitation limit (QL) and greater than 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results.	Method Blank	A
		Completeness	No rejected data	Data evaluation by project decision-makers	S&A

Matrix Soil
Analytical Group Munitions Constituents
Concentration Level NA

Sampling Procedure[1]	Analytical Method/ SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)

Notes:

[1] Reference number from MC QAPP Worksheet #18.

[2] Reference number from MC QAPP Worksheet #23.

[3] With the exception when the concentration is less than 5 times the quantitation limit, in which case a laboratory sample duplicate should be prepared and analyzed.

[4] Compound-specific control limits are specified in the Department of Defense (DoD) *Quality Systems Manual* (QSM), Final Version 4.2 Appendix Table G-13. If QSM does not provide control limits, then the laboratory control limits based on performance-based control charts will be applied to these compounds.

%RPD – percent relative standard deviation.

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13.0 MC QAPP WORKSHEET #13 – SECONDARY USE OF DATA CRITERIA AND LIMITATIONS

(UFP-QAPP Manual Section 2.7)

Secondary data will not be used in this assessment of MC contamination at the site.

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14.0 MC QAPP WORKSHEET #14 -- SUMMARY OF PROJECT TASKS

(UFP-QAPP Manual Section 2.8.1)

The implementation of the NTCRA investigation is divided into definable features of work (DFW) and the tasks required for completing each DFW. They are identified in the table below. Additional discussion about implementing these tasks is provided in MC QAPP Worksheet #17. Specific instructions are provided in the project SOPs indexed in Worksheet #21. DFWs not noted as administrative are subject to Preparatory, Initial and Follow-on QC inspections. Activities of a strictly administrative nature are noted in the table and are not subject to these inspections.

DFW	Tasks
Sampling Tasks	• Collect samples at designated locations after obtaining clearance from a qualified UXO technician using a metal detector (see MEC QAPP). • Collect surface soil at designated locations as indicated in Worksheet #18. • Collect surface soil samples using seven-point compositing sampling techniques. • Screen soil samples using methods SW846 8515 and 8510.
Excavation Tasks	• Excavate soil with potential MCs >PALs for confirmatory laboratory analysis. • Excavate additional soil within a RAA if laboratory analysis indicates that excavated soil exceeded the PALs. • Backfill excavated soil if laboratory analysis confirms that no MCs are present at concentrations >PALs. • Package soil for off-site disposal if laboratory analysis confirms that MCs are present at concentrations >PALs. • Ship soil for off-site disposal in compliance with all agency regulations
Documentation Tasks	• Complete chain-of-custody forms, sample labels, field forms, and field logbook entries during the field event. (Forms are provided in Appendix D of the MEC QAPP)
Analysis Task	• Collect surface soil samples and associated QC samples and send to an analytical laboratory for analysis of MC by EPA Method 8330B (as applicable at each sample location), as indicated on MC QAPP Worksheets #17 and 18). • Laboratory will perform analysis in accordance with method requirements and as specified in the DoD QSM Final Version 4.2 and this MC QAPP.
Quality Control Tasks	• Collect extra sample volume for MS/MSD analysis at a minimum frequency of one set per 20 samples. •
Assessment/Audit Tasks	• A pre-investigation “readiness review” will be performed by the selected contractor’s PM and/or Field Sampling Lead. The contractor’s Project QAO will be responsible for verifying compliance with the work plan and documenting observations on the Contractor QC Report. The Navy conducts internal systems/performance audits of off-site analytical laboratories.
Data Review Tasks	• Analytical data will be reviewed by the laboratory prior to release to the selected contractor. • Third-party data validation for confirmatory laboratory analysis will be performed by an independent contractor (LDC) using data validation procedures and guidance specified in *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA, 2008), and *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (U.S. EPA, 2010). These validation documents do not specifically address ordnance analysis and are more pertinent to analyses performed using Contract Laboratory Program analytical methodology; however, they will be used as guidance for the validation process. The validation will, at a minimum, evaluate sample receipt conditions, holding times, calibrations, method blanks, surrogate recovery, laboratory control samples, MS/MSD, analyte identification, and calculation verification. The validation will be performed using project-

DFW	Tasks
	specific criteria, as well as criteria required in the DoD QSM version 4.2, and analytical methods. Since third-party data validation is a more stringent data review than filling in ADEC-required checklists, the validation reports will be provided in place of the ADEC checklists. • Level III validation will be conducted on 90% of the laboratory data. Level IV validation will be conducted on 10% of the data. If the total number of samples collected for laboratory analysis is less than 20 (i.e., one full analytical batch) the full batch of data will undergo Level IV validation. If more than 20 samples are collected for laboratory analysis, the Level IV samples will be selected randomly by the data validator. Laboratories will not be notified of the validation level selected.
Data Management Tasks:	• Submit field and analytical data, as discussed in Worksheet #11, to USA who will archive electronic data in the Navy's database NIRIS. • Submit hardcopy analytical data to NAVFAC Northwest data management contractor for temporary storage and processing. The hardcopy data will then be submitted to the National Archive and Records Administration for 50-year storage.

15.0 MC QAPP WORKSHEET #15 – REFERENCE LIMITS AND EVALUATION TABLE

(UFP-QAPP Manual Section 2.8.1)

Matrix: Soil

Analytical Group: Explosives

Concentration Level: Low

Analyte	Chemical Abstracts Service (CAS) Number	Project Action Limit (PAL) (mg/kg)	PAL Reference	Achievable Laboratory Limits[4]		
				LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	2.4	Calculated Food Web Model Minimum Eco Screening Level[1]	0.08	0.04	0.003
Hexahydro-1,3,5-Trinitro-1,3,5-trazine (RDX)	121-82-4	5.6	RSL[3]	0.08	0.04	0.003
1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	2,200	RSL[3]	0.08	0.04	0.007
1,3-Dinitrobenzene (1,3-DNB)	99-65-0	5.8	18 AAC 75[2]	0.08	0.04	0.018
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	240	RSL[3]	0.08	0.04	0.003
Nitrobenzene (NB)	98-95-3	4.8	RSL[3]	0.08	0.04	0.009
2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	19	RSL[3]	0.08	0.04	0.005
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	16	18 AAC 75[2]	0.08	0.04	0.009
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	16	18 AAC 75[2]	0.08	0.04	0.014
2,4-Dinitrotoluene (2,4-DNT)	121-14-2	1.6	RSL[3]	0.08	0.04	0.011
2,6-Dinitrotoluene (2,6-DNT)	606-20-2	7.3	18 AAC 75[2]	0.08	0.04	0.013

Analyte	Chemical Abstracts Service (CAS) Number	Project Action Limit (PAL) (mg/kg)	PAL Reference	Achievable Laboratory Limits4		
				LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
2-Nitrotoluene (2-NT)	88-72-2	2.9	RSL[3]	0.08	0.04	0.010
3-Nitrotoluene (3-NT)	99-08-1	6.1	RSL[3]	0.08	0.04	0.010
4-Nitrotoluene (4-NT)	99-99-0	30	RSL[3]	0.08	0.04	0.015
Nitroglycerin (NG)	55-63-0	6.1	RSL[3]	0.16	0.08	0.019
Pentaerythritol tetranitrate (PETN)	78-11-5	120	RSL[3]	0.4	0.2	0.050
3,5-Dinitroaniline (3,5-DNA)	618-87-1	None established	None established	0.08	0.04	0.011

Notes:

[1] Project action level is the NOAEL-based screening level calculated for representative site-specific receptors using conservative assumptions (e.g. 100% site use) and consistent with DEC (2008) guidance (e.g. toxicity uncertainty factors). PAL cited in Table 9.2 of the Remedial Investigation Report for OUB-2, NAF Adak, Alaska (May 2012).

When the risk-based screening value is less than the laboratory QL then the QL will be used as the action level.

[2] Project action level from 18 AAC 75 (revised April 8, 2012), Table B1. Method Two - Soil Cleanup Levels Table, over 40-inch (annual precipitation) Zone, Direct Contact value available at http://dec.alaska.gov/spar/docs/18%20AAC%2075%20Rev%20April%208,%202012.pdf .

[3] Project action level from EPA Region 10, Regional Screen Level (RSL) Table (November 2012) for Residential Soil available at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2012.pdf

[4] MDLs and QLs for actual samples will be adjusted based on sample amount, moisture content, and dilution factor.

Abbreviations and Acronyms:

CAS Number – Chemical Abstracts Service Registry Number

mg/kg – milligram per kilogram

DL – method detection limit

LOD – limit of detection

LOQ – limit of quantitation

16.0 MC QAPP WORKSHEET #16 -- PROJECT SCHEDULE/TIMELINE TABLE (OPTIONAL FORMAT)

(UFP-QAPP Manual Section 2.8.2)

Field sampling schedule will be field determine based on results of intrusive investigation results from field seasons 2013 and 2014.

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17.0 MC QAPP WORKSHEET #17 – SAMPLING DESIGN AND RATIONALE

(UFP-QAPP Manual Section 3.1.1)

This worksheet describes the project's DFWs and related tasks that are performed in conjunction with them to meet requirements and objectives. This procedure will be implemented if, during investigation of MECs using the OU B-2 NTCRA QAPP, potentially MC contaminated soil is identified. Potentially MC-contaminated soil is defined as soil associated with breached munitions, discoloration or staining adjacent to a MEC, or unusual odors coming from the ground during intrusive investigations. Figure 11-1 illustrates the decision process.

17.1 CLEARING MEC

If there is evidence of potentially MC contaminated soil adjacent to a MEC/MDEH, the item will be managed and disposed of IAW SOP 9 (MEC Management and Disposal). The field sampling effort will not start until MEC/MDEH has been removed from the sampling area. Once the munition is removed, the SUXOS will determine if the area contains MCs that will require soil sampling and that the area is safe to commence soil sampling activities. This is a qualitative visual inspection to determine if it is safe to disturb the soil. Any MEC found during the sampling effort will be thoroughly documented and removed in accordance with the SOPs (in Appendix A of the MEC QAPP).

17.2 PREPARATION FOR MC SAMPLING

A UXO technician will escort the sampler during the collection of the composite subsamples. At each location where breached munitions, staining, or odors indicate the potential presence of MCs, UXO technician will remove MC pieces until the area is safe to collect soil samples. The sampling technician will proceed with collecting samples only after the area is deemed to be safe for sampling.

The required field sampling equipment is detailed in SOP 14 (Soil Sampling) and SOP 17 (Field Test Kit for TNT and RDX). The soil sampling will be performed using hardened plastic or metals scoops, spoons, or corers. This method is appropriate for subsurface sampling of breached munitions and post-remediation confirmatory sampling since the objective is to determine soil concentrations in a limited excavated area (less than one cubic yard). Dedicated sampling equipment will be used for each sample and cleaned using the procedures described in SOP 14 (Soil Sampling). Equipment will be stored in a clean, sealable plastic bag and will not be re-used. Either stainless steel or disposable plastic spoons may be used to collect the soil subsamples.

17.3 DOCUMENTATION

Sampling locations with confirmed concentrations of explosives will be thoroughly documented by detailed notes, photographs, and DGPS location information. Field observations and measurements will be documented in dedicated field logs using forms developed for the project (forms will be included in the final MC QAPP developed by USA). All field observations will be made directly into the field logs. Documentation will be in ink, signed and dated by the person making the observations. Units will be recorded. Any changes in entries will be made so as not to obscure the original entry, initialed and dated, and the revised entry clearly documented in the record.

17.4 SAMPLE COLLECTION

Once the UXO technician has visually verified that the area is safe from explosive hazards, soil sampling will proceed.

1. A photograph of the undisturbed area will be taken.
2. The exact sample location will be determined using a RTK DGPS with accuracy of ±0.5-ft (15-cm).
3. The field sampling technician will don a new pair of disposable nitrile gloves immediately before collecting the soil samples at each location.
4. Documentation in the logbook will be initiated.

5. Rocks and debris will be cleared from the RAA with a clean spade, spoon, etc. to the top of the sampling interval.
6. A seven-point sample composite will be collected as described below. Large pebbles and sticks should not be included but small vegetation should be included. Large vegetation will be removed as described in SOP 05 (Vegetation Removal and Surface Clearance).
7. The soil from each of the seven sub-samples will be placed in a heavy-duty re-sealable plastic bag and mixed well.
8. A label will be attached to the bag and the primary sample bag will be placed in a second re-sealable plastic bag and placed in a cooler.
9. Samples will be maintained between 4 ± 2 ºC.
10. Definitive sample concentrations for each RAA will be determined at a fixed laboratory using U.S. EPA Method 8330B. The off-site laboratory will conduct sample processing (air drying, grinding, sieving, and subsampling).

17.5 SEVEN-POINT SAMPLE COMPOSITE SAMPLING

The CRREL seven-point sampling wheel design will be used to collect soil composites for all field test kit screening and laboratory analysis. This design is based on a 4-ft (1.2-m) diameter circle with each of the seven subsamples collected equi-distant around the circumference of the circle. Each of the seven subsamples consists of a 2-in (5-cm)-diameter soil sample collected to 2-in (5-cm) bgs. The resulting seven subsamples will be placed in a re-sealable plastic bag to create one composite. This sampling process will result in one composite sample for each 4-ft (1.2-m)-diameter area where MC contamination is suspected. A seven-point soil composite sample will be collected from each RAA initially, and after if excavation is required and exposes new soil.

The total number of samples to be collected during MC operations cannot be predicted. If MCs are identified at a site, the number of samples required will be based on the size of the area and the need to conduct step-out sampling.

17.6 FIELD TEST KIT ANALYSIS

Testing for explosive soils will be conducted using field test kits for TNT and RDX. U.S. EPA Methods 8515 and 8510 have been chosen for screening since field test kits are readily available for TNT and RDX, which comprise the vast majority of the secondary explosives for the munitions previously found in OU B-2. SOP 17 (Field Test Kit for TNT and RDX) provides details for the methods. The field test kit results ensure that samples sent to the off-site laboratory do not contain high concentrations of explosives. If field test kit concentrations indicate that TNT or RDX concentrations are greater than the project action limits defined in Worksheet #15, then all soil within the diameter of the sampling area will be excavated and held. The field sampling and analysis of contaminated area using the field test kit will continue until adequate soil has been removed. The composite sample of the unexcavated soil will be collected and sent to the laboratory for analysis by U.S. EPA Method 8330B.

17.7 FIELD SAMPLING AND STEP-OUT

As shown in Figure 11-1, seven-point composite samples will be collected to determine MC concentrations using both field test kit and laboratory analysis.

- After it is visually confirmed that the area is safe from explosive hazards, field sampling will proceed.
- After each soil excavation, a new composite sample will be collected and analyzed using the field test kit to determine if adequate contaminated soils have been removed.
- After confirming that clean soil is reached using the field test kit, a composite sample is collected and sent to the laboratory for analysis.

If the results of laboratory analysis verify that MCs are present at concentrations >PALs in an excavated soil, re-sampling will be performed in the excavated hole.

- The first composite sample will be collected and analyzed using the field test kit at the unexcavated area. It will follow the seven-point sampling process with dimensions of 4-ft (1.2-m) diameter x 2-in (5-cm) deep.
- The second composite will be at the site of the excavated hole. It will follow the seven-point sampling process with dimensions of 4.5-ft (1.5-m) diameter x 2-in (5-cm) deep.
- Succeeding composite sampling and analysis using the field test kit will follow the pattern of increasing by 0.5-ft (15-cm) x 2-in (5-cm) deep until clean margins and depths are confirmed.
- Final confirmation composite sample will be collected of the clean margin soil and sent to the laboratory for analysis.

17.8 LABORATORY ANALYSIS

Each composite sample will be submitted to the laboratory for analysis by U.S. EPA Method 8330B. Each soil sample will be air-dried, sieved through a #10 sieve to remove particles that are >2-mm, and the <2-mm portion will be pulverized by grinding in a ring puck mill or equivalent mechanical grinder. (The >2-mm particles are discarded and not included in the rest of the procedure.) Next, the <-2 mm portion will be placed on a stainless-steel tray for subsampling. Thirty different increments (approximately 0.3 grams each) should be obtained from randomly chosen locations to obtain a 10-gram aliquot (approximately) for U.S. EPA Method 8330B sample extraction and analysis.

Laboratory results will be compared to the PALs in Worksheet #15.

- If the concentration of any of the 17 MCs is greater than PALs, then the soil will be excavated and stored for off-site disposal.
- Once excavation is complete, another seven-point composite sample will be collected and sent for laboratory analysis to confirm that the remaining soil does not contain MCs at concentrations greater than the PALs.
- If any MC concentrations are still greater than the PALs, further excavation, using the seven-point composite sampling, and laboratory analysis will be performed until MC concentrations are less than the PALs.
- In each case, the RAA will be re-excavated to a wider radius and deeper level.
- Excavation, test kit screening, and laboratory analysis will continue until laboratory analysis indicates that the soil remaining after excavation is less than the PALs.

Soil determined to be greater than PALs will be held in 55-gallon barrels. Prior to off-site shipment, composite samples will be collected for laboratory analysis to confirm the concentration of the material being shipped.

17.9 EXCAVATION, SAMPLE PACKAGING AND SHIPMENT

Any soil excavated from a RAA will be held until laboratory analysis confirms the MC concentrations. Soil will be excavated using dedicated trowels or spoons. Excavated soil will be held in large plastic buckets with tight-fitting lids. Buckets will be labeled with the same identification number used for the sample composite sent for analysis.

- If laboratory analysis confirms that none of the 17 MC components are present at concentrations greater than PALs, then the material in the bucket will be backfilled into the original hole.
- If laboratory analysis confirms that the concentration of any MC component is present at a concentration greater than the PAL, then the contents of the bucket will be placed in a 55-gallon drum for off-site disposal.

The details of excavation, packaging, and shipment compliant with agency regulations are detailed in SOP 14 (Soil Sampling), in Appendix A of the MEC QAPP.

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18.0 MC QAPP WORKSHEET #18 – SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS

(UFP-QAPP Manual Section 3.1.1)

Sampling Location(s)[1]	Matrix	Depth Relative to Ground Surface (units)	Analytical Group	Sampling SOP Reference[2]
Points of Breached Munitions	Soil	Surface	Munitions Constituents	SOP 14 (Soil Sampling)
Subsurface Breached Munitions	Soil	Depth of breached munition	Munitions Constituents	SOP 14 (Soil Sampling)
As needed to support soil remediation	Soil	Area of excavation	Munitions Constituents	SOP 14 (Soil Sampling) and SOP 17 (Field Test Kit for TNT and RDX)
Point of soil excavation	Soil	Bottom and sides of excavation	Munitions Constituents	SOP 14 (Soil Sampling) and SOP 17 (Field Test Kit for TNT and RDX)

Notes:

[1] The same potential locations will be sampled at each RAA.

[2] The contractor field SOPs will be defined in the final MC QAPP.

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19.0 MC QAPP WORKSHEET #19 – ANALYTICAL SOP REQUIREMENTS

(UFP-QAPP Manual Section 3.1.1)

Matrix	No. of Samples[1]	Analytical Group	Analytical and Preparation Method/SOP Reference[2]	Sample Volume Used for Analysis	Containers (number, size, and type)[3,4]	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Soil	Field Determined	Munitions Constituents	U.S. EPA Method 8330B[3] RTI Laboratory SOP (SOP 16 in Appendix A of the MEC QAPP)	10 grams	1 double-bagged, resealable plastic bag	4±2 °C	14 days to extract, 40 days to analyze

Notes:

[1] The number of samples listed above does not include field QC samples (e.g., matrix spikes).

[2] The appropriate analytical SOP reference letter or number from Worksheet #23 will be inserted in the final MC QAPP.

[3] Sample container type listed may vary; the project chemist shall coordinate the container sizes with the laboratory to ensure sufficient material in appropriate containers is submitted to the laboratory.

[4] The number of containers in the "Sample Container" column denotes the number of containers needed for the actual analysis. Additional volume is required for laboratory quality control (e.g., MS/MSD) sample analyses at a frequency of 1 per 20 samples.

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20.0 MC QAPP WORKSHEET #20 – FIELD QUALITY CONTROL SAMPLE SUMMARY

(UFP-QAPP Manual Section 3.1.1)

[Summarize by matrix, analytical group, and concentration level the number of field QC samples that will be collected and sent to the laboratory.]

Matrix	Analytical Group	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations	No. of Extra Volume Laboratory QC (e.g., MS/MSD) Samples	Estimated No. of Source Blanks[2]	Estimated No. of Rinsates[2]	No. of Performance Evaluation (PE) Samples
Soil	Munitions Constituents	See Worksheet #19 SOP 16, Laboratory SOP	TBD	MS/MSD (5%)	0	0	0
Soil	Munitions Constituents by Test Kits	See manufacturer's specification manual	TBD	NA	NA	NA	NA

Notes:

[1] The appropriate Analytical SOP reference letter or number from Worksheet #19 will be inserted in the final MC QAPP.

[2] The sampling plan calls for the use of dedicated sampling equipment, thus no source or rinsate blanks will be necessary.

TBD – To be determined in the field.

NA – not applicable

21.0 MC QAPP WORKSHEET #21 – PROJECT SAMPLING SOP REFERENCES

(UFP-QAPP Manual Section 3.1.2)

SOP Number	Project Phase	Task	Responsible Party	Title of SOP	Equipment Type or Instrument	Comments
SOP 02	Sampling	Determining sampling location with DGPS	USA	Digital Geophysical Surveying & GSV Plan	RTK DGPS	
SOP 05	Sampling	Vegetation removal	USA	Vegetation Removal and Surface Clearance	Mechanical and Manual	
SOP 07	Sampling	Reacquisition	USA	Target Reacquisition	RTK DGPS & White's DFX-300	
SOP 08	Sampling	Intrusive sampling	USA	Intrusive Investigation	Hand tools and White's DFX-300	
SOP 14	Sampling	Collecting soil samples, sample packaging, shipping and chain-of-custody, site logbook, Clean and decontamination of hand sampling equipment, and sample handling and custody.	USA	Soil Sampling	NA	
SOP 15	Sampling	Investigation-derived waste	USA	Investigation Derived Waste Handling	NA	
SOP 17	Sampling	Soil Field Analysis	USA	Field Test Kit for TNT and RDX	Ensys/ DTech	
SOP 18	Sampling	Data management	USA	Waste Soil Containerization and Disposal	NA	
n/a	Sampling	Excavation, packaging, and shipment of MC soil	USA	n/a – See Worksheet #17	NA	

Note:
All SOPs are provided in Appendix A of the MEC QAPP.

22.0 MC QAPP WORKSHEET #22 – FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION

(UFP-QAPP Manual Section 3.1.2.4)

Field Equipment	Activity[1]	Frequency	Acceptance Criteria	Corrective Action	Resp. Person	SOP Reference[2]	Comments
RTK DGPS	Data positioning and navigation	Daily	Functionality in compliance with the GSV Plan (data positioning); 0.328-ft (10-cm)	Troubleshoot and repair or replace	Geoscientist; UXO Team Leader	SOP 02 (Digital Geophysical Mapping) and GSV Plan	Field utilization of the GPS equipment will be IAW manufacturer's instruction manual.
Method 8510 Test Kit	RDX and HMX analysis	Daily or as defined by test kit manufacturer.	Functionality in compliance with manufacturer specifications[3]	Troubleshoot or maintain as recommended by manufacture – re-verify performance	UXO Team Leader	SOP 10 (Target Reacquisition), and SOP 11 (Intrusive Investigation)	Sampling and field utilization of the test kit is IAW manufacturer's instruction manual.
Method 8515 Test Kit	TNT analysis	Daily or as defined by test kit manufacturer.	Functionality in compliance with manufacturer specifications[3]	Troubleshoot or maintain as recommended by manufacture – re-verify performance	UXO Team Leader	SOP 10 (Target Reacquisition), and SOP 11 (Intrusive Investigation)	Sampling and field utilization of the test kit is IAW manufacturer's instruction manual.

Notes:

[1] Activities may include: calibration, verification, testing, and maintenance.

[2] The appropriate reference letter or number from Worksheet #21 will be inserted into the final MC QAPP.

[3] Acceptance criteria will be defined in the final MC QAPP once the specific test kits are determined by USA.

23.0 MC QAPP WORKSHEET #23 – ANALYTICAL SOP REFERENCES

(UFP-QAPP Manual Section 3.2.1)

Reference Analytical Method	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Yes/No)
Method 8330B	RTI Laboratory SOP	Definitive	Munitions Constituents	High-performance liquid chromatography (HPLC)	RTI SOP Laboratory	No

24.0 MC QAPP WORKSHEET #24 – ANALYTICAL INSTRUMENT CALIBRATION

(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
High-performance liquid chromatography (HPLC)	Per 8330B	Initial calibration: prior to sample analysis.	Initial calibration: ±20% relative standard deviation or r ≥0.995 for each analyte	Initial calibration: inspect system for problems, correct problem, re-calibrate.	Laboratory Technician	RTI Laboratory SOP
HPLC	Per 8330B	Second source verification: following initial calibration	Second source verification: all analytes within ±20% of the initial calibration	Problem must be corrected. No samples may be run until calibration has been verified.	Laboratory Technician	RTI Laboratory SOP
HPLC	Per 8330B	Continuing calibration: before and after every 10 samples.	Continuing calibration: all analytes within ±20% of the initial calibration	Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples.	Laboratory Technician	RTI Laboratory SOP

Notes:

[1]The laboratory SOP reference numbers will be inserted once a laboratory is selected for this project.

25.0 MC QAPP WORKSHEET #25 – ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION

Instrument/ Equipment	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
HPLC	As per instrument manufacturer's recommen-dations	See the analytical method and instrument manufacturer's recommendations	See the analytical method and instrument manufacturer's recommendations	Acceptable re-calibration	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	Laboratory Technician	RTI Laboratory SOP

Notes:

[1] The laboratory SOP reference numbers will be inserted once a laboratory is selected for this project.

26.0 MC QAPP WORKSHEET #26 – SAMPLE HANDLING

(UFP-QAPP Manual Appendix A)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Scott Crandall, Field Engineer/Sampling Technician/ USA
Sample Packaging (Personnel/Organization): Scott Crandall, Field Engineer/Sampling Technician/ USA
Coordination of Shipment (Personnel/Organization): Scott Crandall, Field Engineer/Sampling Technician/USA; Teresa Rottero, Project Chemist/USA; David Howell, Lab PM/Analytical Laboratory/RTI.
Type of Shipment/Carrier: Samples for off-site analysis will be shipped via courier or FedEx
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Coordinator/ RTI
Sample Custody and Storage (Personnel/Organization): Sample Coordinator/ RTI
Sample Preparation (Personnel/Organization): Laboratory Analyst/ RTI
Sample Determinative Analysis (Personnel/Organization): Laboratory Analyst/ RTI
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples will be archived at a minimum until the conclusion of the NTCRA effort. (Contractor PM will be notified before samples are disposed).
Sample Extract Storage (No. of days from extraction/digestion): Samples will be archived at a minimum until the conclusion of the NTCRA effort. (Contractor PM will be notified before radiological samples are disposed)
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Sample Coordinator / RTI
Number of Days After Analysis: Samples will be held at a minimum 30 days after sample receipt

Note: A UXOTII will provide the Field Engineer with field sampling and UXO escort support.

27.0 MC QAPP WORKSHEET #27 – SAMPLE CUSTODY INFORMATION

(UFP-QAPP Manual Section 3.3.3)

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Soil samples will be placed into the appropriate, labeled sample containers. See Attachment #27-1 for an example sample label. The samples will be wrapped in bubble wrap to prevent breakage and placed in a cooler. Samples for chemical analyses will be placed on ice and maintained at a temperature of 4 ± 2°C. A chain-of-custody (COC) will be completed for each cooler and placed inside an airtight re-sealable plastic bag and taped to the inside lid of the cooler. See Attachment #27-2 for an example COC form. Custody seals, which are simple tape seals that are signed, dated and placed over the lid of the transport cooler, will be used for samples shipped to the laboratory. See Attachment #27-3 for an example custody seal. Each cooler will be sealed with shipping tape and labeled for identification. The coolers will be sent priority overnight via Fed Ex to a designated laboratory for analysis.

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal):

Upon the receipt of the samples by RTI, laboratory personnel will inspect the cooler(s) for signs of tampering. The samples will be logged into the facility sample tracking system. The samples will be disposed of by the laboratory unless notified otherwise by USA personnel.

Sample Identification Procedures:

Each sample collected will be given unique sample identification (ID). The sample ID is project specific and a record of all sample IDs will be kept with the field records and recorded on a COC form. The labeling scheme for sample identification will include a location identifier RAA, grid number and a sequentially assigned number (e.g., 001). The location coordinates for each sample will be documented.

For example, ID number RAA-01-A01-001 represents the first sample taken in RAA-01, within grid area A01 during the OU B-2 NTCRA project. See Worksheet #18 for specific sample locations and IDs.

Chain-of-custody Procedures:

The sample ID, matrix, sample collector's name, collection date and time, QC sample designation, along with the laboratory analyses required will be recorded on the COC form. Just before the samples are to be shipped, the sample relinquishment time and date will documented on the COC by the field team leader (or his designee). The COC will then be signed, placed in an airtight re-sealable plastic bag, taped to the top lid of the cooler, and sealed in the sample cooler. Upon receipt of the sample cooler(s) by RTI laboratory, the laboratory personnel will inspect the samples for completeness, and document the receipt time and date on the COC. A copy of the finalized COC will be sent to the field team leader for review.

Attachment 27-1: Sample Label

Date: [DATE] ***Time:*** [TIME]

Collector's Initials:

Sample ID: RAA-01-A01-001

Sample Location:

Matrix: *Soil*

Analyses Required:

Preservative:

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Attachment 27-2: Chain of Custody Record

Project ID: _____

Samples Shipped to: _____

Laboratory Contact Name/Phone Number:_____

Collector's Initials:_____

						Analyses Requested						
Sample ID	**Matrix**	**Date**	**Time**	**Sample Description/ Container Type/Preservative**	**No. of Containers**							**Remarks**

Additional Instructions:

Relinquished By (Signature/Affiliation):	Date:	Received By (Signature/Affiliation):	Date:
Relinquished By (Signature/Affiliation):	Date:	Received By (Signature/Affiliation):	Date:
Relinquished By (Signature/Affiliation):	Date:	Received By (Signature/Affiliation):	Date:

Attachment 27-3: Custody Seal

CUSTODY SEAL

Signature: _____

Date: _____

28.0 MC QAPP WORKSHEET #28 - QC SAMPLES TABLE

(UFP-QAPP Manual Section 3.4)

Table 28-1: QC Samples Table

Matrix	Soil
Analytical Group	Munitions Constituents
Concentration Level	NA
Sampling SOP(s)	See Worksheet #21
Analytical Method/SOP Reference	8330B
Sampler's Name	Scott Crandall, Field Engineer/Sampling Technician
Field Sampling Organization	USA
Analytical Organization	RTI Laboratories, Inc.
No. of Sample Locations	To be determined in the field. Also see Worksheet #18

Laboratory QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per ≤ 20 samples or whenever samples extracted	No analytes detected > ½ Reporting Limit (RL) and greater than 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results.	As specified in DoD QSM (Table F-3)	Laboratory Technician	Accuracy	No analyte > ½ QL
MS MSD	1 per ≤ 20 samples	Compound specific (as provided in Table 28-2)	As specified in DoD QSM (Table G-13)	Laboratory Technician	Accuracy	Compound specific (as provided in Table 28-2)
MSD	1 per ≤ 20 samples	≤ 20%RPD[1]	As specified in DoD QSM (Table F-3)	Laboratory Technician	Precision	≤ 20%RPD

Laboratory Control Sample	1 per ≤ 20 samples	Compound specific (as provided in Table 28-2)	As specified in DoD QSM (Table G-13)	Laboratory Technician	Accuracy	Compound specific (as provided in Table 28-2)
Laboratory QC Sample:	**Frequency/Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**
Surrogate Compounds (4-nitroaniline)	All samples	70-130% recovery per DoD QSM	As specified in DoD QSM (Table F-3)	Laboratory Technician	Accuracy	70-130% recovery per DoD QSM
Second column confirmation	When target analytes are detected on the primary column using the ultraviolet detector (HPLC) at concentrations exceeding the limits of detection (LOD)	≤ 40%RPD	As specified in DoD QSM (Table F-3)	Laboratory Technician	Accuracy	≤ 40%RPD

Notes:

[1] With the exception when the concentration is less than 5 times the quantitation limit, in which case a laboratory sample duplicate should be prepared and analyzed.

Table 28-2: Laboratory Control Limits

Analyte	Precision (%RPD)	Accuracy MS/MSD (% recovery)	Accuracy LCS/LCSD (% recovery)
Explosives			
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	20	75-125	75-125
Hexahydro-1,3,5-Trinitro-1,3,5-trazine (RDX)	20	70-135	70-135
1,3,5-Trinitrobenzene (1,3,5-TNB)	20	75-125	75-125
1,3-Dinitrobenzene (1,3-DNB)	20	80-125	80-125
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	20	70-125	70-125
Nitrobenzene (NB)	20	75-125	75-125
2,4,6-Trinitrotoluene (2,4,6-TNT)	20	55-140	55-140
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	20	80-125	80-125
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	20	80-125	80-125
2,4-Dinitrotoluene (2,4-DNT)	20	80-125	80-125
2,6-Dinitrotoluene (2,6-DNT)	20	80-120	80-120
2-Nitrotoluene (2-NT)	20	80-125	80-125
3-Nitrotoluene (3-NT)	20	75-120	75-120
4-Nitrotoluene (4-NT)	20	75-125	75-125
Nitroglycerin (NG)	20	70-125	70-125
Pentaerythritol tetranitrate (PETN)	20	70-125	70-125
3,5-Dinitroaniline (3,5-DNA)	20	75-125	75-125

Notes:

MS/MSD: Matrix spike/Matrix spike duplicate
LCS/LCSD: Laboratory control sample/ Laboratory control sample duplicate

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29.0 MC QAPP WORKSHEET #29 – PROJECT DOCUMENTS AND RECORDS

(UFP-QAPP Manual Section 3.5.1)

The documents, forms and records listed in the table below were developed for the Adak NTCRA project. A project-specific SharePoint site was established to manage, track, retrieve and store all documents pertinent to the project.

Report/Form	Generator	Work Element	Frequency	Location/Storage
Laboratory QA Plan	Lab	All	Once	RTI
National Environmental Laboratory Accreditation Program (NELAP) Accreditation	NELAP	N/A	Once	RTI
Sample Receipt and Tracking Records	Lab	Sample analysis	Once	USA, RTI, & LDC
Laboratory Chain-of-Custody Records	SUXOS, Lab	Sample analysis	Once	USA, RTI, & LDC
Equipment Calibration Logs	Lab	Sample analysis	Once	RTI
Sample Prep Logs	Lab	Sample analysis	Once	RTI
Laboratory Corrective Action Reports	Lab	Sample analysis	Once	RTI
Electronic copy of the analytical data reports	Lab	Sample analysis	Once	USA, RTI, Admin Record
Data Summary and Instrument raw data for Field Samples, Standards, QC Checks, and QC Samples	Lab	Sample analysis	Once	RTI
Laboratory Internal Data Package Completeness Checklist	Lab	Sample analysis	Once	RTI
Case Narrative	Lab	Sample analysis	Once	RTI
Definition of Laboratory Qualifiers	Lab	Sample analysis	Once	RTI & LDC
Documentation of Laboratory Method Deviations	Lab	Sample analysis	Once	RTI & LDC
Laboratory Sample Identification Numbers	Lab	Sample analysis	Once	USA, RTI, & LDC
Standards Traceability Records	Lab	Sample analysis	Once	RTI & LDC
Analytical Audit Checklists	Lab	Sample analysis	Once	RTI & LDC
Data Validation Reports	Data validator	Data validation	Once	LDC

30.0 MC QAPP WORKSHEET #30 – ANALYTICAL SERVICES

(UFP-QAPP Manual Section 3.5.2.3)

Matrix	Analytical Group	Concen-tration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	Munitions Constituents	NA	See Worksheet #23	28 days	Primary Laboratory: RTI Laboratories, Inc 31628 Glendale Street Livonia, MI 48150 David Howell 734-422-800 ext 302 dhowell@rtilab.com	Secondary (Back-up) Laboratory: Test America Laboratories, Inc. 880 Riverside Parkway West Sacramento, CA 95605 David Herbert (916) 373-5600 david.herbert@testamericainc.com

31.0 MC QAPP WORKSHEET #31 – PLANNED PROJECT ASSESSMENTS

(UFP-QAPP Manual Section 4.1.1)

The planned audits and assessments are designed around the three phase quality control inspection system. QA will conduct independent audits as specified in the Quality Assurance Surveillance Plan. Table 31-1 lists the task, frequency, responsible organization and personnel.

Table 31-1: Task, Frequency, Responsible Organization and Personnel

Assessment Type (Task)	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Preparatory Inspection	Prior to beginning sampling activities	External	Navy	Navy QA Contractor	PQCM & Project Chemist	Project Chemist	Project Chemist
Initial Inspection	During first sampling event	External	Navy	Navy QA Contractor	PQCM & Project Chemist	Project Chemist/Project Superintendent	Project Superintendent
Follow up Inspection	Daily during sampling	External	Navy	Navy QA Contractor	PQCM & Project Chemist	Project Chemist/Project Superintendent	Project Superintendent

32.0 MC QAPP WORKSHEET #32 – ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES

(UFP-QAPP Manual Section 4.1.2)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (name, title, organization)	Timeframe for Response
Surveillance, Inspection or Audit	Nonconformance Report	USA PM, USA Project Superintendent, & Navy QA Contractor	24 hours	Nonconformance Report (QA)	RPM, NTR, USA PM and USA Project Superintendent	48 hours
Surveillance, Inspection or Audit	Deficiency Notice	USA PM, USA Project Superintendent, & Navy QA Contractor	24 hours	Deficiency Notice	RPM, NTR	48 hours

33.0 MC QAPP WORKSHEET #33 – QUALITY CONTROL MANAGEMENT REPORTS

(UFP QAPP Manual Section 4.2)

The QC management reports that will be generated for the project are listed below. All QC management reports will be included as attachments to the final project report, when appropriate.

Type of Report	Frequency (daily, weekly, monthly, etc.)	Projected Delivery Dates	Responsible Person(s)	Report Recipient(s)
Data validation report	Every sample delivery group	Up to 20 business days after receipt of data package	LDC	Teresa Rottero, USA Project Chemist
Laboratory Technical Systems/Performance Audits	As per Navy QSM	Unknown	Navy QA Contractor	RTI Laboratory PM
FCR	As required per field change	As needed	Manok Synakorn, USA PM	Justin Peach, Navy RPM
RA Field Season Completion Report	Once at the completion of field work each field season	Per the contract	Manok Synakorn, USA PM	Justin Peach, Navy RPM

34.0 MC QAPP WORKSHEET #34 – VERIFICATION PROCESS (STEP I)

(UFP-QAPP Manual Section 5.2.1)

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Field logbooks	Field notes will be reviewed periodically to determine completeness, appropriateness, ease of understanding, etc., of the information recorded. Upon completion of the field work, logbooks will be placed in the project files. Copies will be included in the Final Report.	Internal	Frank Magner, USA Project Superintendent Manok Synakorn, USA PM
COC forms	COC forms will be reviewed against the samples packed in the specific cooler prior to shipment. Original COC forms will be sent with the samples to the laboratory, while a copy is retained for the project files.	Internal	Frank Magner, USA Project Superintendent Manok Synakorn, USA PM
Sample receipt and log-ins	Sample receipt and log-in summaries will be reviewed to determine potential receipt issues that may impact data quality and for consistency with the COC forms.	Internal	Teresa Rottero, USA Project Chemist
Laboratory analytical data package prior to release	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal	External	David Howell, RTI Laboratory PM
Laboratory analytical data package	Data packages will be reviewed by the validation firm	External	LDC
Data validation report	Data validation reports will be reviewed by the Project Chemist	Internal	Teresa Rottero, USA Project Chemist
Electronic Data	Electronic laboratory data and field data will be reviewed for consistency with the hardcopy information	Internal	Teresa Rottero, USA Project Chemist
Data validation report	The validated analytical results will be compiled in a tabulated summary. Entries will be reviewed/verified against hardcopy information.	Internal	Manok Synakorn, USA PM
Audit reports	Upon report completion, a copy of all audit reports will be placed in the project file. If corrective actions are required, a copy of the documented corrective action taken will be attached to the appropriate audit report in the project file. Periodically, and at the completion of site work, project file audit reports will be reviewed internally to ensure that all appropriate corrective actions have been taken and that corrective action reports are attached.	Internal	Teresa Rottero, USA Project Chemist

35.0 MC QAPP WORKSHEET #35 – VALIDATION PROCESS (STEPS IIA AND IIB)

(UFP-QAPP Manual Section 5.2.2) (Figure 37 UFP-QAPP Manual) (Table 9 UFP-QAPP Manual)

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs, MC QAPP	Examine field logbooks, logsheets, and COCs to ensure sample collection was performed per the plan. Determine impacts of any deviations from sample collection.	Scott Crandall, USA Field Engineer/Sampling Technician Teresa Rottero, USA Project Chemist
IIa	Chain-of-Custody Forms	Examine COC forms against MC QAPP requirements such as analytical methods, sample identification, etc.	Field Engineer/Sampling Technician, Scott Crandall
IIb	Documentation of QC sample results	Establish that all required QC samples were analyzed, results reported and evaluation criteria met.	Teresa Rottero, USA Project Chemist
IIb	Laboratory data package	Examine laboratory package against MC QAPP requirements and COCs (i.e., sample identification, holding times, quality control samples, field replicates, analytical methods, etc.) Determine impacts of any deviations or quality issues associated with analytical data.	Teresa Rottero, USA Project Chemist
IIb	Laboratory data package	Perform validation on 10% of reported data to confirm calculations.	Teresa Rottero, USA Project Chemist
IIb	Quantification limits	Determine whether Quantitation Limits identified in the MC QAPP were met.	Teresa Rottero, USA Project Chemist

Notes:

IIa = Compliance with methods, procedures, and contracts

IIb = Comparison with measurement performance criteria in the MC QAPP

36.0 MC QAPP WORKSHEET #36 – ANALYTICAL DATA VALIDATION SUMMARY (STEPS IIA AND IIB)

(UFP-QAPP Manual Section 5.2.2.1)

Step IIa / IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (Title and Organizational Affiliation)
IIa	Soil	Munitions Constituents	In accordance with laboratory SOPs, the provisions of this MC QAPP, the method parameters, and the U.S. EPA National Functional Guidelines and the DoD Quality Systems Manual version 4.2.	Laboratory QA Manager; LDC
IIb	Soil	Munitions Constituents	In accordance with the DQO's, the provisions of this MC QAPP; and the DoD Quality Systems Manual version 4.2.	Project QC Manager, USA

Notes:

Third-party data validation will be conducted at the frequency of 10% Level IV and 90% Level III.

Level III and IV Data Validation

Level IV data validation will be performed on the summary and complete raw data packages for analyses of soil samples. For explosives analyses 100% of all detects must be recalculated. Level III data validation will be performed on the summary information (i.e., no raw data packages) for analyses of soil samples. The data reviewer will not recalculate any of the detections during the level III validation.

The data reviewer will validate all components of the data package and will qualify any data that fail to meet established criteria. An overall final qualification of results will encompass the impact of individual findings and will be determined using the professional judgment of a senior data reviewer. Results will be flagged as estimated or rejected as appropriate according to procedures in the U.S. EPA National Functional Guidelines.

Data validation procedures will be in accordance with U.S. EPA National Functional Guidelines and DoD QSM version 4.2.

Data Validation Elements

The elements to be reviewed during data validation include holding times, ICAL, continuing calibration, blanks, surrogate recovery, MS and MSD recovery, laboratory control sample recovery, compound identification, compound quantitation, second column confirmations, manual integrations (including the chromatograms before and after integration and the reason for the manual integration), detection limits and system performance.

37.0 MC QAPP WORKSHEET #37 – USABILITY ASSESSMENT

(UFP-QAPP Manual Section 5.2.3)

Analytical Data Quality and Usability

Project decision-makers will perform the data quality assessment. Key project personnel, including the USA PM and Navy QA Contractor, will evaluate the overall quality of the dataset to determine whether the project decisions can be made with the desired level of certainty. This involves reviewing the analytical results while considering the specific questions outlined in Worksheet #11. Evaluation of the laboratory QC samples will permit an estimation of analytical uncertainty. Evaluation of the MS results will permit an evaluation of bias resulting from the sample matrix.

In looking at the overall measurement error associated with this project, the data will be reviewed for precision, accuracy, representativeness, comparability, sensitivity, and completeness (PARCC) parameters). If project-required measurement performance criteria are not achieved for these parameters, then it will need to be determined if the project data are usable to address the environmental questions asked in Worksheet #11. If the project data are not usable, then it will need to be determined if re-sampling is necessary.

QC Criteria for Usability Assessment

- **Precision** - A measure of the reproducibility of a set of replicate results or the agreement among repeat observations made under the same conditions. Analytical precision is the measurement of the variability associated with duplicate or replicate analyses. For this project, a LCS will be used to determine the precision of the analytical method. Total precision is the measurement of the variability associated with the analysis process. It is determined by analysis of duplicate laboratory control samples and measures variability introduced by the laboratory. Laboratory control duplicate and MSD samples will be used to assess analytical precision and the precision measurement will be determined using the RPD between the duplicate sample results. The formula for calculating the RPD is as follows:

  RPD = 100 × 2 × (result - duplicate result)/(result + duplicate result)

  Unacceptable precision may result from analytical measurement performance, poorly preserved sample, or heterogeneity of the sample. Impact of unacceptable precision should be discussed in the report.

- **Accuracy -** The nearness of a result or the mean of a set of results to the true or accepted value. Analytical accuracy is measured by comparing the percent recovery of analytes spiked into a LCS against a control limit. Surrogate compound recoveries are also used to assess accuracy and method performance for each sample analyzed. The formula for calculating accuracy uses the following equation to determine percent recovery (%R) of specific analytes.

  %R = 100 x (spiked sample result - unspiked sample result)/amount of spike added

Unacceptable performance is associated with sampling and analytical systematic and random errors. Systematic errors affect the precision parameter, while random errors will introduce bias in the analysis.

- **Representativeness** - The degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter mostly concerned with the proper design of the sampling program.
- **Field Completeness** - The percentage of samples collected according to the sampling scheme. The field completeness goal is to collect a sufficient amount of samples to produce valid data to meet project needs. Completeness is calculated as the number of samples collected divided by the number of sampling locations including step-outs expressed as a percentage determines the

completeness of the data set. The field completeness goal is 100 percent for soil samples. The field completeness is calculated using the following equation:

% Completeness = 100 × (number of soil samples/number of sampling locations including step-outs)

- **Laboratory Completeness** - The percentage of measurements made that are judged to be valid measurements. The laboratory completeness goal is to generate a sufficient amount of valid data to meet project needs. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results expressed as a percentage determines the completeness of the data set. For completeness requirements, valid results are all results not qualified with a rejected ('R') flag. The laboratory completeness goal is 90 percent for soil samples. The laboratory completeness is calculated using the following equation:

  % Completeness = 100 × (number of valid analyte results/number of possible results)

- **Comparability** - A qualitative parameter expressing the confidence which one dataset can be compared with another. Sample data should be comparable with other measurements for similar samples and sample conditions. The objective for the QA/QC program is to produce data with the greatest possible degree of comparability. Comparability is achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standard and comprehensive reporting formats.

Usability of the data generated for this project will be determined by evaluating:

a. Data completeness
b. Field documentation
c. Sample tracking (COC)
d. Holding time compliance
e. Unusable samples due to breakage or insufficient quantity may require resampling (i.e., broken, leaking and/or missing sample containers)
f. Adherence to project specific sampling and analytical methods
g. QC sample performance
h. Impact of interference/bias in analysis (matrix effect)
i. PARCC parameters

A statement regarding the usability of the data will be included in the completion report.

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FINAL

APPENDIX C

CONSTRUCTION WORK PLAN (CWP)

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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LIST OF ATTACHMENTS

Attachment A: Road Construction / Maintenance Activity Hazard Analyses

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ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
AOC	Area of Concern
bgs	below ground surface
CWP	Construction Work Plan
DGM	Digital Geophysical Mapping
EMRF	Estimated Maintenance Road Footage
ENAPF	Estimated New Access Path Footage
ESS	Explosives Safety Submission
FS	Feasibility Study
HDPE	High Density Polyethylene
IAW	In Accordance With
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAF	Naval Air Facility
NAVFAC	Naval Facilities Engineering Command
NTCRA	Non-time Critical Removal Action
NTR	Navy Technical Representative
OU	Operable Unit
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Area
RI	Remedial Investigation
RPM	Remedial Project Manager
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
USA	USA Environmental
UV	Utility Vehicle
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer
UXOTII	UXO Technician II

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1.0 INTRODUCTION

Naval Facilities Engineering Command (NAVFAC) Northwest is conducting a non-time critical removal action (NTCRA) for munitions and explosives of concern (MEC) in various Remedial Action Areas (RAAs) within Operable Unit (OU) B-2 at the former Naval Air Facility (NAF), Adak, Alaska. This Construction Work Plan (CWP), which is a component of the NTCRA MEC Quality Assurance Project Plan (QAPP), documents the steps necessary to implement improvements to existing roadways and drainage associated with access paths to facilitate the planned remedial action for the designated five RAAs at OU B-2. The five RAAs are RAA-01, RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01. Figure 1-1 shows the locations of the RAAs. Specific proposed activities in the RAAs are listed in Table 1-1. Temporary access paths will be constructed to access the RAAs to facilitate the NTCRA field activities.

This CWP contains procedures and metrics for access path construction and existing road maintenance and drainage improvements for application at the RAAs listed in Table 1-1. This plan is organized as follows.

- Section 2.0 of this plan describes the overall road and drainage Improvement and restoration approach.
- Section 2.1 describes the mobilization for this project.
- Section 2.2 provides the details of road improvements and access pathway construction activities related to area RAA-03.
- Section 2.3 outlines the construction activities related to area RAA-05/ALDA-01.
- Section 2.4 describes road improvement and access pathways for area RAA-04.
- Section 2.5 presents road construction and access pathway construction details for area RAA-02.
- Section 2.6 describes construction activities associated with area RAA-01 (OB/OD-01).
- Section 2.7 provides a description of demobilization activities.
- Section 3.0 provides references cited in the document.

Construction work on the road and drainage improvements is planned to begin in April 2013 as support activity to the removal actions planned for RAA-02, RAA-03, RAA-04, and RAA-05/ALDA-01. Field activities for RAA-01 are planned for Field Season 2 of the NTCRA at OU B-2. Field Season 1 for road maintenance and access path drainage improvements is expected to span April through August 2013. Field Season 2 is expected to span April through June 2014, where additional maintenance will be performed, with final site restoration and demobilization activities finishing up in June 2014.

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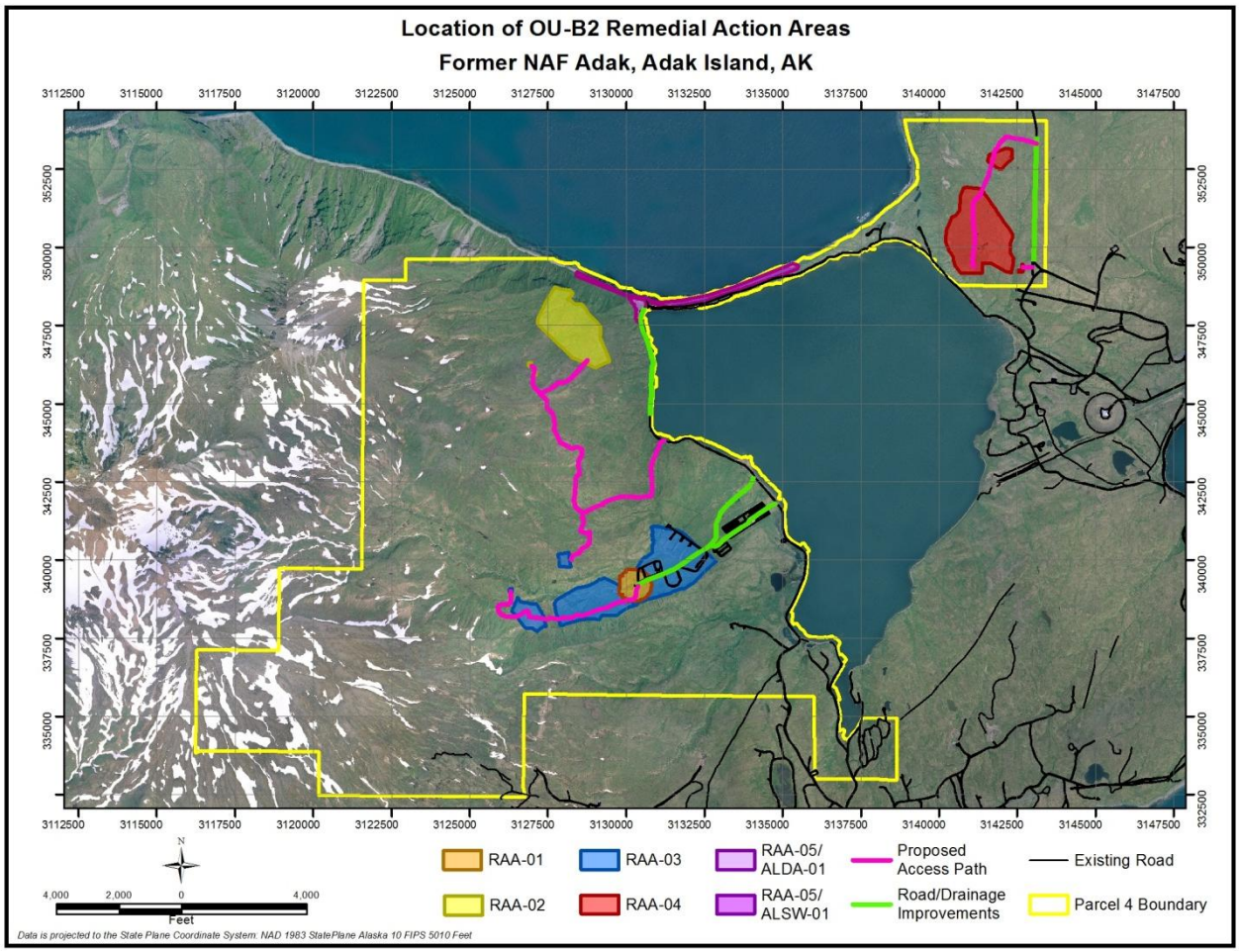

Figure 1-1: Location of OU B-2 RAAs and AOCs, Adak Island, AK

Table 1-1: Proposed Road and Drainage Improvements for NTCRA Activities in OU B-2

RAA Name	Former Area of Concern (AOC)	Proposed Activity	Estimated Maintenance Road Footage (EMRF)/ Estimated New Access Path Footage (ENAPF)
RAA-02 and RAA-05/ALDA-01	C1-01 and ALDA-01	Road and Drainage Improvement and Site Restoration.	EMRF 3,600 linear ft ENAPF 6,000 linear ft
RAA-01 and RAA-03	Western AOCs: MI-01, MI-02 and MI-03 Eastern AOCs: RR-01 and HG-01 OB/OD-01	Road and Drainage Improvement and Site Restoration.	EMRF 8,100 linear ft ENAPF 5,100 linear ft
RAA-04	SA93-01 and SA93-03	Road and Drainage Improvement and Site Restoration.	EMRF 4,000 linear ft ENAPF 4,400 linear ft

2.0 ROAD/DRAINAGE IMPROVEMENT AND RESTORATION

The overall approach for construction activities related to road maintenance and access path establishment is to provide minimal impact construction to those areas that require vehicle access. This maintenance and path establishment will allow for necessary access to conduct the NTCRA and related remedial activities.

After mobilization of materials and equipment at the beginning of Field Season 1, initial access road maintenance and layout of new access paths will be conducted. Existing roads leading to the new access paths will initially be evaluated for areas that require maintenance to better facilitate transport and access to each RAA. Upon completion of the evaluation of existing roads, specific areas identified may have minor maintenance performed, including ditch clearing and grading to properly convey surface run off, pothole filling, and grading with native material to better crown roads for proper drainage and provide for daily transit to the work areas during the NTCRA activities. New access paths will be laid out across the existing topography to gain access to each RAA in order to facilitate common main approaches to each RAA, thus minimizing the overall impact to surface areas.

Prior to any access pathway determination, the pathway will require MEC clearance (the portion of the paths located inside the defined RAA) in accordance with Vegetation Removal and Surface Clearance Standard Operating Procedure (SOP) 5, and Intrusive Investigation SOP 8 (Appendix A of the MEC QAPP) and Section 6.0 of the Explosives Safety Submission (ESS). Preceding vegetation clearance prior to construction of the access paths, unexploded ordnance (UXO) teams will perform a detector-aided surface clearance to remove any surface MEC, material potentially presenting an explosive hazard (MPPEH), or other metallic debris that would affect the construction. The cleared path will be flagged for the construction crew to follow. No access paths in any RAAs will be constructed without being first MEC screened and cleared.

Based on experience during the 2008 Remedial Investigation/Feasibility Study (RI/FS) activity, vegetation at the RAAs varies from bare soil to 2- to 3-ft in height. This grass height may impede worker access and could affect the depth to which metallic objects are detected during digital geophysical mapping (DGM) and hand-held geophysical instrument operation. Therefore, grass clearance may be necessary in some areas of the sites. Prior to grass or vegetation clearing, UXO teams will perform a detector-aided surface clearance to remove any surface MEC, MPPEH, or other metallic debris that may affect the construction of the new access paths.

Vegetation clearance teams will consist of UXO technicians. This clearance may involve cutting the grass to a height of approximately 6-in. above the walking surface. Grass cutting and the disturbance of the tundra mat will be limited only to the degree necessary to perform clearance activities and allow for access path construction as applicable at affected areas.

Those areas that may require further clearing or excavation into the mineral soil will require subsurface clearance prior to conducting any intrusive activity. In accordance with Section 6.0 of the ESS and the QAPP, the subsurface will then require screening and any anomalies will be flagged and investigated in accordance with (IAW) the QAPP and ESS. The UXO Safety Officer (UXOSO) and Senior UXO Supervisor (SUXOS) will provide approval prior to an intrusive action for any construction activity. In the event that potentially contaminated soil is encountered, the Navy Remedial Project Manager (RPM) and Navy Technical Representative (NTR) will be notified by the Project Superintendent. At the direction of the RPM, appropriate sampling and further steps will be taken IAW the MC QAPP (Appendix B).

Likewise, encounters with cultural (historic landmarks and archaeological features) and natural resources (floodplain, plant, wildlife, etc.) will be handled IAW the MEC QAPP, Cultural Resources Protection Plan, and other supporting documents.

Stormwater runoff will not need to be sampled during the project; however, silt fence may be used, as necessary, to prevent silt runoff into Andrew Lake (NAVFAC Land Use Controls 2010). Other Best Management Practices may be used to maintain a clean site and prevent unwanted erosion and detrimental surface impacts.

2.1 MOBILIZATION

This task covers efforts associated with the mobilization and demobilization of personnel, materials, and equipment. Specific mobilization and demobilization activities include equipment and material mobilization plus staging for transport on a barge to Adak from Seward, Alaska, for the first season. Equipment and materials to be mobilized include:

- Several hundred feet of standard silt fencing, t–posts, orange construction fencing, wire ties, absorbent booms, and core logs for erosion and sediment controls
- Several 20-ft sections of 12-in-diameter, smooth bore, high density polyethylene (HDPE) culvert material
- Several sections of 2-ply 8-ft by 7-ft swamp mats for placement across swampy wetland areas to allow utility vehicles (UVs) to traverse with minimal damage to the terrain
- Miscellaneous lumber, construction tools, small generator, pressure washer, and an assortment of miscellaneous other materials (oils, lubricants, starting fluids, air filters, and equipment maintenance materials).

A core group of personnel for the first season will mobilize to Adak early to attend site orientation and organizational meetings prior to initial site setup activities. Personnel will include:

- Operator foreman, and up to two operators/laborers. The personnel mobilized will have a multi-faceted skill set to be able to address different construction scenarios as the construction work will be varied in specific application and type.
- Equipment and materials mobilization and staging as needed for the second season. It is not anticipated that barging of equipment and materials will be less for the second season. Transfer of materials will be conducted on a normal commercial carrier for the second season as appropriate for the work to be completed.

First Season Demobilization will include departure of personnel and selected equipment/materials from the site. Demobilization will take place after site restoration activities are conducted, relative to the completion of Season 1 field activities and related road/access path maintenance construction. Before full demobilization from Field Season 1, construction equipment and miscellaneous tools to remain on-island will be winterized and secured so that upon mobilization for Season 2, this equipment will be readily usable with minimal maintenance.

Personnel for Field Season 2 will mobilize to Adak for site orientation and commence Field Season 2 construction activities. Field Season 2 personnel and equipment will consist of the following:

- Operator foreman, and up to two operators/laborers
- Re-use of equipment and hand tools that were secured at the end of Season 1
- A re-supply of miscellaneous equipment maintenance materials, (oil, grease, lubricants, miscellaneous maintenance equipment parts)
- A re-supply of temporary erosion and sediment control devices (silt fence, posts, core logs) and miscellaneous lumber and hardware
- A re-supply of culvert, if necessary

Personnel for the second season will again be required to attend a site orientation and perform initial site set up organizational activities prior to conducting the actual construction activities.

Demobilization of equipment, materials, and personnel at the end of the second season will include removal of all equipment, materials, and personnel from the site after site restoration activities are complete.

2.2 RAA-03

Project activities are planned in four geographically separate areas, as shown on Figure 1-1. Road and drainage improvements on the necessary existing access roads will be made in the above areas to support the project activities. Additional new temporary access paths will be installed to facilitate common access to interior portions of each RAA so that the NTCRA activities can be conducted with minimal surface impact. The existing roads in RAA-03 will be evaluated for application of maintenance to facilitate safe and effective vehicle passage. This includes the clearing and repairs to existing ditches, swales, and culverts adjacent to established roads to maintain the road in passable condition so that washouts are repaired, culverts are unblocked, and overwash conditions are corrected.

Road maintenance activities include ditch clearing, minor road grading, and filling of pot holes and low lying areas that need repair to allow for effective movement of construction related traffic. Note that NOSSA determined that maintenance of the roads to Parcel 4, along the west side of Andrew Lake, and along the eastern border of RAA-04 did not pose a munitions hazard and no ESS was required for work in those areas. Road maintenance will be conducted at RAA-03 using heavy equipment, excavator loader, skid steer type tracked equipment. Ditch spoils will be cast upwards from the ditch parallel to the road. Cast spoils consisting of soil, sediment, gravel, and small rocks will be inspected by the UXOTII, graded along or near the shoulder, and used along unimproved roads to fill pot holes and assist with grading.

The construction crew will be briefed on MEC and MEC avoidance procedures. During road maintenance outside of the RAAs, MEC/MPPEH is not expected to be encountered; however, in the instance that the construction crew recognizes or suspects an item of concern, the crew will then retreat, and subsequently report (Three R's) the item. Reporting of the find will be to the UXOSO and the SUXOS, where further potential MEC investigation and determination would be handled by UXO personnel. Subsequent construction in the immediate vicinity will cease until the area is cleared for continuing construction by the UXOSO and SUXOS.

Any MEC/MPPEH encountered will be handled by UXO personnel IAW the MEC QAPP. Excess spoils will be stockpiled. Movement of spoils to other locations along the roadway will be accomplished by use of various heavy equipment, front end loader, or dump truck, as dictated by the specific distances to be moved and the volume of material.

Construction of the new access path will consist of following the prescribed location, removal of minimal necessary vegetation, and minimal grading and civil slope work. The path will traverse the slopes at locations that maximize level placement while minimizing disturbance of existing surface conditions IAW the topography drainage requirements and specific location. If necessary, the movement of soil and/or materials will be accomplished after UXO team clearance and with approval by UXOSO and SUXOS. A certain portion of such construction may be accomplished manually to minimize physical impact to the existing surface conditions. Minimal construction impact practices will be employed to limit the amount of material movement necessary to construct the pathway. Additionally erosion and sediment controls will be utilized at the critical areas where disturbance dictates necessary controls be placed. Erosion controls will include use of jute matting with silt fencing applied, as necessary. The wear surface will consist of unimproved soil/rock/gravel meant for traverse by UVs with minimal widths to limit the overall footprint and environmental impact.

Along the path there may be a number of necessary culvert crossings so that perennial streams can flow without being impacted by vehicular traffic. It is not anticipated that any culvert crossings will be across identified anadromous streams or creeks as identified by the Alaska Department of Fish and Game (ADF&G).

Ref: http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.display&LocationID=ADA250.PDF&region=swt

In accordance with Alaska Statutes (AS 16.05.841 - AS 16.05.861) regarding fish passages that culvert crossings cross anadromous streams, any crossings constructed will be compliant with stream bed / culvert alignment so as not to encumber fish passage and be constructed in compliance with applicable regulations.

In the presence of streams that are considered intermittent or ephemeral, a field decision will be made as to the necessity of construction of a temporary culvert or if an improved crossing is required. If deemed necessary, temporary conveyances will be installed that will include small-diameter piping to allow for water to cross the roadway without impacting traffic or the path. In other instances, small diversion ditches may be constructed parallel to the roadway to a point where a crossing is not required or where the crossing location allows for better flow control and minimization of erosion potential. USA does not expect that any forded-type crossing will need to be constructed.

Access path construction into RAA-03 will be completed from the existing road traversing west – southwest into the RAA. The access path will follow the approximate location as indicated in Figure 2-1; however, final placement will be dictated by field conditions at the time of construction. The location of the path will be dictated to minimize the impact to existing surface conditions and vegetation, as well as to consider topography and appropriate drainage.

Preceding vegetation clearance prior to construction of the access paths, UXO teams will perform a detector-aided surface clearance to remove any surface MEC, MPPEH, or other metallic debris that would affect the construction. The cleared path will be flagged for the construction crew to follow.

The surface clearance, once complete and flagged, will be traversed and inspected by the construction team in conjunction with the UXO team. Along the path, USA's SUXOS and UXOSO will determine whether further construction or intrusive work is necessary. In the event that construction is needed, additional subsurface MEC clearance will be required in accordance with Section 6.0 of the ESS and the QAPP. Subsurface screening identification and removal of any anomalies will be performed by the UXO team prior to intrusive work for the access path(s).

Construction of the access path will be of minimal impact to the surface conditions. Only minimal work will be conducted to keep the surface as natural and undisturbed as possible. Culvert crossings in RAA-03 will be constructed only as needed. Construction of any ditches or swales to direct surface water will be minimal, and any such construction will be accomplished with small equipment or by hand.

Areas saturated with water or that are wetlands requiring access paths to cross will be provided with a number of 2-ply swamp mats 8-ft by 7-ft in size placed adjacent to each other for the utility vehicles (UVs or Argos) to drive across, thus minimizing damage to the sensitive terrain. Access pathways will be flagged and followed for ingress and egress to the work areas within RAA-03 allowing for trunk feed access paths for all motorized UVs and equipment into active work areas.

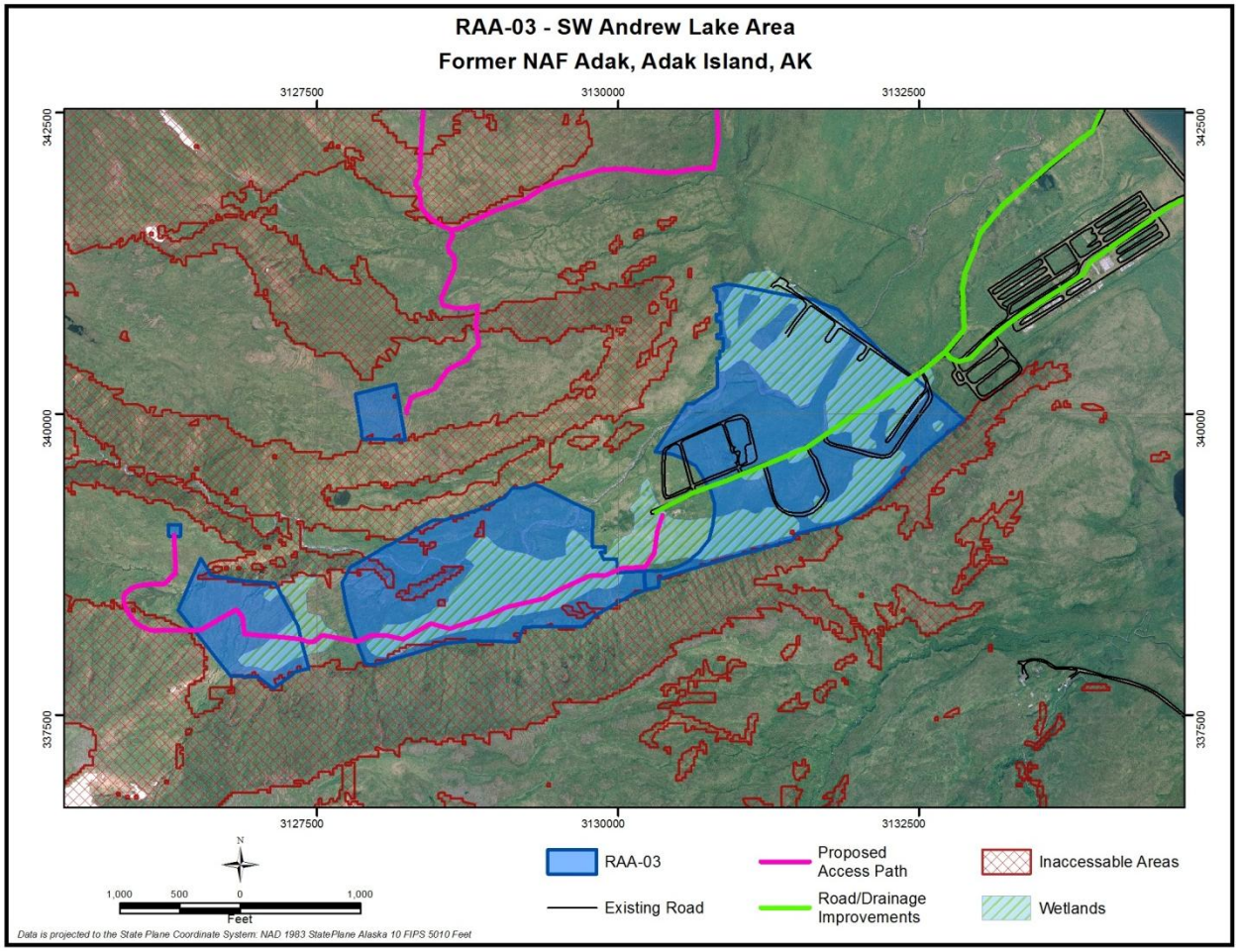

Figure 2-1: RAA-03 Location and Proposed Site Access

Figure 2-1 shows the general location for RAA-03 and the proposed access paths.

2.3 RAA-05/ALDA-01

Road maintenance activities for the road leading into RAA-05 include minor ditch clearing, minor road grading, and filling of potholes and low lying areas that need repair to allow for effective movement of construction-related traffic. Road maintenance will be conducted at RAA-05 using heavy equipment, excavator loader, and skid steer-type tracked equipment. Ditch spoils will be cast upwards from the ditch parallel to the road. Cast spoils consisting of soil, sediment, gravel, and small rocks will be inspected by the UXO Technician II (UXOTII), graded along or near the shoulder, and used along unimproved roads to fill potholes and assist with grading.

Access path construction will be into RAA-05 at the end of the road at the northwest corner of Lake Andrew. Before any intrusive activity into the RAA-05 area where access path routes are to follow or where excavation activities are to be conducted, each area affected is to be cleared for surface debris, MEC, MPPEH, and metal debris in accordance with SOP 8 (Intrusive Investigation SOP in Appendix A of the MEC QAPP) and Section 6.0 of the ESS.

Approximately 4.7 acres within RAA-05 is a former landfill area. This area is to be excavated proportionately 70% down to 2-ft below ground surface (bgs) and 30% down to 4-ft bgs. A tracked excavator will be utilized to accomplish the excavation. This excavation activity is to be performed to clear potential buried munitions. The tracked excavator will be armored with lexan shielding to provide for additional operator protection. The process of excavation will be accomplished in 6.0- to 12.0-in lifts. Before each gridded area is excavated, surface screening for MEC will be performed across the grid and

any anomalies will be flagged and investigated prior to gross excavation of the lift by the excavator. Any MPPEH encountered will be handled by UXO personnel in accordance with the MEC QAPP and applicable SOPs.

Before breaking soil/ground with the excavator and after the initial grid area to be excavated is cleared for MEC, the area again will have necessary erosion and sediment controls in place so as to minimize the impact of the excavation activities and provide for proper sediment/erosion controls surrounding the work area.

During excavation, excess spoils will be stockpiled, if necessary, prior to final disposition and incorporation into final grading for restoration. Necessary movement of the stockpile materials will be accomplished using various heavy equipment, dump trucks, and/or loaders, depending on the placement and/or transport requirements. Final grading of the area will be performed when the area is deemed clear of any MEC/MPPEH by the SUXOS or UXOSO. No imported backfill is anticipated to be utilized in the final grading of the former landfill area.

Upon completion of the excavation activities to clear the area of potential MEC, existing spoils will be graded evenly across the excavation area to match as best possible the area prior to digging activities. The area will be restored using appropriate restoration methods and employ erosion and sediment control devices such as jute matting and silt fencing to assist stabilization.

A new access gate is to be installed across the access road at RAA-05. The gate will be installed using steel poles/gate hardware that will be set in concrete. The supporting caisson holes will be excavated with the excavator to allow placement of the posts and concrete. Upon setting of the concrete, the gate will be assembled on the posts. Perpendicular to the gate and along each side of the roadway leading up to the gate, boulders will be placed to deter unauthorized vehicles from attempting to bypass the gate. Additionally, on the roadward side of each line of boulders leading up to the gate, barbed wire fencing will be installed to further deter unauthorized entry.

Final restoration actions at RAA-05 will be the surface grading, and leveling of disturbed areas to match the existing contours. Various temporary erosion and sediment controls will be removed. Final grading and seeding will be conducted to finish the restoration activities.

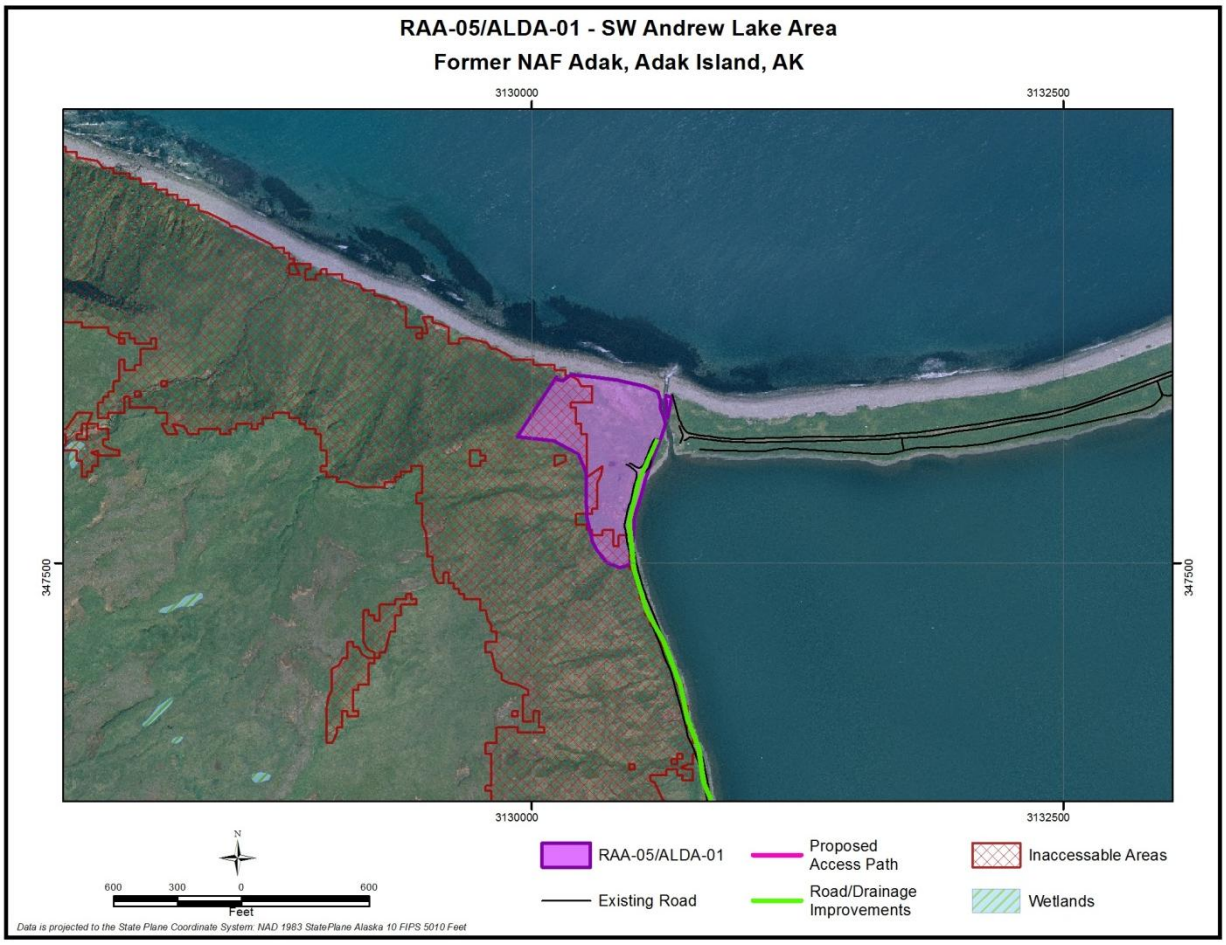

Figure 2-2: RAA-05/ALDA-01 Location and Proposed Site Access

2.4 RAA-04

Road maintenance activities include ditch clearing, minor road grading, and filling of potholes and low lying areas that need repair to allow for effective movement of construction-related traffic. Road maintenance will be conducted at RAA-04 using the same equipment, means, and methods as described above for area RAA-03.

Access path construction into RAA-04 will be from the existing road westward traversing across the tundra/grass into the northern and southern ends of RAA-04. Figure 2-3 depicts the approximate locations of the planned access paths. The access path will follow the approximate layout with specific modifications based on specific topography or need. Establishment of the access path will be flagged and cleared. The surface clearance once complete and flagged, will be traversed and inspected by the construction team in conjunction with the UXO team. Along the path, determination will be made by the SUXOS or UXOSO whether further construction or intrusive work is necessary. In the event that construction is needed, additional subsurface MEC clearance will be conducted, and establishment of the access pathway will be performed.

To keep the surface as natural and undisturbed as possible, only minimal work will be conducted. Culvert crossings in RAA-04 will be constructed only as needed. Construction of any ditches or swales to direct surface water will be minimal, and any such construction will be accomplished with small equipment or by hand.

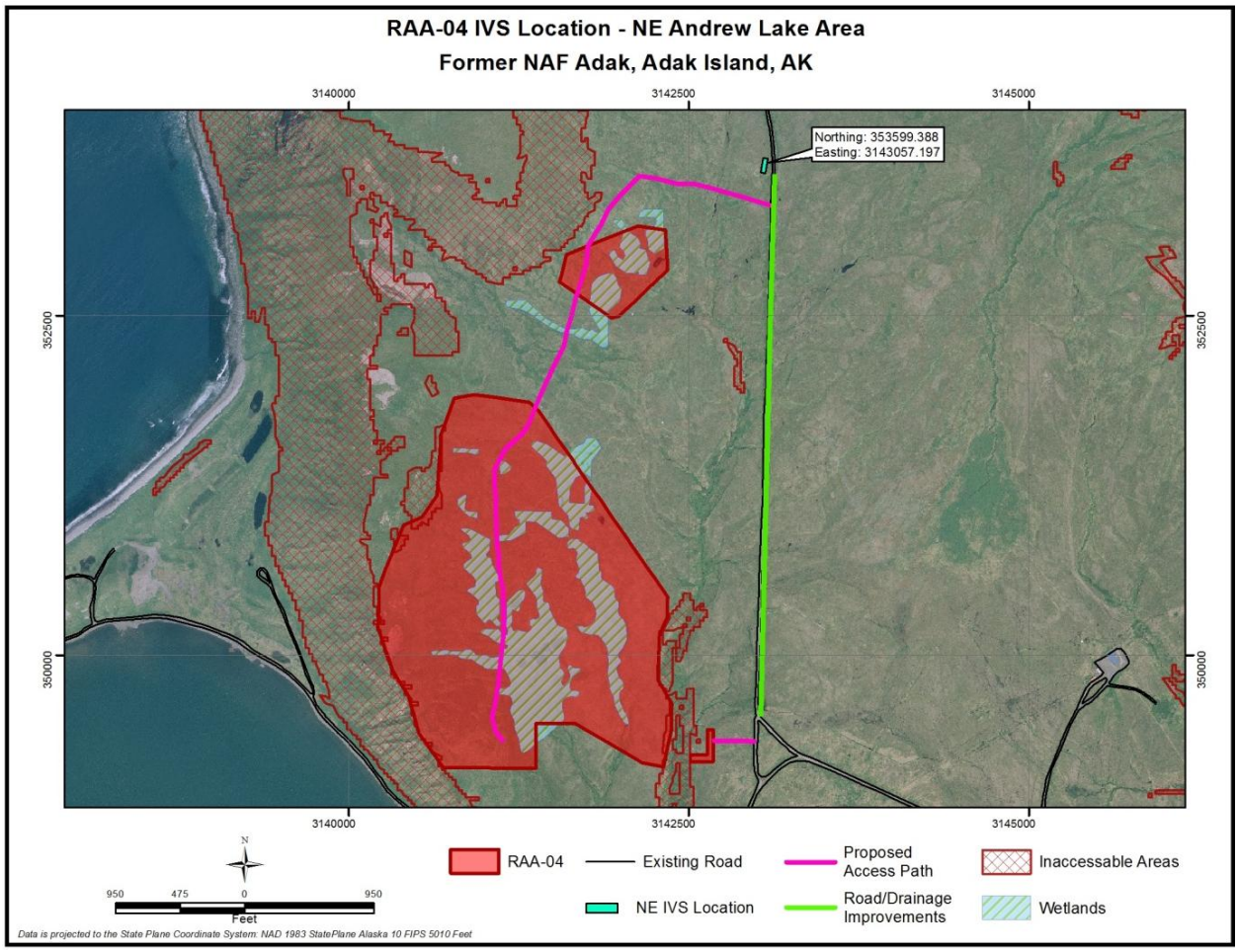

Figure 2-3: RAA-04 Location and Proposed Site Access

Figure 2-3 shows the general location of RAA-04 and the proposed temporary access paths.

2.5 RAA-02

The Road and Drainage Improvement at RAA-02 includes completion of the following components:

- Maintain up to 3,600 linear feet of surface and parallel ditching to improve drainage and road surface (unimproved) to allow for traffic access to RAA-02.
- Construct up to 6,000 linear feet of new access paths into RAA-02 to facilitate trunk road ingress and egress from the RAA-02 work area.

Access path construction into RAA-02 will be completed from the existing road along the west shore of Andrew Lake and will generally follow the path established by previous contractors (Figure 2-4). Final placement will be dictated by field conditions at the time of construction. The location of the path will be dictated by minimization of impact to existing surface conditions and vegetation, as well as considerations for topography and appropriate drainage.

Preceding vegetation clearance prior to construction of the access paths, UXO teams will perform a detector-aided surface clearance to remove any surface MEC, MPPEH, or other metallic debris that would affect the construction. The cleared path will be flagged for the construction crew to follow.

The surface clearance, once complete and flagged, will be traversed and inspected by the construction team in conjunction with the UXO team. Along the path, a determination will be made as to whether further construction or intrusive work is necessary. In the event that construction is needed requiring civil

work or intrusive grading and excavation, additional subsurface MEC clearance will be required in accordance with Section 6.0 of the ESS, the MEC QAPP, and Intrusive Investigation SOP 8 (in Appendix A of the MEC QAPP). Subsurface screening identification and removal of any anomalies will be performed by the UXO team prior to intrusive work for the access path(s).

Access paths that exceed 30 degrees in slope will be flagged and monitored during use for erosion and interim repairs will be made during use as needed and appropriate. Construction of any type on slopes greater than 30 degrees will not be performed with equipment due to safety considerations. Temporary biaxial grid may be laid on the steep surfaces to assist in slope stabilization in susceptible areas. Civil excavation of the slope will not be performed; only repairs and minor stabilization will be conducted due to the sensitive nature of the steeper slopes. When the pathway is no longer needed, it will be restored and any temporary stabilization materials will be removed as natural stabilization is re-established.

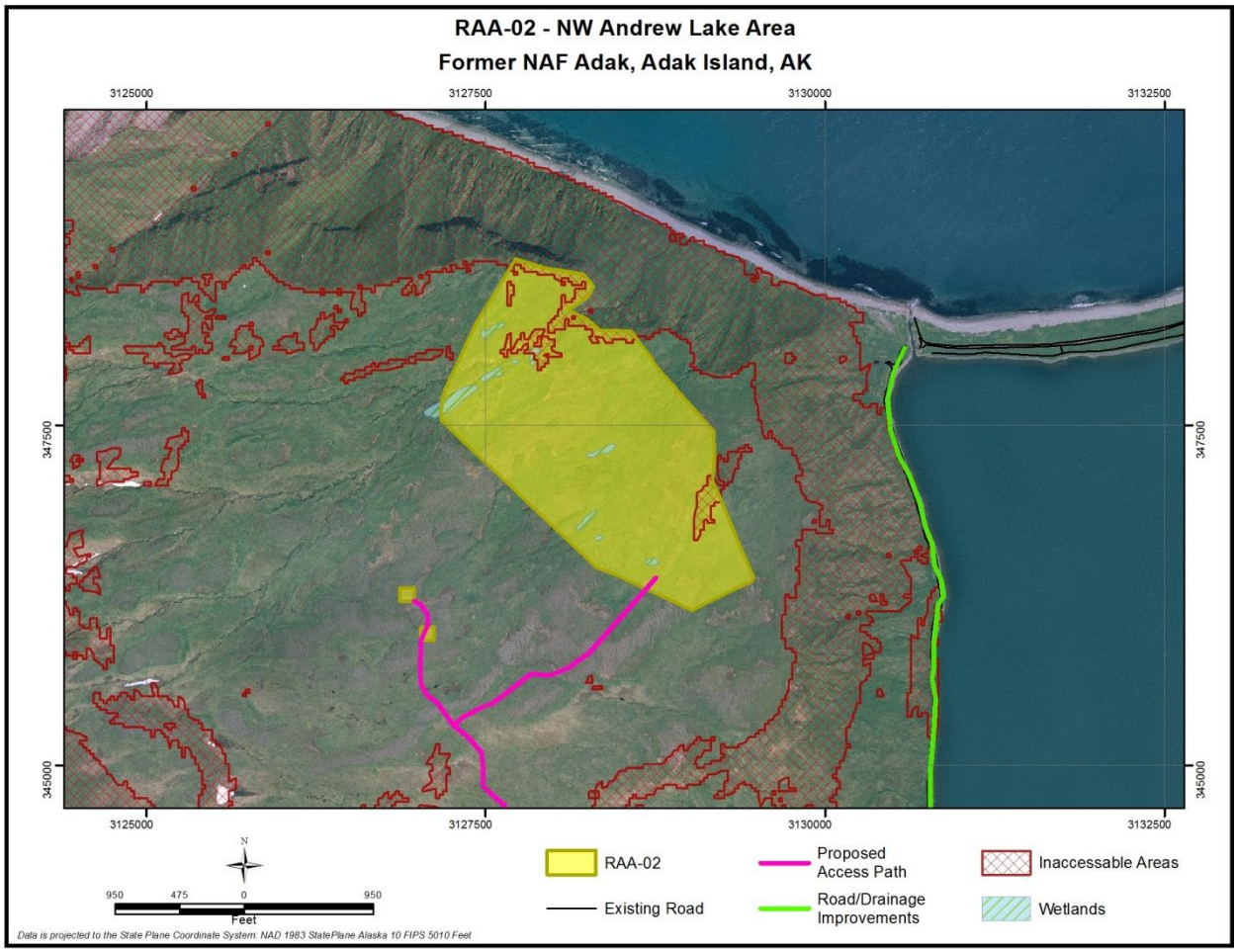

Figure 2-4: RAA-02 Location and Proposed Site Access

Figure 2-4 shows the general location for RAA-02 and the proposed access paths.

2.6 RAA-01

RAA-01 is to be accessed via the road into RAA-03 and subsequently, an access path to the north of the road into the OB/OD -01 area will be designated, cleared for MEC and improved as necessary to allow for UV traffic (see Figure 2-5). Ditch clearing, minor road grading, and filling of potholes and low lying areas that need repair along the road to allow for effective movement of construction-related traffic will be conducted. All construction activities will include a UXOTII escort.

The ditch alongside existing roads may need to be improved or cleared, as determined by means of visual observation of the existing conditions. An excavator will be used to excavate ditches to provide for or renew positive drainage. Spoils will be cast upwards from the ditch parallel to the road. Cast spoils consisting of soil, sediment, gravel, and small rocks will be inspected by the UXOTII, graded along shoulder or near shoulder, and used along unimproved road to fill potholes and assist with grading for any washboard that exists. Any MPPEH encountered will be handled by UXO personnel IAW the MEC QAPP. Excess spoils will be stockpiled as appropriate and as necessary. Movement of spoils to other locations along the roadway will be accomplished by use of various heavy equipment, front end loader, or dump truck if needed. No borrow material is to be utilized for the grading or surface improvement of the existing road.

Access path construction across RAA-01 will be completed from the existing road. Final placement will be dictated by field conditions at the time of construction. Initial surface clearance for MPPEH will be performed prior to flagging of the path. The location of the path will also take into account the importance of minimizing the impact to existing surface conditions and vegetation, as well as topography and drainage.

Preceding vegetation clearance prior to construction of the access paths, UXO teams will perform a detector-aided surface clearance to remove any surface MPPEH that would affect the construction. The teams will clear grids by walking on lines spaced 4- to 5-ft between individuals using the metal detector where the top of the tundra mat is not visible. The cleared path will be flagged for the construction crew to follow.

Additionally, erosion and sediment controls will be utilized at the critical areas where evidence of disturbance dictates that such controls are necessary. Erosion controls will be the use of jute matting and silt fencing, applied as necessary. The wear surface will be unimproved soil/rock/gravel meant for traverse by UV-sized vehicles with minimal widths to limit the overall footprint and environmental impact.

In the instance of streams that are considered intermittent or ephemeral, a field decision will be made as to whether a temporary culvert needs to be constructed or whether an improved crossing is required. If deemed necessary, temporary conveyances will be installed that would include small diameter piping to allow for water to cross under the roadway without impacting traffic or the path. In other instances, small diversion ditches may be constructed parallel to the roadway to a point at which a crossing is not required or the crossing location allows for better flow control and minimization of erosion potential. No forded type crossings will be required to be constructed.

Across the RAA-01, there are a number of blow holes from previous detonations. These depressions and holes will be backfilled. Backfilling of the blow holes will be accomplished using heavy equipment (loader, dump truck, or other, as required). Backfill material is to be created at a local quarry on Adak by the use of a hydraulic hammer attached to a tracked excavator. Crushed gravel backfill material will be transported from the quarry area and staged for placement near the OB/OD area.

Before actual placement of backfill material within the blow holes, each blow hole will be inspected for any MPPEH. The blow hole will be pumped out in coordination with UXO teams to evacuate any water and inspect / screen the blow hole for potential MPPEH. Any MEC or related material will be removed by the UXO team in accordance with the MEC QAPP and SOPs.

Upon clearance of the blow hole(s) the backfill material will be placed in the depression and the hole filled to match existing topography. The material placed will be machine compacted and top-dressed with no more than 4.0-in of surrounding topsoil obtained from adjacent surroundings of each hole. The surface will then be restored with seed for restoration.

The installed access pathway at RAA-01, including culverts and/or drainage passages, will finally be removed and the locations restored to their native condition. Surface restoration will include regrading and seeding, per project requirements.

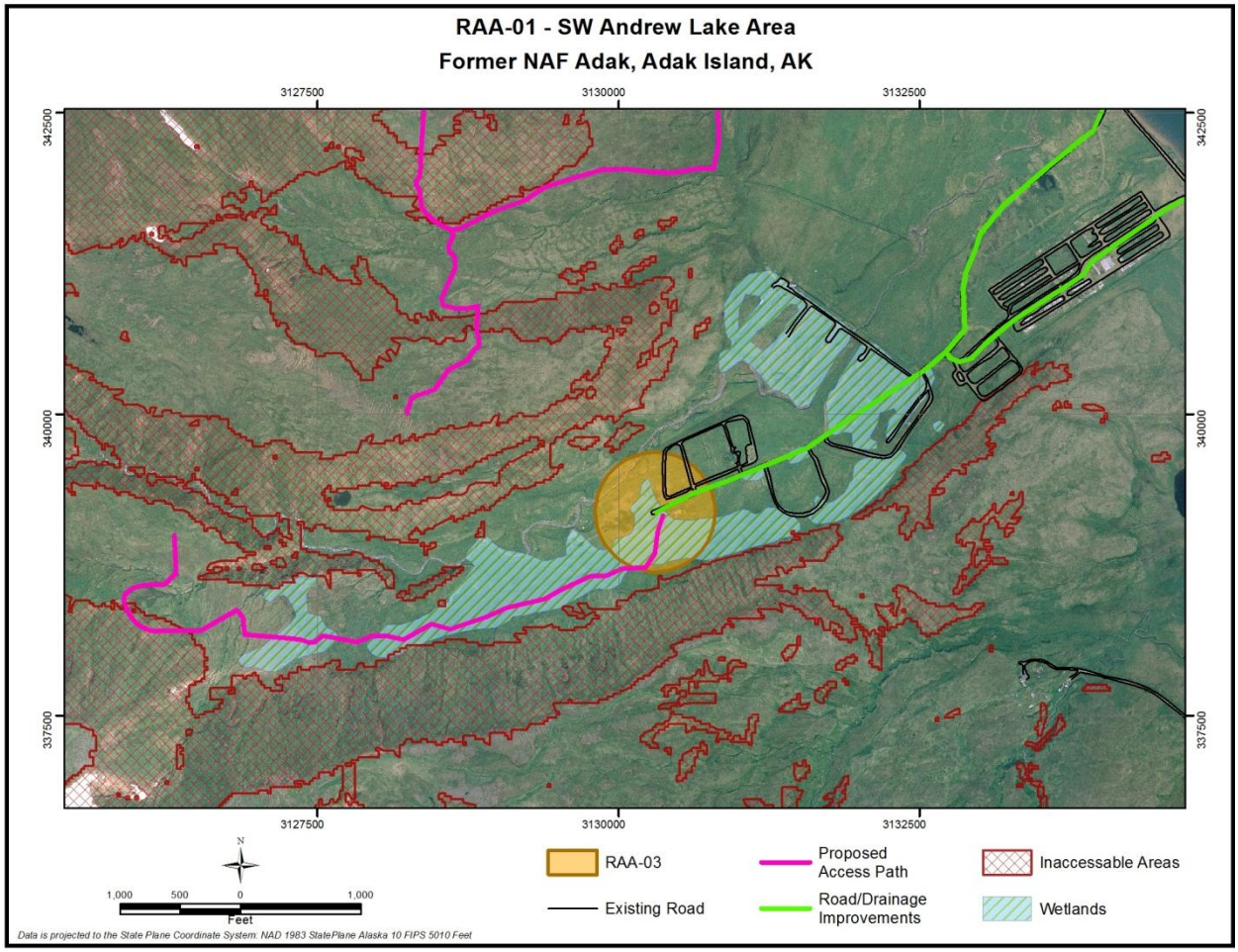

Figure 2-5: RAA-01 Location and Proposed Site Access

2.7 DEMOBILIZATION

Before Field Season 1 demobilization, the necessary site restoration will be completed on the areas where the removal work has been completed. Restoration will consist of the removal of temporarily installed culverts and surface runoff ditches that were constructed in association with the temporary access paths. Removal will be accomplished with the use of equipment and UV where possible. In other areas, the constructed temporary structures will be removed by hand. Upon removal of any installed conveyances, grading of the surface will be performed to match that of the prior pre-construction condition. In areas requiring re-vegetation, a tundra seed mix that has been certified as weed free and that matches project specifications will be sown, and the area will be protected, as needed, with jute matting to promote re-establishment.

When restoration activities are complete, demobilization will take place. Demobilization includes removal of all equipment, materials, and personnel, and departing the site. As part of the demobilization process, any trash or constructed or remedial action related materials not required to be left in the field will be removed. All trash and debris, as appropriate, will be disposed of. Certain construction materials and equipment will be secured and stored locally for use in Field Season 2, as deemed necessary.

3.0 REFERENCES

Alaska Statutes, 2012. Title 16, Fish and Game. April

Naval Facilities Engineering Command Northwest (NAVFAC NW). 2010. *Land Use Controls and Institutional Controls Repair / Improvement Work Plan*. April.

USA Environmental, Inc., 2012. *Final Feasibility Study Report for OU B-2 Sites, Former Naval Air Facility Adak, Adak, Island, AK,* May.

USA Environmental (USA). 2013. *Final Munitions and Explosives of Concern Quality Assurance Project Plan, Non-Time Critical Removal Action at Operable Unit B-2, Various Remedial Action Areas, Adak, AK*, January.

USA Environmental, Inc. 2013. *Explosives Safety Submission, Non-Time Critical Removal Action at Operable Unit B-2, Various Remedial Action Areas, Adak, AK*, *January.*

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Attachment A.

Health and Safety Activity Hazard Analyses

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AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Restoration- Backfill Excavations

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Restoration - Backfill Excavations	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Standard Level D PPE * * Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots that provide sufficient ankle support, hand, hearing and face protection, as dictated by task.

Site Restoration - Backfill Excavations (cont.)	Biological	• Observe ground surfaces, enclosed structures, ground water well heads, surrounding vegetation other site features for presence of spiders, bee/wasp hives, stinging centipedes etc. • Where venomous snakes are known to inhabit or may be present, the use of snake guards must be evaluated. • Where exposure to poisonous plants that have oils, berries, needles that could cause skin irritations, infections or allergic reactions use disposable coveralls for protection. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant with DEET or other insect repellent to deter being bit by mosquitoes or other stinging/biting insects. Frequently check body and clothing for ticks, spiders. Where tick exposure is moderate or high exposure, the use of disposable coveralls shall be considered. f there is potential for tick or chigger infestation at the site, personnel shall wear "bug-out" suits or disposable tyvek suits to minimize potential exposures to ticks or other biting insects (i.e., chiggers) in combination with permethrin applied to outer clothing layer (only) or dedicated permethrin impregnated clothing. • Tape pant legs to boots and ensure there are no open seams between boots and pant legs. • Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Standard Level D PPE *
Site Restoration - Backfill Excavations (cont.)	Excavations	• Inspect the excavation every day and after everyday hazard increasing event. Documentation of this inspection must be maintained daily and available as part of the project record. Documentation should be available on-site for inspection. • Personnel may not enter excavations greater than 5′ in depth unless shoring and sloping precautions have been implemented. Personnel entering excavations 4′ or greater where hazardous atmospheres may exist must first verify hazardous atmospheric conditions do not exist in the excavation. • Where excavation edges are exposed to public, excavations shall be protected and identified from inadvertent access by the public.	Standard Level D PPE *
	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher. • Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds. • Only smoke in designated areas. Designated area must be free of combustible/flammable materials. • ASTs for heavy equipment fuel storage should have secondary containment capabilities.	Standard Level D PPE *

Site Restoration - Backfill Excavations (cont.)	Haul trucks	• **All haul trucks must following the designated Haul Route established for the Adak project.** • Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn or alarm. All equipment should be equipped with an operational backing alarm. • Haulage trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots. • Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator. • Haul trucks should be loaded evenly for proper weight distribution and on stable competent ground. • Stay out of the operating envelop of haul trucks. Do not walk in front of or in back of haul trucks. Ensure you are in the haul truck operator's field of vision.	Standard Level D PPE *
Site Restoration - Backfill Excavations (cont.)	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Standard Level D PPE (light colored clothing)

Site Restoration - Backfill Excavations (cont.)	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Standard Level D PPE * * ** Level D PPE plus warm multi-layered clothing including hard hat liners and foul weather gear, as necessary
	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. • Avoid carrying heavy objects above shoulder level.	Standard Level D PPE *
	Material Handling	• No loads (excavator bucket/boom) shall be passed over ground personnel. • No ground personnel shall walk under or in front of a suspended load.	Standard Level D PPE *
	Noise	• Personnel exposed to loud working environments shall wear hearing protection.	Standard Level D PPE *
Site Restoration - Backfill Excavations (cont.)	Overhead Utilities	• When using an excavator to backfill, maintain proper separation between Power Transmission Lines and over overhead utilities during the operation of heavy equipment. See Electric Safety section in HSP for references to proper separation between operating equipment and power transmission lines/overhead utilities. Do not swing operate or swing heavy equipment booms or other components of operating heavy equipment toward overhead utilities. Be cognizant of utility pole guy wire positions. • Do not allow haul trucks to raise their beds while underneath overhead utilities.	Standard Level D PPE *
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions (well casings). Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Three points of contact when enter/exiting equipment or when using stairways/ladders.	Standard Level D PPE *

Site Restoration - Backfill Excavations (cont.)	Pinched/Struck-by/ Caught-in-between	• Sufficient separation between ground support personnel and any operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. • Step away from heavy equipment when adjustments (positioning) are made. • Ensure heavy equipment operator has spotter for obstructed views and backing up. • When using a chain drive trenching machine for the installation of ESC features, If using trenching equipment, keep hands, feet and arms away from activated drive chains or belts of trench. Stop trenching operations if personnel approach active trenching equipment. • Ensure that all machine guards are in place to prevent contact with drive belts rotary action devises/blades of trenching machine etc. Do not modify safety feature of the trenching machine. • Stay out of the "flip over radius" of operating haul trucks. Do not stand on truck runner board when collecting fill delivery ticket from haul truck driver while the dump body of the haul truck is being raised or lowered.	Standard Level D PPE *
	Suspended loaded	• Suspended loads shall not be passed over ground personnel. • Ground personnel shall not walk under or in front of suspended loads.	Standard Level D PPE *
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Standard Level D PPE *
Site Restoration - Backfill Excavations (cont.)	Spill Prevention	• Ensure that spill control and spill clean-up and materials are on hand prior to initiating any heavy equipment or fueling operations to prevent entry into sensitive receptors. • Only properly trained personnel should respond to/mitigate a spill or release with proper protective clothing and equipment. (Modified Level D or C).	Standard Level D PPE *

	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	Standard Level D PPE *

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BbPK/CPR shield • Track excavator and/or bulldozer or loader • Vibratory compactor (~1 T or less) • Haul trucks • Spill Kit • Communication devices	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.) • Inspections of hand tools (power) and extension cords if used	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SCC (10 hr Construction Safety) or equivalent • Competent Person Excavation • Heavy equipment operators qualified by previous training or experience.

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Probability: Likelihood of the hazard to cause a incident, near miss, or accident.

- Frequent - Occurs very often, known to happen regularly
- Likely - Occurs several times, a common occurrence
- Occasional - Occurs sporadically, but is not uncommon
- Seldom - Remotely possible, could occur at some time
- Unlikely - Can assume will not occur, but not impossible

Severity: Outcome/degree of the incident, near miss, or accident.

- Catastrophic - Death or permanent total disability; Major property damage
- Critical - Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
- Marginal - Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
- Negligible - First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage

	PRINT	SIGNATURE	
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
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	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____

AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities)	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Standard Level D PPE * * Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots that provide sufficient ankle support, hand, hearing and face protection, as dictated by task.
	Biological	• Observe ground surfaces, enclosed structures, ground water well heads, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Where exposure to poisonous plants that have oils, berries or needle-like projections could cause skin irritations, infections or allergic reactions use disposable coveralls for protection. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant with DEET or other insect repellent to deter being bit by mosquitoes or other stinging/biting insects. • If there is potential for tick infestation at the site, personnel shall wear "bug-out" suits or disposable tyvek suits to minimize potential exposures to ticks or other biting insects in combination with permethrin applied to outer clothing layer (only) or dedicated permethrin impregnated clothing. • Tape pant legs to boots and ensure there are no open seams between boots and pant legs. • Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Standard Level D PPE *
	Cuts/Abrasions	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp/cut edges or hand tools. • Avoid use of razor knives. When cutting with knives, cut away from the body and never towards another worker.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities) (cont.)	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher. • Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds. • Secure any applicable Adak Hot Work permit from Adak Fire Department representatives as necessary. • Only smoke in designated areas. Designated area must be free of combustible/flammable materials. • ASTs for heavy equipment fuel storage should have secondary containment capabilities.	Standard Level D PPE
	Electric Safety	• Ensure that electric connections to temporary construction facilities are performed by qualified/licensed electricians. • Verify electric power sources have been have undergone LOTO process before being worked on. • Use double insulated or properly grounded electric power-operated hand tools • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Keep all plugs and receptacles out of water/liquids. • Inspect all electrical power circuits prior to commencing work. • If/when electrical extension cords are required to complete work, extension cords must be: - Equipped with third-wire grounding. - Covered, elevated, or protected from damage when passing through work areas. - Protected from pinching if routed through doorways. - Not fastened with staples, hung from nails, or suspended with wire. - Extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed. - Rated to handle the voltage/amperage of equipment.	Standard Level D PPE

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities) (cont.)	Hand & Power Tools	• Perform daily or more frequent inspections on power tools, as may be needed • Power tools shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable, level, dry work surface is available for the operation of power tools. • All required guards are in place, functioning and utilized. • Hand held power tools equipped with constant pressure switch. Tools inspected before use. Maintain all tools in a safe condition. • Select and use the proper tool for the task. • Do not use tools that have been damaged or repaired in a manner which is not consistent with manufacturer's requirements.	Standard Level D PPE
	Haul Trucks	• Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn/back-up alarm. All equipment should be equipped with an operational backing alarm. • Haulage trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots or a spotter must be provided. • Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator. • All haul trucks must following the designated Haul Route established for the Adak project site.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70˚F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Standard Level D PPE (light colored clothing)
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Standard Level D PPE * * ** Level D PPE plus warm multi-layered clothing including hard hat liners and foul weather gear, as necessary

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities) (cont.)	Heavy Equipment	• Seat belts or other restraint system shall be used by heavy equipment operators. • Perform daily maintenance and inspections on operating equipment. Keep documentation on site. • Use caution around pressurized lines/hoses. Inspect hoses daily for cuts, abrasions and wear. • Equipment shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable ground surface is available for the operation of heavy equipment. • Equipment operators shall not leave the cab of the equipment while they are lifting/controlling a load unless the load has been delivered to its intended transport location or the load has been fully secured (no potential for rolling onto or crushing ground personnel) and the equipment and controls are fully secured/disengaged and equipment is "de-energized".	Standard Level D PPE *
	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. Avoid carrying heavy objects above shoulder level.	Standard Level D PPE *
	Noise	• Personnel exposed to loud working environments shall wear hearing protection.	Standard Level D PPE *
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions (well casings). Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Three points of contact when enter/exiting equipment or when using stairways/ladders.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities) (cont.)	Pinched/Struck-by/ Caught-in-between	• Sufficient separation between ground support personnel and any operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. Ensure heavy equipment operator has spotter for obstructed views and backing up. • Step away from heavy equipment when adjustments (positioning) are made.	Standard Level D PPE *
	Spill Prevention	• Ensure that spill control and spill clean-up and materials are on hand prior to initiating any heavy equipment or fueling operations to prevent entry into sensitive receptors. • **Understand notification processes in the event a spill occurs. If a spill should occur on the project implement the following:** – Ensure all unnecessary persons are removed from the hazard area. Determine the major components in the waste at the time of the spill. – Put on protective clothing and equipment. (Modified Level D or C). – Only properly trained personnel should respond to/mitigate a spill or release – If a flammable/combustible material is involved, remove all ignition sources, and use spark- and explosion-proof equipment for recovery of material. – Remove all surrounding materials that could be especially reactive with materials in the waste. – If wastes reach a storm or sewer drain, dam the outfall by using sand, earth, sandbags, etc. Pump this material out into a temporary holding tank or drums as soon as possible. – Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site. – Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids. – For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.	Standard Level D PPE * with upgrade to higher level of protection such as Level D modified or Level C (see HSP) for spill control response
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Standard Level D PPE

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Mobilization/Demobilization Activities (set-up/breakdown of work area & construction facilities)

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Mobilization & Demobilization (set-up/break down of work area & construction facilities) (cont.)	Vehicular Traffic	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.	Standard Level D PPE
	Overhead Utilities	• Maintain proper separation between Power Transmission Lines and over overhead utilities during the operation of heavy equipment. See Electric Safety section in HSP for references to proper separation between operating equipment and power transmission lines/overhead utilities. • Do not swing operate or swing heavy equipment booms or other components of operating heavy equipment toward overhead utilities. Be cognizant of utility pole guy wire positions.	Standard Level D PPE
	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	Standard Level D PPE

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • First Aid/BbPK/CPR shield • Extension chords • Spill Kit • Haul trucks (delivered heavy equipment or materials) • Heavy Equipment (earth moving) • Communication devices	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.) • Inspections of hand tools (power) and extension cords if used.	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SCC (10hr Construction Safety) or equivalent • Power tool and heavy equipment operators qualified by previous training or experience • Qualified equipment operators – Previous training or experience

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)					
Risk Assessment Code (RAC) Matrix					
Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Probability: Likelihood of the hazard to cause a incident, near miss, or accident.

- Frequent - Occurs very often, known to happen regularly
- Likely - Occurs several times, a common occurrence
- Occasional - Occurs sporadically, but is not uncommon
- Seldom - Remotely possible, could occur at some time
- Unlikely - Can assume will not occur, but not impossible

Severity: Outcome/degree of the incident, near miss, or accident.

- Catastrophic - Death or permanent total disability; Major property damage
- Critical - Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
- Marginal - Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
- Negligible - First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage

	PRINT	SIGNATURE	
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Land and Utility Surveys

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Land and Utility Surveys	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may be developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Standard Level D PPE * * Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots that provide sufficient ankle support, hand, hearing and face protection, as dictated by task.
	Biological	• Observe ground surfaces, enclosed structures, ground water well heads, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Where exposure to poisonous plants that have oils, berries or needle-like projections could cause skin irritations, infections or allergic reactions use disposable coveralls for protection. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant with DEET or other insect repellent to deter being bit by mosquitoes or other stinging/biting insects. • If there is potential for tick infestation at the site, personnel shall wear "bug-out" suits or disposable tyvek suits to minimize potential exposures to ticks or other biting insects in combination with permethrin applied to outer clothing layer (only) or dedicated permethrin impregnated clothing. • Tape pant legs to boots and ensure there are no open seams between boots and pant legs. • Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Standard Level D PPE *
	Fire Prevention	• Only smoke in designated areas. Designated area must be free of combustible/flammable materials.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Land and Utility Surveys

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Land and Utility Surveys (cont.)	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70˚F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Standard Level D PPE (light colored clothing)
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Standard Level D PPE * * ** Level D PPE plus warm multi-layered clothing including hard hat liners and foul weather gear, as necessary

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Land and Utility Surveys

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Land and Utility Surveys (cont.)	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. • Avoid carrying heavy objects above shoulder level.	Standard Level D PPE *
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions (well casings). Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Three points of contact when enter/exiting equipment or when using stairways/ladders.	Standard Level D PPE *
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Standard Level D PPE
	Vehicular Traffic	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.	Standard Level D PPE

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Land and Utility Surveys

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Land and Utility Surveys (cont.)	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Personnel using survey equipment containing lasers shall be trained to utilize that equipment properly. Personnel operating laser equipped survey equipment must avoid exposing their eyes to direct or indirect laser light energy sources. • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	Standard Level D PPE

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BbPK/CPR shield • Communication devices • Land Survey or EM/GPR utility locating equipment (as applicable to task)	• Visual Inspections of designated work areas identify and address hazardous conditions • Emergency Response equipment Inspections (Fire Extinguishers, Eye wash First Aid/CPR etc.)	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SCC (10hr Construction Safety) or equivalent

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)					
Risk Assessment Code (RAC) Matrix					
Severity	**Probability**				
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Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

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Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation)	Buried Utilities or Unknown Objects	• Where unknown or unanticipated buried objects are encountered (i.e. drums, tanks, cylinders, munitions of explosive concern, soil with unusual staining or odor) AGVIQ or subcontractor personnel shall 1) secure equipment to the extent possible, without causing bodily injury, 2) evacuate the work area, and 3) immediately notify the site manager, SSHO, or PM of the encountered condition. Work may only resume with appropriate documentation/notification that exposure hazards (physical or chemical) do not exist. Notify AGVIQ PM and program officials and applicable NAVFAC POCs and do not resume work until authorized to do so.	Standard Level D PPE * Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots that provide sufficient ankle support, hand, hearing and face protection, as dictated by task.
	Biological	• Observe ground surfaces, enclosed structures, ground water well heads, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Where exposure to poisonous plants that have oils, berries or needle-like projections could cause skin irritations, infections or allergic reactions use disposable coveralls for protection. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant with DEET or other insect repellent to deter being bit by mosquitoes or other stinging/biting insects. • If there is potential for tick infestation at the site, personnel shall wear "bug-out" suits or disposable tyvek suits to minimize potential exposures to ticks or other biting insects in combination with permethrin applied to outer clothing layer (only) or dedicated permethrin impregnated clothing. • Tape pant legs to boots and ensure there are no open seams between boots and pant legs. • Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation) (cont.)	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Standard Level D PPE *
	Chainsaws/Wood Chipper Use	• **In the event chainsaw and wood chippers must be used to perform any land clearing activities, a separate AHA for this task is required and the HSP must be updated to include Hazard control measures for this operation.**	Develop an AHA for Land Clearing via Chainsaw/ Wood chipper use if needed
	Chemical Exposure	• **Where installation of ESC measures must disturb of surface or subsurface soil impacted by petroleum and other site Constituents of Concern (COCs) may occur, then an upgrade to Level D Modified PPE will be required in accordance with the HSP and performed by personnel having appropriate training and be enrolled in a medical surveillance program in accordance with 29CFR1910.120. Supervisors would also need training in accordance with 29CFR1910.120(e)(4).**	**Standard Level D PPE * but upgrade to Level D Modified PPE, as necessary In accordance with the HSP as necessary**
	Cuts/Abrasions	• Wear cut resistant work gloves, when the possibility of lacerations or other injury may be caused by sharp edges of power or hand tools. • Do not distract or disturb someone who is operating a trenching machine. Before approaching someone using a trenching machine, first establish eye contact with the operator and signal (via hand) that they would like to approach the active work area. Both the trenching machine operator and ground personnel must that it is appropriate to other personnel to access the work area. • Use two hands when operating the trenching machine. • Keep hands, feet and legs away from any chain drive mechanisms of the trenching machine.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation) (cont.)	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher. • Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds. • Secure any applicable Adak Hot Work permit from Adak Fire Department representatives as necessary. • Only smoke in designated areas. Designated area must be free of combustible/flammable materials. • ASTs for heavy equipment fuel storage should have secondary containment capabilities.	Standard Level D PPE *
	Hand & Power Tools	• Perform daily or more frequent inspections on power tools, as may be needed • Power tools shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable, level, dry work surface is available for the operation of power tools. • All required guards are in place, functioning and utilized. • Hand held power tools equipped with constant pressure switch. Tools inspected before use. Maintain all tools in a safe condition. • Select and use the proper tool for the task. • Do not use tools that have been damaged or repaired in a manner which is not consistent with manufacturer's requirements.	Standard Level D PPE
	Heavy Equipment	• Seat belts or other restraint system shall be used by heavy equipment operators. • Perform daily maintenance and inspections on operating equipment. Keep documentation on site. • Use caution around pressurized lines/hoses. Inspect hoses daily for cuts, abrasions and wear. • Equipment shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable ground surface is available for the operation of heavy equipment. • Equipment operators shall not leave the cab of the equipment while they are lifting/controlling a load unless the load has been delivered to its intended transport location or the load has been fully secured (no potential for rolling onto or crushing ground personnel) and the equipment and controls are fully secured/disengaged and equipment is "de-energized".	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation) (cont.)	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Standard Level D PPE (light colored clothing)
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Standard Level D PPE * * ** Level D PPE plus warm multi-layered clothing including hard hat liners and foul weather gear, as necessary

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation) (cont.)	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. • Avoid carrying heavy objects above shoulder level.	Standard Level D PPE *
	Noise	• Personnel exposed to loud working environments shall wear hearing protection.	Standard Level D PPE *
	Pinched/Struck-by/ Caught-in-between	• Sufficient separation between ground support personnel and any operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. • Step away from heavy equipment when adjustments (positioning) are made. • Ensure heavy equipment operator has spotter for obstructed views and backing up. • When using a chain drive trenching machine for the installation of ESC features, If using trenching equipment, keep hands, feet and arms away from activated drive chains or belts of trench. Stop trenching operations if personnel approach active trenching equipment. • Ensure that all machine guards are in place to prevent contact with drive belts rotary action devises/blades of trenching machine etc. Do not modify safety feature of the trenching machine.	Standard Level D PPE *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Site Preparation (including any ESC installation) (cont.)	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions (well casings). Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Three points of contact when enter/exiting equipment or when using stairways/ladders.	Standard Level D PPE *
	Vehicular Traffic	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.	Standard Level D PPE
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Standard Level D PPE
	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	Standard Level D PPE

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • First Aid/BbPK/CPR shield • Track excavator or chain drive trencher • Spill Kit • Communication devices	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.) • Inspections of hand tools (power) and extension cords if used	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SCC (10hr Construction Safety) or equivalent Power tool and heavy equipment operators qualified by previous training or experience • Training /medical surveillance in accordance with 29CFR1910.120 where soil/water is disturbed and is impacted by petroleum or other site COCs.

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Probability: Likelihood of the hazard to cause a incident, near miss, or accident.

- Frequent - Occurs very often, known to happen regularly
- Likely - Occurs several times, a common occurrence
- Occasional - Occurs sporadically, but is not uncommon
- Seldom - Remotely possible, could occur at some time
- Unlikely - Can assume will not occur, but not impossible

Severity: Outcome/degree of the incident, near miss, or accident.

- Catastrophic - Death or permanent total disability; Major property damage
- Critical - Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
- Marginal - Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
- Negligible - First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage

	PRINT	SIGNATURE	
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Level D PPE or as required by HSP* D: Work clothes, reflective vests, hard hat, safety glasses and sturdy hard toed work boots, hearing and hand protection as necessary for task, water proof suits/gear (cofferdam)
	Buried Objects	• • Where unknown or unanticipated buried objects are encountered AGVIQ or subcontractor personnel shall 1) secure equipment to the extent possible, without causing bodily injury, 2) evacuate the work area and 3) immediately notify the site manager, SHSO and PM of the encountered condition. Work may only resume with appropriate documentation/notification that exposure hazards (physical or chemical) do not exist. Consult with AGVIQ PM, HSPA/CIH prior to resuming activities.	Level D PPE or as required by HSP*
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions. Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Use a sufficient amount of personnel (3) to cover waste stockpiles, use more as necessary in windy conditions. • Avoid walking on top of slippery or irregular surfaces (rip rap). or muddy slopes. • Maintain three point contact when entering and existing heavy equipment.	Level D PPE or as required by HSP*

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings (continued)	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Level D PPE or as required by HSP*
	Noise	• Personnel exposed to loud working environments shall wear hearing protection. • Wear hearing protection in open cabs of heavy equipment or when working adjacent to operating heavy equipment.	Level D PPE or as required by HSP*
	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. •	Level D PPE or as required by HSP*
	Biological	• Observe ground surfaces, building structure, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant or permethrin (clothes). Tape pant legs to boots and ensure there are no open seams between boots and pant legs. Frequently check body and clothing for ticks, spiders. Where tick exposure is moderate or high exposure, the use of disposable coveralls shall be considered. Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Level D PPE or as required by HSP*
	Heavy Equipment	• Seat belts or other restraint system shall be used by heavy equipment operators. • Perform daily maintenance and inspections on operating equipment. Keep documentation on site. • Use caution around pressurized lines/hoses. Inspect hoses daily for cuts, abrasions and wear. • Equipment shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable ground surface is available for the operation of heavy equipment. • Do not swing overhead loads over ground personnel. • Ensure that proper material handling equipment (grapplers) on heavy equipment handling large diameter rip rap. • Ensure that ground water or other nuisance water has been depressed to at least one (1) foot beneath the ground surface to avoid the potential for excavation slope failures. Dewatering shall be performed in accordance with the project Work Plan requirements and monitored by an excavation competent person.	Level D PPE or as required by HSP*

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings (continued)	Vehicular traffic & Haul trucks	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • Stay out of flip over radius of haul trucking when dumping delivered revetment stone. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • **All haul trucks must following the designated Haul Route established for the Adak, project.** • Haul truck operators should be familiar with their equipment and inspect all equipment before use. • Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn or alarm. All equipment should be equipped with an operational backing alarm. • Haulage trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots. • Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator. • Where grades are steep, provide signs indicating the actual grade as well as measures for a runaway truck. • Haul roads should be well lit, sufficiently wide (at least 50% of the width of the equipment on both sides of road) and equipped with reflectors to indicate access points. • Haul roads should have adequate right-of-way signs indicating haul directions, where appropriate.	Level D PPE or as required by HSP*

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings (continued)	Engulfment	• The cofferdam system design if utilized shall be approved by a registered professional engineer. • Special Excavation Requirements defined by 29CFR1926.651 shall also be evaluated prior to the start of site excavation activities. • The competent person must inspect the excavation every day and after everyday hazard increasing event. Documentation of this inspection must be maintained on site at all times. • AGVIQ personnel must not enter any excavation where protective systems are deficient at any time, for any reason. The competent person must be notified of such conditions. • Site control measures (warning signs and barricades, as necessary) shall be used to provide a means of mitigating unauthorized entry to the active work area.	Level D PPE or as required by HSP*
	Stuck by/Pinched Caught in Between	• Sufficient separation between ground support personnel and the operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. • Step away from heavy equipment when adjustments (positioning) are made. • Ensure heavy equipment operator has spotter for obstructed views and backing up.	Level D PPE or as required by HSP*
	Dewatering	• Use chemical/liquid resistant gloves and face shield (as necessary) when handling contaminated liquids. See section 5.0 of site specific HSP. • All pressured lines and fittings should be 'tethered' or otherwise secured to minimize whipping or 'launching' of lines in the event of a failure. Any 'quick connect' type fittings should be secured with appropriate pins, clips or covering to prevent accidental disengagement of the fitting. • Ensure all pressure is removed from discharge hoses before disconnecting hose sections. • Inspect all equipment, hoses, pressure lines and fittings daily and prior to pressurizing.	Level D PPE or as required by HSP*

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings (continued)	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Level D PPE or as required by HSP*
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Level D PPE or as required by HSP*

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Installation of Ditches/ Ditch Clearing and Culvert Installation

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Installation of ditches / clearing of ditches installation of culvert crossings (continued)	Other	• Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Shut down operations in heavy rain and lightning. Seek safe haven in a grounded structure or vehicle. Implement 30 – 30 rule. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	NA

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • First Aid/BbPK/CPR shield • Excavator with material handling attachments, Loader, Haul trucks	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Inspections of hand tools (power) and extension cords if used	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • Supervisors, SSHO - BBLPS, SCC (10 hr Construction Safety) • All - Training and medical surveillance in accordance 29CFR1910.120 (HAZWOPER) or 29CFR1910.134 (respiratory, as necessary) • Heavy equipment operators qualified by previous training or experience

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Probability: Likelihood of the hazard to cause a incident, near miss, or accident.

- Frequent - Occurs very often, known to happen regularly
- Likely - Occurs several times, a common occurrence
- Occasional - Occurs sporadically, but is not uncommon
- Seldom - Remotely possible, could occur at some time
- Unlikely - Can assume will not occur, but not impossible

Severity: Outcome/degree of the incident, near miss, or accident.

- Catastrophic - Death or permanent total disability; Major property damage
- Critical - Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
- Marginal - Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
- Negligible - First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage

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Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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AHA Prepared By:
Rachel Francis
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Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material	Buried Objects	• Review base engineering records or drawings against utility owner or third party utility mark-out to verify any potential differences. • Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, utilities must be relocated/marked. • Where unknown or unanticipated buried objects are encountered AGVIQ or subcontractor personnel shall 1) secure equipment to the extent possible, without causing bodily injury, 2) evacuate the work area and 3) immediately notify the site manager, SHSO and PM of the encountered condition. Work may only resume with appropriate documentation/notification that exposure hazards (physical or chemical) do not exist. Consult with AGVIQ PM and HSPA/CIH prior to resuming activities.	Level C per HSP * *C: Work clothes, hard hat, safety glasses and sturdy hard toed work boots with outer disposable chemical resistant boot covers (or rubber chemical boots with steel toe and shank), hand protection (inner and outer nitrile/chemical resistant gloves, ½ Face or Full Face APR with P100 HEPA Cartridges, Organic Vapor Cartridges or P100 HEPA/Organic Vapor Combination Cartridges depending on actual contaminant exposure.
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions. Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Use a sufficient amount of personnel (3) to cover waste stockpiles, use more as necessary in windy conditions. • Avoid walking on top of waste stockpiles that are covered in polyethylene sheeting or similar materials.	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Chemical Exposure	• All personnel performing this task shall be trained in accordance with 29CFR1910.120 and 29 CFR 1926.1101 and been rolled in a medical monitoring program appropriate for their assigned duties. • Pregnant or potentially pregnant AGVIQ personnel to review SOP Reproductive Protection before performing any hazardous or potentially hazardous duty. • Do not allow dermal contact or incidental ingestion of impacted soil or groundwater. Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media (soil or ground water) without first donning proper PPE. • Exercise good hygiene practices. Always wash hands before eating, drinking, smoking and leaving site. Only eat, drink, smoke or chew tobacco in designated areas. •	Level C per HSP *
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Level C per HSP *
	Heavy Equipment	• Seat belts or other restraint system shall be used by heavy equipment operators. • Perform daily maintenance and inspections on operating equipment. Keep documentation on site. • Use caution around pressurized lines/hoses. Inspect hoses daily for cuts, abrasions and wear. • Equipment shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable ground surface is available for the operation of heavy equipment. • Do not swing overhead loads over ground personnel. • Ensure that ground water or other nuisance water has been depressed to at least one (1) foot beneath the ground surface to avoid the potential for excavation slope failures. Dewatering shall be performed in accordance with the project Work Plan requirements and monitored by an excavation competent person.	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Cave Ins/ Engulfment	• Each employee in an excavation must be protected from cave-ins by adequate protective systems designed in accordance with applicable OSHA standards (i.e. Design of Sloping and Benching Systems and Design of Support Systems, Shield Systems and other Protective Systems) except when; – 1)Excavations are made entirely in rock; – 2) Excavations are less than 5 feet (1.52m) in depth AND examination of the ground by a competent person provides there is no indication of cave-in. – Sloping and benching configurations shall be in accordance with 29 CFR 1926.652(b) or EM 385 1-1, section 25.C, whichever is more stringent. – Special Excavation Requirements defined by 29CFR1926.651 shall also be evaluated prior to the start of site excavation activities. – AGVIQ personnel must notify and be granted authorization from the excavation-competent person prior to entering any excavation. AGVIQ personnel must follow all excavation requirements established by the competent person. The competent person must be a person designated by their employer. • The competent person must inspect the excavation every day and after everyday hazard increasing event. Documentation of this inspection must be maintained on site at all times. • Provide Excavation Perimeter Protection and Warning signs as necessary to be in compliance with EM 385 11-1, Section 25B Safe Access and Appendix Q, "Perimeter Protection".	Level C per HSP *
	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Review and be cognizant of applicable Adak Fire Prevention Procedures and Requirements. Secure any applicable Hot Work permit from Adak Fire Department representatives and institute fire watch provisions.	Level C per HSP *
	Noise	• Personnel exposed to loud working environments shall wear hearing protection. • Wear hearing protection in open cabs of heavy equipment or when working adjacent to operating heavy equipment.	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Biological	• Observe ground surfaces, building structure, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant or permethrin (clothes). Tape pant legs to boots and ensure there are no open seams between boots and pant legs. Frequently check body and clothing for ticks, spiders. Where tick exposure is moderate or high exposure, the use of disposable coveralls shall be considered. f there is potential for tick or chigger infestation at the site, personnel shall wear "bug-out" suits or disposable tyvek suits to minimize potential exposures to ticks or other biting insects (i.e., chiggers) in combination with permethrin applied to outer clothing layer (only) or dedicated permethrin impregnated clothing. Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Level C per HSP *

AGVIQ Construction and Environmental Support Access Road Maintenance and Construction NTCRA , Adak Island, Alaska ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**
Excavation, Handling, Management and Loading of Material (Cont.)	Vehicular traffic & Haul trucks	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • **All haul trucks must following the designated Haul Route established for the Adak project.** • Haul truck operators should be familiar with their equipment and inspect all equipment before use. • Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn or alarm. All equipment should be equipped with an operational backing alarm. • Haulage trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots. • Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator. • Where grades are steep, provide signs indicating the actual grade as well as measures for a runaway truck.. • Haul roads should be well lit, sufficiently wide (at least 50% of the width of the equipment on both sides of road) and equipped with reflectors to indicate access points. • Haul roads should have adequate right-of-way signs indicating haul directions, where appropriate	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. • Avoid carrying heavy objects above shoulder level.	Level C per HSP *
	Dewatering	• Use chemical/liquid resistant gloves and face shield (as necessary) when handling contaminated liquids. See section 5.0 of site specific HSP. • All pressured lines and fittings should be 'tethered' or otherwise secured to minimize whipping or 'launching' of lines in the event of a failure. Any 'quick connect' type fittings should be secured with appropriate pins, clips or covering to prevent accidental disengagement of the fitting. • Ensure all pressure is removed from discharge hoses before disconnecting hose sections. • Inspect all equipment, hoses, pressure lines and fittings daily and prior to pressurizing. • If a flammable/combustible material is involved, remove all ignition sources, and use spark- and explosion-proof equipment for recovery of material. • Dewatering operations are to be reviewed/monitored by the Excavation Competent Person.	Level C per HSP *

AGVIQ Construction and Environmental Support Access Road Maintenance and Construction NTCRA , Adak Island, Alaska ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**
Excavation, Handling, Management and Loading of Material (Cont.)	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. Adak may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Level C per HSP *
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 50lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. • Avoid carrying heavy objects above shoulder level.	Level C per HSP *
	Stuck by/Pinched Caught in Between	• Sufficient separation between ground support personnel and the operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. • Step away from heavy equipment when adjustments (positioning) are made. • Ensure heavy equipment operator has spotter for obstructed views and backing up.	Level C per HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Excavation, Handling, Management and Loading of Material

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Excavation, Handling, Management and Loading of Material (Cont.)	Other	• Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Shut down operations in heavy rain and lightning. Seek safe haven in a grounded structure or vehicle. Implement 30 – 30 rule. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	NA

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BbPK/CPR shield • Excavator, Loader, On-site haul trucks • Communication Devices	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Inspections of hand tools (power) and extension cords if used	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel. • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SC-HW (29CFR1910.120(e)(4) or equivalent, SCC (10 hr Construction Safety) • All - Training and medical surveillance in accordance 29CFR1910.120 (HAZWOPER), 29CFR 1926.1101 (asbestos) and 29CFR1910.134 (respiratory protection) • Power tool and heavy equipment operators qualified by previous training or experience • Competent Person – Excavation • Competent Person - Asbestos

	PRINT	SIGNATURE	
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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	_____	_____	**Date/Time:**_____

AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Demolition Planning/ Compliance	• Complete C&D waste determination requirements in accordance with applicable SOPs Waste Management Planning, Waste Characterization, Sampling, and Analysis or Non-Hazardous Waste Management • All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise controlled outside the building line before demolition work is started. Any utility company involved shall be notified in advance. If it is necessary to maintain any power, water, or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected. •	Standard Level D PPE or as required by HSP * * Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots, hand, hearing and face protection, as dictated by task.
	Chemical Exposure or Environmental Releases	• Verify that all potential/confirmed Oil and Hazardous Materials (OHM) have been removed from the piping before initialing any demolition operations. • Tanks, containers, piping or ducts that held or is contaminated with hazardous substances should be characterized marked accordingly with non-toxic paint or markers (e.g., color coding) and removed prior to demolition. • Fugitive dust must be controlled during demolition by using water sprays or other methods. • Proper control measures shall be in place before welding or cutting on surfaces covered by coatings containing flammable or hazardous materials such as lead, cadmium, zinc, etc. Highly flammable or toxic coatings may require stripping of the coating a sufficient distance from the area to be heated.	Standard Level D PPE or as required by HSP *
	Slips, Trips, Falls	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, rip rap, utilities, ground protrusions. Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Clear/removed materials and debris from pathways and commonly traveled areas as soon as possible. • Fall protection shall be provided when personnel are exposed to a fall of 6 feet or greater	Standard Level D PPE or as required by HSP *
	Noise	• Personnel exposed to loud working environments (demolition operations) shall wear hearing protection. • Wear hearing protection in open cabs of heavy equipment or when working adjacent to operating heavy equipment.	Standard Level D PPE or as required by HSP *
	Visible Lighting	• Perform tasks in daylight hours whenever possible. If dawn, dusk or dark work is to be performed portable lightly must be provided to sufficient illuminate work area(s).	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Spill Prevention	• Ensure that spill control and spill clean-up and material to prevent entry into sensitive receptors are on hand prior to the start of work. • Ensure all unnecessary persons are removed from the hazard area. Determine the major components in the waste at the time of the spill. • Put on protective clothing and equipment. (Modified Level D_2 or C). • If a flammable/combustible material is involved, remove all ignition sources, and use spark- and explosion-proof equipment for recovery of material. • Remove all surrounding materials that could be especially reactive with materials in the waste. • If wastes reach a storm or sewer drain, dam the outfall by using sand, earth, sandbags, etc. Pump this material out into a temporary holding tank or drums as soon as possible. • Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site. • Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids. • For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank. • **For addition spill preparedness and prevention measures refer to the Spill Prevention and Countermeasures Control Plan procedures contained with the Environmental Protection Plan component of the Project Work Plan.** • **Understand notification processes in the event a spill occurs.**	Standard Level D PPE or as required by HSP *
	Hazardous Energy	• Conduct work area survey of any high voltage electric equipment in structures \ as related to designated sample areas. If designated sample locations are sufficiently close to energized equipment try to relocate the location. • Prior to any OHM removal that may be located in pipes scheduled for demolition, review process systems, ensure systems are de-energized via the LOTO process. Review and execute SOP Lockout and Tagout when it is determined that control of hazardous energy is required	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Site control	• Personnel shall not enter the demolition zone unless completely necessary, and only after the competent person has assessed the condition of the structure and has authorized entry. • Personnel shall be aware of and follow all requirements established by the competent person. The competent person shall inform personnel of the areas that are safe to enter and the areas where entry is prohibited. The competent person shall escort personnel while in the demolition zone. • The competent person shall control entry into the demolition zone. Unauthorized entry shall be prohibited. • Appropriate warning and instructional safety signs shall be conspicuously posted where necessary. In addition, a signalman shall control the movement of motorized equipment in areas where the public might be endangered.	Standard Level D PPE or as required by HSP *
	Heavy Equipment	• Only appropriately sized heavy equipment shall be used in demolition operations and shall be affixed with suitable material handling/demolition attachments. Demolition balls shall be sized according for the heavy equipment to be used. Where demolition balls are used in concrete sizing operations, the ball shall be able to be firmly and appropriately attached to operating heavy equipment material handling/demolition attachments. • Seat belts or other restraint system shall be used by heavy equipment operators. • Demolition equipment shall be inspected each day, before use, to ensure safe operational condition. Keep documentation on site. • Use caution around pressurized lines/hoses. Inspect hoses daily for cuts, abrasions and wear. • Equipment shall only be operated by personnel qualified by prior training or experience. • Ensure that a stable ground surface is available for the operation of heavy equipment. • Do not swing overhead loads over ground personnel.	Standard Level D PPE or as required by HSP *
	Electric Safety/Overhead Utilities	• Maintain proper separation between Power Transmission Lines and over overhead utilities. See Electric Safety section in HSP for references to proper separation between operating equipment and power transmission lines/overhead utilities. • Do not swing excavator boom or other components of operating heavy equipment toward overhead utilities. Be cognizant of utility pole guy wires.	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Material Handling	• The demolition ball shall be attached to the load line with a swivel-type connection to prevent twisting of the load line, and shall be attached by positive means so that the weight cannot become accidentally disconnected. • Suspended loads will not pass over workers at any time. Site personnel are prohibited from passing under suspended loads. • Rigging use, maintenance and inspection shall be performed in accordance with the applicable standards of 29CFR1926.250 and Army Corps of Engineers Manual EM 385 1-1, section 15, Rigging, whichever is more stringent. • Only load rated (tagged or labeled) rigging shall be utilized on AGVIQ projects. User shall familiarize themselves with design load rate capacities (i.e. vertical, basket/cradle or choker applications) for the selected rigging.	Standard Level D PPE or as required by HSP *
	Fire Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Review and be cognizant of applicable NSNR Fire Prevention Procedures and Requirements. Secure any applicable NSNR Hot Work permit from NSNR Fire Department representatives and institute fire watch provisions. • Hoses associated with cutting operations must be protected from damage from flames or cutting slag and such that ignition/explosion may not occur.	Standard Level D PPE or as required by HSP *
	Biological	• Observe ground surfaces, building structure, surrounding vegetation other site features for presence of spiders, bee/wasp hives etc. • Observe areas for presence of stinging insects. Prior to starting field activities, **notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant or permethrin (clothes). Tape pant legs to boots and ensure there are no open seams between boots and pant legs. Frequently check body and clothing for ticks, spiders. Where tick exposure is moderate or high exposure, the use of disposable coveralls shall be considered. • Avoid exposure to blood borne pathogens. Use universal precautions against exposure.	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Stuck by/Pinched Caught in Between	• Personnel shall remain a safe distance from the demolition zone to reduce exposure to fragmentation of glass, steel, masonry, and other debris during demolition operations.. • Sufficient separation between ground support personnel and the operating heavy equipment must be maintained. • Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators. • Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed objects, operating equipment. Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators performing lifting/hoisting operations. • Ensure equipment has operable back-up alarms. • Step away from heavy equipment when adjustments (positioning) are made. • Ensure heavy equipment operator has spotter for obstructed views and backing up.	Standard Level D PPE or as required by HSP *
	Haul trucks	• All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • **All haul trucks must following the designated Haul Route established for the NSNR, NSNR OFFTA project.** • Haul truck operators should be familiar with their equipment and inspect all equipment before use. • Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn or alarm. All equipment should be equipped with an operational backing alarm. • Haul trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots. • Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator. • Where grades are steep, provide signs indicating the actual grade as well as measures for a runaway truck. • Haul roads should be well lit, sufficiently wide (at least 50% of the width of the equipment on both sides of road) and equipped with reflectors to indicate access points. • Haul roads should have adequate right-of-way signs indicating haul directions, where appropriate.	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	Adverse Weather	• Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available on-site to monitoring local weather or marine forecasts. If on-site internet or radio monitoring are not available, check with the Adak security office if severe weather systems appear to be developing. NSNR may be able to provide an update local forecast. If not check with home office support personnel who may be able to verify pending regional severe weather conditions. • Frequently observe the skyline for developing rain squalls and thunder storms systems that may developing. • Bring clothing suitable for anticipated daily weather conditions. • Shut down operations during heavy rain/lightning events or high wind conditions. For storms producing lightning, seek safe haven in a grounded structure or rubber vehicle. Implement 30 – 30 rule. Do not seek refuge under trees during electrical or high wind storm events. • Stay away from ravines and gullies during heavy rain events, because of the possibility of flash flood events. • Do not use telephones during electrical storms, except in the case of emergency.	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.* 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	Standard Level D PPE or as required by HSP *
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (HSP) to assist with work warming regiment determination and frostbite avoidance	Standard Level D PPE or as required by HSP *

AGVIQ Construction and Environmental Support Access
Road Maintenance and Construction

NTCRA , Adak Island, Alaska
ACTIVITY HAZARD ANALYSIS – Demolition and Sizing of Concrete Drainage Structure and Ancillary Features

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment
Demolition Activities (Cont.)	Cutting	• Proper control measures shall be in place before welding or cutting on surfaces covered by coatings containing flammable or hazardous materials such as lead, cadmium, zinc, etc. Highly flammable or toxic coatings may require stripping of the coating a sufficient distance from the area to be heated. • Appropriately sized, easily accessible ABC fire extinguisher in all work areas or heavy equipment. • Review and be cognizant of any specific NSNR Fire Prevention Procedures and Requirements prior to performing any hot work activities (hot cutting, welding, grinding). • Prior to performing any cutting operations, evaluate if there is any potential for presence or build-up of hazardous atmosphere conditions that would require the use of a multi-gas meter (LEL, O2, H2S, CO) to verify there are no potentially explosive conditions or hazardous atmospheres in the work area.. Perform periodic checks of the work area for the duration of the welding and cutting procedure. • During welding or cutting activities, use protective eye wear which meets the shading requirements where light emitting energy is generated. Use face protection, as necessary to mitigate cut/abrasions/injuries to the face that may be associated with the selected cutting method. • Compressed gas cylinder valve caps must be in place and cylinder valves closed when cylinders are transported, moved, or stored. • Compressed gas cylinder cylinders must be secured in an upright position at all times. • Compressed gas cylinder cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.	Standard Level D PPE or as required by HSP *
	Other	• Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Buddy System maintained for all phases of work. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	NA

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • First Aid/BbPK/CPR shield • Excavator with material handling attachments, Loader, demolition ball, demolition attachments • Loader • Haul trucks	• Visual Inspections of designated work areas identify and address hazardous conditions • Equipment inspections and maintenance • Inspections of hand tools (power) and extension cords if used	• Review AHA with all task personnel • Review Site Specific Health and Safety Plan for new site personnel • 1st Aid/CPR (two people on-site) • Supervisors, SSHO - BBLPS, SCC (10hr Construction Safety) or equivalent • Power tool and heavy equipment operators qualified by previous training or experience

NOTES (Field Notes, Review Comments, etc.):

Overall Risk Assessment Code (RAC) (Use highest code)					
Risk Assessment Code (RAC) Matrix					
Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Probability: Likelihood of the hazard to cause a incident, near miss, or accident.

- Frequent - Occurs very often, known to happen regularly
- Likely - Occurs several times, a common occurrence
- Occasional - Occurs sporadically, but is not uncommon
- Seldom - Remotely possible, could occur at some time
- Unlikely - Can assume will not occur, but not impossible

Severity: Outcome/degree of the incident, near miss, or accident.

- Catastrophic - Death or permanent total disability; Major property damage
- Critical - Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
- Marginal - Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
- Negligible - First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage

	PRINT	SIGNATURE	
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Site Personnel:	_____	_____	**Date/Time:**_____
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	_____	_____	**Date/Time:**_____

AHA Prepared By:
Rachel Francis
AGVIQ, LLC.
Health & Safety Officer

FINAL

APPENDIX D. FORMS

Non-Time Critical Removal Action

For the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

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Silverdale, WA 98315

Prepared by:

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Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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Project Forms for OU B-2 NTCRA

This appendix contains the following forms that are to be used during the NTCRA at OU B-2, Adak, Alaska:

- Accident Illness Near Miss Report
- Contractor Incident Report System (CIRS)
- Contractor Production Report
- Daily Quality Control Report
- DD Form 626
- Deficiency Notice Log
- Deficiency Notice
- Design Change Notice
- Field Change Request Log
- Field Change Request
- Grid QC Inspection Record
- Magazine Data Card
- MDAS Accumulation Form
- MDAS Certification Form
- MDEH Certification Form
- MEC Accountability Log
- MPPEH Inert/Demilitarization Certification/Verification Manifest
- Nonconformance Report Log
- Nonconformance Report
- Operator & Geophysical Instrument Checkout Form for MEC Operations
- Personnel Qualification Verification Form
- QC Surveillance Tracking Form
- QC Surveillance
- Safety Inspection Report
- Safety Meeting/Training Record
- Safety Violation or Non-Compliance Record
- Site Visitors Log
- Tailgate Safety Briefing
- Training Documentation (MEC Operations)
- Weekly Quality Control Report
- Weekly Quality Control Report – Instructions
- Weekly Vehicle Inspection Sheet
- Uniform Hazardous Waste Manifest – EPA Form 8700-22 (for use as EXAMPLE only)

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USA Environmental, Inc.

ACCIDENT / ILLNESS / NEAR MISS REPORT

SECTION 1 – GENERAL INFORMATION			
Name: _____		SSN: _____	Log #:_____
D.O.B.: _____	Sex: _____	Age:_____	OSHA Recordable Incident: ☐ Yes ☐ No
Job Title: _____			
Date of Report: _____	Date of Incident: _____	Time of Incident: _____	
Task/Operation Being Conducted: _____			
PPE Worn: _____			

SITE CONDITIONS AT TIME OF ACCIDENT / INCIDENT		
Temperature: Direction: Other:	Humidity: Cloud Cover:	Wind Speed: Precipitation:
Type of Incident:	☐ Personal Injury ☐ Motor Vehicle	☐ Personal Illness ☐ Property Damage ☐ Chemical Exposure ☐ Near Miss
If chemical exposure, what material(s) was(were) involved: _____ What was the nature of exposure (contact, inhalation, etc.): _____		
Other Individual(s) Involved: _____		

SECTION 2 – PERSONAL INJURY/ILLNESS INFORMATION
Nature/Type of Injury/Illness (laceration, strain, etc.): _____
Cause of Injury/Illness: _____
Body Part(s) Affected: Primary: _____ Secondary: _____
Injury/Illness Required: ☐ On Site/Clinic First Aid Treatment ☐ Emergency Room Treatment ☐ Hospitalization
Injury/Illness Resulted In: ☐ Loss of Work Time ☐ Limitation of Duties ☐ Fatality ☐ Other (Explain): _____
Status at Time of Report: ☐ Returned to Work: (Date: _____) ☐Hospitalized: (Anticipated Stay: _____) ☐ Convalescing: (Anticipated Length of Convalescence:) ☐ Other: _____
On Site First Aid Treatment Given: _____
Off Site First Aid or Other Medical Treatment (attach documentation, including Physician statement): _____

ACCIDENT/ILLNESS/NEAR MISS REPORT (cont.)

SECTION 3 – MOTOR VEHICLE ACCIDENT

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
☐ Automobile/SUV ☐ Van/Truck ☐ MHE/EMM ☐ Other:	☐ Side Swipe ☐ Rear End ☐ Backing ☐ Head on ☐ Broadside ☐ Roll	Front Seat ☐ Yes ☐ No Back Seat ☐ Yes ☐ No

Property/Material/Items Involved

Name of Item:	Owner:	Damage Estimate:
_____	_____	$

Accident/Near Miss Description (Use additional paper if needed): _____

SECTION 4 – POST-ACCIDENT/INJURY/ILLNESS REVIEW

Has the Home Office been notified? ☐ Yes ☐ No If Yes, When? _____ By Whom? _____

Were operations conducted using approved USAE SOP or an APP/ SSHP?

☐ Yes Reference: _____

☐ No Explain: _____

SUXOS's Comments: _____

Employee Comments: _____

WITNESSES

Name	Organization	Phone Number
_____	_____	_____

Employee Signature: Date: _____

SUXOS Signature: Date:_____

Actions Completed by: _____ Date: _____

Corporate Review by: _____Date:_____

ACCIDENT/ILLNESS/NEAR MISS REPORT (cont.)

Additional Information (if needed):

○ Initial Report
○ Follow-up Report
○ Final Report
Date _____/_____/_____

Contractor Incident Report System (CIRS)

1. Contract Information	Incident Information
Prime Contractor:	**Cage Code:**
Contract Number:	**Installation of Incident:**
Task Order #:	**Contracting Activity/ROICC Office:**

Contractor Contact Information	
Name (Last, First):	**Phone #:**
Email Address:	**Date Notified:**

2. Incident Type (Please Check/Bold All That Apply)

☐ Assault/Violent Act	☐ Extreme Environmental Exposure	☐ Man over the side (No water entry)
☐ Diving	☐ Falls, slip, trip, or bodily exertion	☐ Man Overboard - Water Entry
☐ Electrical Shock/Burns	☐ Fires - All Types	☐ Material Handling Equipment
☐ Equipment Installation/Repair	☐ Hazardous Material (any type)	☐ Ordnance-Related (Explosive)
☐ Explosion, Non-Ordnance	☐ **Industrial (Select Additional Below)**	☐ Vehicle (Government or Private)

Industrial Incident Additional Information (Please Check/Bold All That Apply)

☐ Confined Space	☐ Hand and Power Tools	☐ Work Platforms and Scaffolding
☐ Demolition/Renovation	☐ Rigging	☐ Underground Construction, Shafts, and Caissons
☐ Trenching/Entrapment	☐ Cranes and Hoisting Equipment	☐ Concrete, Masonry, Steel Erection and Residential Construction
☐ Traffic Control	☐ Floating Plant and Marine Activities	☐ Tree Maintenance and Removal
☐ Welding and Cutting	☐ Pressurized Equipment and System	☐ Airfield and Aircraft Operations
☐ Control of Hazardous Energy	☐ Fall Protection	

3. General Information	Incident Information
Date of Accident:	**Time of Accident:**

Describe the accident in detail in your words: *(Use the back of page if you need additional space)*

Exact Location of Accident:

Were Hazardous Material(s) Involved ☐ Yes ☐ No

If Yes, Explain What Hazardous Materials Were Involved and Why:

Who Provided Clean-up? ☐ Onsite ☐ Base ☐ Public

Activity of the injured person at the time of incident:

Personal Protective Equipment: (Check/Bold Response)

☐ Available and used ☐ Available and not used ☐ Not Required

☐ Not related to Mishap ☐ Wrong PPE for job

List PPE Used:

4. Fully Explain What Allowed or Caused the Incident: Incident Information

Direct Cause:

Indirect Cause:

Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description)

Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description) *(Use the back of page if you need additional space)*

5. Contributing Factors:

Was Visibility Restricted? ☐ Yes ☐ No

Distance Visibility was restricted:

Unit of Measure (Check/Bold): ☐ Feet ☐ Yards ☐ Meters ☐ Miles ☐ Nautical Miles

Visibility Restricted By: (Check/Bold all that apply)

☐ Fog ☐ Smoke ☐ Rain ☐ Sleet ☐ Snow

☐ Mist ☐ Dust ☐ Sandstorm ☐ Unknown Object ☐ Other:

Lighting Conditions at Site of Mishap:

(Please Check)

☐ Adequate ☐ Inadequate ☐ Unknown

Was Noise Level a Factor:

(Please Check)

☐ Yes ☐ No ☐ Unknown

Was Carbon Monoxide (CO) a Factor:(Please Check)

☐ Yes ☐ No

If Yes CO Alarm Manufacturer:

5. Contributing Factors: Continued

Incident Information

Other Contributing Factors:

6. Attached Documents

Attached Documents/Files Name/Description:	Date Added:	Uploaded By:

1. Injured Data (if applicable) Person

Age:	Gender: (Check/Bold) ☐ Male ☐ Female	Prime Contractor Company Name:	Subcontractor Company Name:

2. General Information

Drug or Alcohol Involved: (Check/Bold all that apply)

☐ None ☐ Unknown ☐ Alcohol ☐ Drugs ☐ Alcohol and Drugs

Who Provided First Aid? ☐ Onsite ☐ Base ☐ Public

Was Ergonomics a Factor: (Check/Bold) ☐ Yes ☐ No

Type of Ergonomic Injury: (Check/Bold All That Apply)

☐ Lifting ☐ Positioning ☐ Bending ☐ Equipment Placement Office

☐ Equipment Placement Industrial ☐ Repetitive Motion ☐ Impact Strain

3. Injury Illness/Fatality Information

Severity of Injury/Illness: (Check/Bold)

☐ Fatality ☐ Lost Workday Case Involving Days Away From Work

☐ Temporary Disability ☐ Recordable Workday Case Involving Restricted Duty

☐ Permanent Total Disability ☐ Other Recordable Case ☐ Recordable First Aid Case

☐ Permanent Partial Disability ☐ Non-Recordable Case ☐ No Injury

Where There Days Lost: (Check/Bold)	Where There Days Hospitalized: (Check/Bold)	Where There Days Restricted Duty: (Check/Bold)
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Part of Body Affected:

Nature of Injury or Illness:

Event or Exposure:

Source of Injury or Illness:

General Location Description:

Injury Activity Code:

4. License (if applicable) Person

Are Appropriate License and Certification/Medical Current: (Check/Bold) ☐ Yes ☐ No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

5. Training

Was all the contract-required training provided to the employee: (Check/Bold) ☐ Yes ☐ No

Explain:

6. Attached Documents

Attached Documents Name/Description:	Date Added:	Uploaded By:

1. Involved Person Data			(if applicable) Property Damage
Age:	Gender: ☐ Male ☐ Female	Contractor:	Contractor:

2. Attached Documents

Attached Documents Name/Description:	Date Added:	Uploaded By:

3. Property Damaged

Was Anyone Injured: ☐ Yes ☐ No

Was A Government Motor Vehicle Involved: ☐ Yes ☐ No

Property Type	Property ID #	Detailed Description	Property Owned By	Estimated Cost USD	Lost Use Days

4. License (if applicable) Property Damage

Are Appropriate License and Certification/Medical Current: (Check/Bold) ☐ Yes ☐ No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

5. Training

Was all the contract-required training provided to the employee? (Check/Bold) ☐ Yes ☐ No

Explain:

CONTRACTOR INCIDENT REPORT SYSTEM (CIRS) INSTRUCTIONS
Complete Only Sections Appropriate to Incident (Rev. 03/11).

NOTE: THE ATTACHED CIRS FORM IS TO BE USED BY CONTRACTORS TO RECORD THE RESULTS OF THEIR ACCIDENT/INCIDENTS INVESTIGATIONS AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER WITHIN THE REQUIRED TIMEFRAMES.

GENERAL. Complete a separate report for each person who was injured in the accident pages 5-6. A report needs to be completed for all OSHA recordable accidents and property damage cases. Please type or print legibly. Appropriate items shall be Checkd/Bolded, non-applicable sections shall be marked "N/A". If additional space is needed, provide the information on a separate sheet of paper and attach to the completed form.

Mark the report: (Check/Bold)
Initial: If this form is being used as initial notification of a Fatality or High Visibility Mishap. The initial form is due within 4 hours of a serious accident. A form marked 'Follow-up' or 'Final' is required within 5 days.

Follow-Up: If you are providing additional information on a report previously submitted.

Final: If you are providing a completed report and expect no changes.

Incident Information

Section 1 Contract Information – Incident Information
Prime Contractor: Name as it appears on contract documents.

Cage Code: If known.

Contract Number: Number as it appears on the contract documents.

Installation: Name of installation where incident occurred.

Task Order #: Insert number if applicable.

Contracting Activity/ROICC Office: Enter the name and address of the Contracting Office administering the contract under which the mishap took place (e.g. ROICC MCBH, ROICC NORFOLK, PWC GUAM, etc.).
Contractor Contact Information: (Contractor point of contact information for the individual responsible for completing the form) Self Explanatory

Section 2 Incident Type: Check/Bold most applicable category, if you select Industrial you must Check/Bold at least one additional category from the **Industrial Incident Additional Information Section**.

Section 3 General Information Incident Information
Date of Accident: Enter the month, day, and year of accident.

Time of Accident: Enter the local time of accident in military time. Example: 14:30 hrs (not 2:30 p.m.).

Describe the Accident in Detail in your words: Fully describe the accident in the space provided. If property damage involved, give estimated dollar amount of damage and/or repair costs involved. If additional space is needed continue on a separate sheet and attach to this report. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Ensure questions below regarding direct cause(s), indirect cause(s), and actions taken are answered. **NOTE!** Review questions in Section 4 (Fully Explain What Allowed or Caused the Incident - Incident Information) below before completing.

Exact Location of Accident: Enter facts needed to locate the accident scene (e.g. installation/project name, building/room number, street, direction and distance from closest landmark, etc.).

Were Hazardous Material(s) Involved Yes No

If Yes, Explain What Hazardous Materials Were Involved and Why: Check or Bold appropriate block and list name(s) and quantities of hazardous materials spilled/released during the mishap. List why the hazardous chemicals were being used.

Activity at the time of incident: What type of work/task was being performed by the injured when the injury took place or property damage occurred.

Personal Protective Equipment– Check/Bold appropriate items and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)

Section 4 Fully Explain What Allowed or Caused the Incident - Incident Information
Direct Cause(s): The direct cause is that single factor which most directly lead to the accident. See examples below.

Indirect Cause(s): Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:
1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: Failure to provide fall protection at elevation
Indirect causes: Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)
Direct cause: Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

Additional Action Taken: Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue in the additional box and or on additional sheets of paper if necessary to fully explain and attach to the completed report form.

Please Include a Begin Date and Estimated Completion Date in Description
(1) Begin: Enter the date when the corrective action(s) identified above will begin.
(2) Est. End Date - Enter the date when the corrective action(s) identified above will be completed.

Section 5 Contributing Factors Incident Information: Check/Bold appropriate items fill in information where required
Other Contributing Factors: Describe in detail any additional contributing factors not listed in previous information provided.

Section 6 Attached Documents: Provide the appropriate information for each document/file attached or uploaded.

Injured Data Person

Complete Pages 5 and 6 for each injured person At the upper right hand corner of page 5 and 6 differentiate between each person by using a numerical value (e.g. Person #1, Person #, Person #3, etc.)
Section 1 Injured Data: Fill in all applicable information, Check/bold appropriate responses.

Section 2 General Information:
Check/bold appropriate responses

Section 3 Injury/Illness Fatality Information: Check/bold appropriate responses
Part of Body Affected: Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist: abdomen: single eye; jaw: both elbows: second finger: great toe: collar bone: kidney, etc.).

Nature of Injury/Illness: Describes the manner in which the injury or illness was inflicted or produced. It attempts to answer the broad question of "how" work injuries and illnesses occurred. (e.g. Fall, Struck By, Caught By, Repetitive Motion, Rubbed or Abraded By, etc.)

Event or Exposure: Describes what was produced by the injury or illness was produced or inflicted. (e.g. Infectious Parasitic Diseases, Traumatic Injuries and Disorders, Open Wounds, Burns, Intracranial Injuries, etc.)

Source of Injury Illness: Identifies the object, substance, bodily motion, or exposure, which directly produced or inflicted the previously identified injury or illness. (e.g. Acids, Chemical Products, Furniture and Fixtures, Machinery, Structures and Surfaces, Tools Instruments and Equipment, etc.)

General Location Description: Describes where the injury occurred (e.g. Industrial Facilities, Operational Industrial Building Plant , Roadway, etc.)

Injury Activity Code: Describes what the injured person was doing when the injury occurred. (e.g. Operating Type of Equipment, Construction Activity Being Performed, Industrial Operation Being Conducted, etc.)

Section 4 License:
Are Appropriate License and Certification/Medical Current: Did the injured employee have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

Describe/Explain: Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. "Powdered Actuated Tools, Hilti DX-350, License issued 11/29/2011, expires 3-years from issue date." "Respirator Semi Annual Medical Evaluation, conducted 12/30/2011, expires on 12/30/2013", etc.)

Attach Image of License or Certification: Self-Explanatory

Section 5 Training:
Was all the contract-required training provided to the employee: Self-Explanatory

Explain: If no, to the previous questions explain why the employee was not trained.

Section 6 Attached Documents:
Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

Property Damage

Section 1 Involved Person Data: Fill in all applicable information, Check/bold appropriate responses.

Section 2 Attached Documents:
Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

Section 3 Property Damaged:
Check/bold appropriate responses. Other Headings Self-Explanatory.

Section 4 License:
Are Appropriate License and Certification/Medical Current: Did the equipment operator have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

Describe/Explain: Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. "State Issued Driver, License issued 11/29/2011, expires on MM/DD/YYY)" "Scissor Lift, JLG Model 260MRT conducted 12/30/2011, does not expire.")

Attach Image of License or Certification: Self-Explanatory

Section 5 Training:
Was all the contract-required training provided to the employee: Self-Explanatory

CONTRACTOR PRODUCTION REPORT

Sheet 1 of 1

Date: 4/30/08

Contract No:	Title & Location	Report No. 0

Contractor:	Superintendent:

AM Weather:	PM Weather	Temperature: (min/max):

Work Location & Description	Employer	Number	Trade	Hours
		0	SM/Superintendent	0
		0	GTM / Geo	0
		0	PQCM	0
		0	ESS/QC	0
		0		0
		0	UXO Tech	0
		0	Engineer	0

Was a job safety meeting held this date? (If yes, attach a copy of the meeting minutes.)	Yes: / No:		Total work hours on site this date:	0
Were there any lost time accidents? (If yes, attach a copy of completed OSHA report.)	Yes: / No:		Cumulative work hours from previous report:	0
Was trenching/scaffolding/HV electrical/high work done this date? (If yes, attach statement or checklist showing inspection performed.)	Yes / No:			
Was hazardous material/waste released to the environment? (If yes, attach description of incident and proposed action.)	Yes / No:		Cumulative work hours since start of work:	0

List safety actions taken today/safety inspections conducted:

Remarks:

	Started	In Process	Completed/Found	Total Completed/Found	
	0	0	0	0	
Target Locations			0	0	
DMM with HE or Propellant			0	0	
Small Arms & Smokeless Powder			0	0	
MPPEH			0	0	
Investigated locations			0	0	Ratio
Total Metallic Items (Debris) (items/ est. lbs)			0	0	0 / 0

Grid Numbers Started This Day: 0

Grid Numbers Completed This Day: 0

DMM Found This Day (Grid/Item): 0

Small Arms & Smokeless Powder (Grid/ Item): 0

MPPEH Found This Day (Grid/Item): 0

Site Superintendent — Date: 4/30/08

USA Environmental, Inc.

DAILY QUALITY CONTROL REPORT

Date:	**Contract #:**	**Task Order #:**
Site/Location:		
Weather:	**Temperature:**	**Rainfall:**

1. Preparatory Inspection:

Results:

2. Initial Inspection:

Results:

3. Follow-up Inspection:

Results:

4. QC Audits Performed:

a. Operations:

Results:

b. Safety:

Results:

c. Administrative:

Results:

d. Equipment:

Results:

5. Instructions Received:

UXOQCS Signature: _____ **Date:** _____

Printed Name: _____

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

(Read Instructions before completing this form.)

This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.	1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER

SECTION 1 - DOCUMENTATION	ORIGIN a.	DESTINATION b.
2. CARRIER/GOVERNMENT ORGANIZATION		
3. DATE/TIME OF INSPECTION		
4. LOCATION OF INSPECTION		
5. OPERATOR(S) NAME(S)		
6. OPERATOR(S) LICENSE NUMBER(S)		
7. MEDICAL EXAMINER'S CERTIFICATE*		

8. *(X if satisfactory at origin)*

								9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	YES	NO
a. HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:		YES		NO				
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*						a. TRUCK/TRACTOR		
c. ROUTE PLAN		f. COPY OF 49 CFR PART 397						b. TRAILER		

SECTION II - MECHANICAL INSPECTION

All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.

10. TYPE OF VEHICLE(S)	11. VEHICLE NUMBER(S)

12. PART INSPECTED *(X as applicable)*	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT		ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
a. SPARE ELECTRICAL FUSES					k. EXHAUST SYSTEM					
b. HORN OPERATIVE					l. BRAKE SYSTEM*					
c. STEERING SYSTEM					m. SUSPENSION					
d. WINDSHIELD/WIPERS					n. COUPLING DEVICES					
e. MIRRORS					o. CARGO SPACE					
f. WARNING EQUIPMENT					p. LANDING GEAR*					
g. FIRE EXTINGUISHER*					q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING					r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS					s. TARPAULIN*					
j. FUEL SYSTEM*					t. OTHER *(Specify)*					

13. INSPECTION RESULTS *(X one)* ACCEPTED ☐ REJECTED ☐

(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)

14. SATELLITE MOTOR SURVEILLANCE SYSTEM: *(X one)* ACCEPTED ☐ REJECTED ☐

15. REMARKS

16. INSPECTOR SIGNATURE *(Origin)*	17. INSPECTOR SIGNATURE *(Destination)*

SECTION III - POST LOADING INSPECTION

This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.

	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR					
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT					
20. SEALS APPLIED TO CLOSED VEHICLE; TARPAULIN APPLIED ON OPEN EQUIPMENT					
21. PROPER PLACARDS APPLIED					
22. SHIPPING PAPERS/DD FORM 2890 FOR GOVERNMENT VEHICLE SHIPMENTS					
23. COPY OF DD FORM 626 FOR DRIVER					
24. SHIPPED UNDER DOT SPECIAL PERMIT 868					

25. INSPECTOR SIGNATURE *(Origin)*	26. DRIVER(S) SIGNATURE *(Origin)*
27. INSPECTOR SIGNATURE *(Destination)*	28. DRIVER(S) SIGNATURE *(Destination)*

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials. Check the expiration date on driver's HAZMAT Certification.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2)).

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II *(Continued)*

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with one serviceable fire extinguisher with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28)

INSTRUCTIONS

SECTION II *(Continued)*

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

SECTION II *(Continued)*

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All placarded quantities items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR 172.201 and 202. For shipments transported by Government vehicle, shipping paper will be DD Form 2890.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Special Permit 868, ensure that shipping papers are properly annotated and copy of Special Permit 868 is with shipping papers.

Item 26. Ensure driver/operator signs DD Form 626 at origin.

Item 28. Ensure driver/operator signs DD Form 626 at destination.

PROJECT: _____

DEFICIENCY NOTICE LOG

D.N. NO.	DESCRIPTION OF DISCREPANCY	ISSUE DATE	DATE CLOSED	REMARKS

USA Environmental, Inc.

DEFICIENCY NOTICE

PROJECT: _____

RESPONSIBLE ORGANIZATION: _____ D.N. No. _____

DEFICIENT CONDITION _____ DATE _____

LOCATION _____

I. DESCRIBE DEFICIENCY:

_____

_____

_____

_____

_____

_____

_____

QC Notification Required Prior to Initiating Corrective Action: Yes _____No_____

D.N. Prepared by: _____ Approved by: _____

SITE QC REPRESENTATIVE

II. CORRECTIVE ACTION:

_____

_____

_____

_____

_____

_____ _____ _____

ORGANIZATION SIGNATURE DATE

III. REINSPECTION

Results:

_____ Accept

_____ Reject - Reissue Under: D.N. No. _____

_____ _____

INSPECTOR DATE

_____ _____

SITE QC REPRESENTATIVE DATE

IV. DISTRIBUTION

Responsible Organization: _____ Program QC Manager: _____

Site Superintendent: _____ Project/TO Manager: _____

Program Manager: _____

CONTRACT #:_____

DESIGN CHANGE NOTICE (DCN)				
TASK ORDER #	DCN#		DATE	
LOCATION	NTR/RPM			

1. Document to be changed. Identify revision, date, section, drawing, etc.

2. Description of Change (Items involved, submit sketch, if applicable): (Use continuation sheet if necessary)

3. Reason for Change (Attach additional information ,if needed)

4. Originator (Print name and sign)		Title	Date
Reviewed by: (Print name and sign)		Title	Date
Project Manager: (Print Name and sign)	Date	Project QC Manager (Print name and sign)	Date
NTR Acknowledgement (Print name and sign)	Date	RPM Approval (Print name and sign)	Date
COR Acknowledgement (Print name and sign)	Date		

FIELD CHANGE REQUEST LOG

Contract:

FCR No.	DESCRIPTION OF CHANGE	DATE INITIATED	STATUS

FIELD CHANGE REQUEST FORM

Date:	Department:	Name:
Change or Revision:	Plan/Procedure/SOP Name or #:	
Site Location:		

Preliminary Information

Current Document	Check All That Apply	Supporting Documentation (List document, page, para. etc.)	Submitted By (Initials)	Reviewed By (Initials)
Change or Revision Due To:				
1. Regulatory Update	☐			
2. Contract Requirement	☐			
3. Equipment Change	☐			
4. Newly Identified				
a) Safety Hazard	☐			
b) QC Measure	☐			
c) Operational Issue	☐			
5. Other:	☐			

Summary of Change or Revision: (Identify procedural, contractual, equipment, or operator and how this affects the current SOP)**:**

Change or Revision Requested: (Identify page, para, figure, table, etc. that is changed or revised)

Requestor's Signature:	
Change or Revision: ☐ Accepted ☐ Rejected **Reason for Rejection** –	**Reviewer's Signature:** **Safety/QC Signature:**
Corporate: ☐ Concurrence ☐ Non-Concurrence	**Corporate Approval Signature:**
NTR Acknowledgement (Name)	**NTR Signature**
RPM (Name)	**RPM Signature**

FINAL GRID QC INSPECTION RECORD

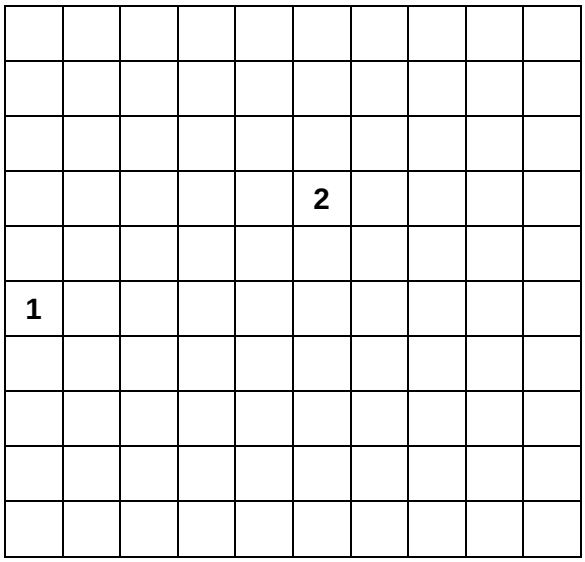
Site/Location: RAA- **Date:**

Grid Number: **Inspected By:**

Start Time: ☐ AM ☐ PM **Stop Time** ☐ AM ☐ PM

CHECK	YES	NO	NA	COMMENTS
Vallon checked at IVS?				(Vallon serial number)_____
Was the grid BSI detected and recovered?				BSI ID#_____
Were 10% of investigated targets rechecked? Total # of Targets_____ Total # of Targets rechecked_____				(List rechecked target ID # here)
Were 100% of No-finds rechecked? Total # of No-finds_____				(List rechecked target ID # here)
Were 100% of targets deeper than the required removal depth rechecked? Total # of targets_____				(List rechecked target ID # here)
Were 100% of all abandoned targets or debris left in place or holes filled with water rechecked? Total # of targets				(List rechecked target ID # here)
Were all resolved targets backfilled by investigation team?				
Were road/trail repairs removed/restored as close to their original condition?				
Were two semi-randomly selected mini-grids collected?				

Mini-grid locations:.



SW CORNER OF GRID

MINI-GRID RESULTS:

Number of targets picked above threshold for RAA: (Number picked targets and list mV readings)

Investigation results of picked targets:

QC Specialist Signature	_____

Magazine Data Card

Nomenclature:

Lot Number: **Unit of Issue:**

Date	Name	Received	Issued	Balance	Checker's Initials

MDAS Accumulation Form for Drum/Container No._____

Date	Description/NIIN	Qty (lbs)	Type of Treatment*

* If applicable

"The material listed on this form has been inspected or processed by DDESB-approved means, as required by DoD policy, and to the best of my knowledge and belief does not pose an explosive hazard."

CERTIFIER:

Signature _____ Date _____

Printed name _____

Position _____

Organization name _____

Organization address_____

Organization phone number _____

VERIFIER:

Signature _____ Date _____

Printed name _____

Position _____

Organization name _____

Organization address_____

Organization phone number _____

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46 47 48 49 50 51	52 53 54 55 56 57 58 59 60 61	62 63 64 65 66 67 68 69 70	71 72	73 74 75 76 77 78 79 80
DOCUMENT	RI FROM	M&S	UNIT	QUANTITY	SER / SUPPLEMENTARY ADDRESS	SIG / FUND / DISTRIBUTION / PROJECT	PRI / REQD / DELTE / ADV / RI	O/P / COND	MGT

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE	DOLLARS	CTS	4. MARK FOR	
DOLLARS	CTS			

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS

10. QTY. REC'D	11.UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE

22. RECEIVED BY	23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX (30-44)

25. NATIONAL STOCK NO. & ADD (8-22)

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

27. ADDITIONAL DATA

The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard

Certified By _____ Verified By _____

Container ID: _____ Seal Number: _____

PREVIOUS EDITION MAY BE USED

PerFORM (DLA)

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46 47 48 49 50	51	52 53 54 55 56 57 58 59 60 61	62 63 64 65 66 67 68 69 70	71	72 73 74 75 76 77 78 79 80
DOCCENT	RI FROM	M&S	UNIT	QUANTITY	SER / SUPPLEMENTARY ADDRESS	SIG	FUND / DISTRIBUTION	PROJECT / PRI	REQD / DEALTE / ADV	RI / O/P / COND / MGT

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE	DOLLARS	CTS	4. MARK FOR	
DOLLARS / CTS				

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS

10. QTY. REC'D	11.UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE

22. RECEIVED BY	23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX (30-44)

25. NATIONAL STOCK NO. & ADD (8-22)

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

27. ADDITIONAL DATA

This certifies that the material potentially presenting an explosive hazard listed has been 100 percent properly inspected and to the best of my knowledge and belief presents an explosive hazard.

Certified By

Verified By

PREVIOUS EDITION MAY BE USED

PerFORM (DLA)

MEC ACCOUNTABILITY LOG

NTCRA at OU B-2, Adak, AK

RAA	Grid/ Location	DGM Targe #	Date	Type	MPPEH Qty UXO	DMM	MDAS	MDEH	Description	Condition	Depth (in)	Approx Weight (lb)	Orientation	Disposal Date	X Coordinate	Y Coordinate	Photo #
Total:					**0**	**0**	**0**	**0**									

MEC/MDEH Statistics:

Type	Qty
UXO	0
DMM	0
MDAS	0
MDEH	0

GENERAL	MDAS Inert/Demilitarization Certification/Verification Manifest	
	1. Generator's Name and Mailing Address	1.a Generator's Ph # ( )
	2. Project Location	2.a Project Ph # ( )
	3. MEC Contractor Name and Mailing Address	3.a MEC Contractor Ph # ( )
	4. Government Assigned Verification Name and Mailing Address	4.a Certifier Ph # ( )
	5. Transporter 1 Name and Mailing Address	5.a Transporter 1 Ph # ( )
	6. Transporter 2 Name and Mailing Address	6.a Transporter 2 Ph # ( )
	7. Recycler Name and Mailing Address	7.a Recycler Ph # ( )

MEC Contractors and Government Certifier

8. Security Seal #	9. Gross Wt. (Lbs)	10. Tare Wt (Lbs)	11. Net Wt. (Lbs)	12. Weight Ticket #

13. Description	14. Material	15. Quantity	16. Unit (Wt., Vol)

INERT CERTIFICATION: *This certifies that the material potentially presenting an explosive hazard listed has been 100 percent properly inspected and to the best of our knowledge and belief, is inert and/or free of explosives or related material.*

17. USAE Senior UXO Supervisor Certification		
Signature	Address	Date
Printed/Typed Name		Phone
18. Government Assigned Verification		
Signature	Address	Date
Printed/Typed Name		Phone

Transporters	**19. Transporter 1 Acknowledgement of Receipt of Materials** (Receiving Signature Verifies that Container was Received with Seal Intact)		
	Signature	Address	Date
	Printed/Typed Name		Phone
	20. USAE Acknowledgement of Receipt of Materials (Signature Verifies that Container was Received with Seal Intact and Contents Loaded to Transporter 1)		
	Signature	Address	Date
	Printed/Typed Name		Phone
	21. Transporter 2 Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seals Intact)		
	Signature	Address	Date
	Printed/Typed Name		Phone
	22. Discrepancy Indication Space		
	Signature	Address	Date
	Printed/Typed Name		Phone
Demil / Recycle Facility	**23. Recycler Acknowledgement of Receipt of Materials** (Receiving Signature Verifies that Drums were Received with Seal Intact)		
	Signature	Address	Date
	Printed/Typed Name		Phone
	DEMILITARIZATION CONFIRMATION This certifies and verifies that each item or items contained have been demilitarized to the minimum requirements of DOD 4160-M-1, Defense Department Demilitarization Trade Security Control Manual.		
	24. Recycler		
	Signature	Signature	Signature
	Printed/Typed Name	Printed/Typed Name	Printed/Typed Name
	25. USAE Senior UXO Supervisor Certification		
	Signature	Signature	Signature
	Printed/Typed Name	Printed/Typed Name	Printed/Typed Name
	26. Government Assigned Verification		
	Signature	Signature	Signature
	Printed/Typed Name	Printed/Typed Name	Printed/Typed Name
	27. Final Disposition		

NONCONFORMANCE REPORT LOG

CONTRACT: **TO:**

NCR NO.	DESCRIPTION OF CONDITIONS/ ITEM AFFECTED	LOCATION	DATE				REMARKS
			NONCONFOR-MANCE	DISPOSITION/ CORRECTIVE ACTION APPROVAL	RE-INSPECTION	CLOSURE	

USA ENVIRONMENTAL, INC.	REPORT NO:
CLIENT:	PROJECT NO:
PROJECT:	TASK ORDER NO.:
	DATE:
NONCONFORMANCE REPORT	LOCATION:

DESCRIPTION OF ITEM OR PROCESS:	
SPEC/DRAWING/PLAN OR PROCEDURE NO.:	

SECTION 1 – DESCRIPTION OF NONCONFORMANCE

ORIGINATOR:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY

COMPLETED BY INITIATOR

SECTION 2 – RESPONSE/PLANNED CORRECTIVE ACTION

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY

COMPLETED BY QA REPRESENTATIVE

SECTION 3 – RECOMMENDED DISPOSITION

☐ USE-AS-IS	☐ OTHER: Specify Below
☐ REPAIR	☐ DCN / FCR Required
☐ REWORK TO SPECIFICATIONS	☐ DCN / FCR Not Required

COMMENTS:

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY

COMPLETED BY SUXOS/SITE SUPERINTENDENT

NONCONFORMANCE REPORT

REPORT NUMBER:	0		DATE:	MM/DD/YY

SECTION 4 - EVALUATION

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY

DISPOSITION / CORRECTIVE ACTION IS: ☐ ACCEPTED ☐ REJECTED WITH COMMENTS

FCR / DCN GENERATED: ☐ YES (ATTACH COPY) ☐ NO **FCR / DCN NO.:**

COMMENTS:

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY

DISPOSITION / CORRECTIVE ACTION IS: ☐ ACCEPTED ☐ REJECTED WITH COMMENTS

COMMENTS:

NTR/RPM TO DETERMINE NECESSARY EVALUATIONS

NONCONFORMANCE REPORT

REPORT NUMBER:			DATE:	MM/DD/YY

SECTION 5 – VERIFYING CORRECTIVE ACTION

VERIFICATION NEEDED?	☐ YES ☐ NO	PERSON RESPONSIBLE:	

DESCRIPTION OF VERIFICATION TO BE PERFORMED:

COMMENTS FROM VERIFYING PARTY

SIGNATURE OF VERIFYING PARTY:		DATE:	

UXOQCS/QA TO DETERMINE VERIFICATION

SECTION 6 – CLOSING THE NONCONFORMANCE

The information contained on this Nonconformance Report has been reviewed and has been found sufficient to satisfactorily close this issue.

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	MM/DD/YY
ATTACHMENTS:	☐ YES ☐ NO	DESCRIBE:	

UXOQCS OR DESIGNEE

INSTRUCTIONS (CONSULT PROCEDURE QC-3, OR CONTACT QA/AC DEPARTMENT FOR MORE INFORMATION):	
INITIATOR (QC/QA): **Section 1**	1. Consult NCR Log for appropriate NCR number 2. Complete header and Section 1 of form. 3. After Section 1 is complete, forward a copy of the NCR to the QA representative or the NTR as appropriate. 4. Route NCR to responsible Site Superintendent or Department Head.
QA REPRESENTATIVE: **Section 2**	1. Complete Section 2 of NCR. 2. Corrective Action should be appropriate to the magnitude of the nonconformance and commensurate with the project and/or programmatic impact. 3. Forward NCR to appropriate the NTR.
SUXOS/SITE SUPERINTENDENT: **Section 3**	1. Recommend disposition or route to Project Manager for disposition. **USE-AS-IS, CHANGE REQUIREMENTS BY DCN / FCR:** The work will be accepted "as is". A DCN / FCR will be written to change the specification to reflect the condition. **REWORK TO SPECIFICATIONS:** The item will be reworked or replaced to meet the specifications. **REPAIR, VARIANCE BY DCN / FCR:** The item will be repaired as required to meet design intent; however, a variance to the specification is needed. Requires technical justification and documentation, in the form of a DCN / FCR.
SUXOS/SITE SUPERINTENDENT: **Section 3 cont.**	1. Indicate reviewers as needed from affected disciplines and organizations who shall review NCR disposition and corrective 2. N/A all sections not used 3. Begin routing process.
NTR/RPM: **Section 4**	1. Indicate acceptance or rejection of the corrective action and disposition. **ACCEPTED:** The information presented provides sufficient justification that the corrective action will remedy the nonconforming condition. Proceed with work. **ACCEPTED WITH COMMENTS:** The information presented provides sufficient justification that the corrective action will remedy the nonconforming condition, after changes in recognition of the reviewer's comments. Proceed with work provided the work addresses comments noted. **REJECTED:** The corrective action is unacceptable and shall be revised and resubmitted. Work associated with the corrective action shall not proceed. 2. Route to QA (or designee).
QC/QA: **Section 5**	1. Perform and document verification as described. 2. Complete Section 5. 3. Return NCR to UXOQCS (or designee).

Operator & Geophysical Instrument Checkout Form for MEC Operations

WEEK START DATE:	Team No.:	Instrument Serial No.: USA: Model:
Operator Name:		
SITE NAME AND LOCATION:		
Instrument Verification Strip:		

Test Results (Pass)	MON	TUE	WED	THU	FRI
Item Description	PASS	PASS	PASS	PASS	PASS
1. Instrument checked For Broken/ Missing Components.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
2. Instrument Serviceability Check Performed.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
3. Correct Settings Selected for the Instrument.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
4. Correct Survey / Sweep Techniques Employed.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
5. Instrument Responsive To The Test Item(s)	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
6. Operator Responsive to Instrument Signal / Sound.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
7. Operator Locates Point of Origin For Test Item(s).	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
8. Operator familiar with Pass / Fail Criteria.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
9. Operator Familiar with Work Plan Procedures.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
10. Instrument Trained Operator.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
11. Instrument Passed Test Area.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐
12. Operator Passed Test Area.	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐	Y ☐/ N ☐

SUMMARY OF DEFICIENCIES NOTED: (Identify if procedural, process, instrument, or operator, number missed)

CORRECTIVE ACTIONS RECOMMENDED: (If required):

- **Instruments failing the test will be tagged and removed from service until repaired or replaced.**
- **Individuals will be corrected on deficient procedures, processes, techniques, and/or retrained to acceptable standards.**

Team Leader Signature: _____ **End of Week Date:**

NOTE: Quality Control tests are to be conducted for the instrument and operator each day and documented on this form. This form will also be used to document the current status of deficiencies noted during daily tests. Any daily test forms where deficiencies have been noted will be forwarded to the Senior UXO Specialist / Manager or the UXO Quality Control Specialist / Manager.

PERSONNEL QUALIFICATION VERIFICATION FORM

NAME: _____ **POSITION** _____

CONTRACT:

REVIEW ITEMS		QUALIFICATIONS	VERIFIED BY/DATE
EXPERIENCE	REQUIRED:		
	ACTUAL:		
EDUCATION	REQUIRED:		
	ACTUAL:		
CERTIFICATIONS & QUALIFICATIONS	REQUIRED:		
	ACTUAL:		
TRAINING	REQUIRED (See page two):		
	ACTUAL:		
OTHER	REQUIRED:		
	ACTUAL:		

TRAINING REQUIREMENTS FOR:_____

TRAINING	YES	NO	NA	DATE
40-Hour HAZWOPER				
8-Hour HAZWOPER Refresher				
8-Hour Supervisor				
30-Hour Construction Safety Course				
First-Aid/CPR				
Corporate Quality Control Training				
Corporate Safety Training				
Explosives Driver Training				
Utility Vehicle Training (ARGO)				
Site-Specific Training				
EM-61 Training				
Reacquisition Training				
Thermal Flashing Unit Training				

QC SURVEILLANCE TRACKING FORM

Project:	Project Manager:	UXOQCS:

Reference Number	Definable Feature of Work	Preparatory		Initial		Follow-Up		Completion		
		Date Planned	Actual Date	Date Planned	Actual Date	Planned Begin/End	Actual Dates	Planned Begin/End	Actual Dates	Status

PREPARATORY, INITIAL, FOLLOW-UP QC SURVEILLANCE FORM

CONTRACT/TO:

DFW:

TEAM INFORMATION		
Team:	**Location:**	**Date:**
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): ***Preparatory (P); Initial (I); Follow-Up (F)***		

CHECKLIST						
Item	**Ref.**	**Inspection Point**	**Yes**	**No**	**N/A**	**Comments**

FINDINGS	
Item	**Comments**

Conducted By: _____Reviewed By: _____

USA Environmental, Inc.

SAFETY INSPECTION REPORT

Site / Location:	**Date:**
Type of Inspection: ☐ **Daily** ☐ **Weekly** ☐ **Re-Inspection** ☐ **Other**	
Type of Operation Inspected:	
Equipment Inspected (Specify if Safety or Operational in Nature):	
Comments:	
Deficiencies Found or Noted:	
Corrective Action:	
Re-Inspection Required: ☐ **Yes** ☐ **No**	**If Yes, Date of Re-Inspection:**

Signatures:

_____ _____

Site Safety Officer **SUXOS/Project Manager**

***Copy to Supervisor if Deficiencies or Corrective Action were found, noted, or deemed necessary.**

SAFETY MEETING/TRAINING RECORD

Date: **Time:** ☐ **AM** ☐ **PM**

Location/Site:

1. Reason for Meeting/Training: (Check all that apply):			
☐	Daily Safety Meeting/Training	☐	Periodic Safety Meeting/Training
☐	Initial Site Safety Meeting/Training	☐	New Site Procedures
☐	New Task Briefing	☐	New Site Information
☐	Periodic Review of Site Information	☐	Other (Explain):

2. Personnel Attending Meeting/Training:		
Name	**Signature**	**Company**

3. Topics Covered (Check all that apply)			
☐	Site Safety Personnel	☐	Decontamination Procedures
☐	Site/Work Area Description	☐	Emergency Response Plan
☐	Site Characterization	☐	Hazard Communication
☐	Biological Hazard(s)	☐	On-Site Emergency
☐	Chemical Hazard(s)	☐	On-Site Injuries/Illnesses
☐	Physical Hazard(s)	☐	Evacuation Procedures
☐	Heat Stress	☐	Rally Point(s)
☐	Cold Stress	☐	Emergency Communication
☐	Site Control	☐	Directions to Medical Facility
☐	Work and Support Zones	☐	Drug and Alcohol Policies
☐	PPE	☐	Medical Monitoring Program
☐	Air monitoring	☐	Specific Task Training
☐	Safe Work Practices	☐	Confined Spaces
☐	Engineering Controls and Equipment	☐	Heavy Equipment
☐	Spill Containment Procedures	☐	Other: (Specify)
☐	Equipment Safety	☐	Other: (Specify)

4. Remarks:

5. Verification:

I certify that the personnel listed above on this record received the Information and/or Training described as indicated. Personnel not attending this meeting/training will receive said information/training prior to commencing their assigned duties.

_____ **Date:**

Site Safety Officer - Signature

SAFETY VIOLATION OR NON-COMPLIANCE RECORD

Employee Name: _____ **Position:** _____

Site / Location: _____ **Date** _____ / _____ / _____

Type of violation: _____ PPE _____ Procedural _____ Explosive _____ Equipment _____ Other

Type of Non-Compliance: _____ Policy _____ Procedural _____ Directive _____ Contract _____ Other

Description of Violation or Non-Compliance:

_____

_____

_____

Document Reference (Specify document, page, paragraph, etc. as applicable):

_____

_____

_____

Corrective Action(s) to be taken:

_____

_____

_____

Employee or Company Response and Comments:

_____

_____

_____

Notification made to:

Site Manager: _____ Yes _____ No **Date:**

SUXOS: _____ Yes _____ No **Date:**

Supervisor: _____ Yes _____ No **Date:**

Corrective Actions Inspection Required: _____ Yes _____ No

If Yes, Date of Inspection: _____ / _____ / _____

Signature: _____ **Signature:** _____

UXO Safety Officer Employee/Company Representative

USA Environmental, Inc.

SITE VISITORS LOG

Project Location:_____ **Month of:** _____

Date	Name	Agency or Company	Purpose of Visit	Safety Briefing	Escort Required	Time In	Time Out	Remarks

USA Environmental, Inc.

TAILGATE SAFETY BRIEFING

Date: **Location:**

Time: ☐ **AM** ☐ **PM** **Team #:**

1. Reason for Briefing:			
☐	Daily Safety Briefing	☐	New Site Procedure
☐	Initial Safety Briefing	☐	New Site Information
☐	New Task Briefing	☐	Review of Site Information
☐	Periodic Safety Meeting	☐	Other (Specify):

2. Personnel Attending:		
Name	Signature	Position

3. Briefing Given By:		
Name	Signature	Position

4. **Topics:** (Check All That Apply)			
☐	Site Safety Personnel	☐	Decontamination Procedures
☐	Site/Work Area Description	☐	Emergency Response/Equipment
☐	Physical Hazards	☐	On-Site Injuries/Illnesses
☐	Chemical/Biological Hazards	☐	Reporting Procedures
☐	Heat/Cold Stress	☐	Directions to Medical Facility
☐	Work/Support Zones	☐	Drug and Alcohol Policies
☐	PPE	☐	Medical Monitoring
☐	Safe Work Practices	☐	Evacuation/Egress Procedures
☐	Air Monitoring	☐	Communications
☐	Task Training	☐	Confined Spaces
☐	MEC Precautions	☐	Other:

5. Remarks:

USA Environmental, Inc.

TRAINING DOCUMENTATION FORM
FOR MEC OPERATIONS

SUBJECT:	**TRAINING DATES:** **From:** **To:**
EMPLOYEE NAME (Printed, Last name first):	
TRAINING LOCATION (site, building, facility, etc.):	
REFERENCE / TRAINING MATERIAL UTILIZED (handouts, publications, etc):	

TRAINING RESULTS

Training Description	Pass	Hours	Trainer(s) Name	Initials
1. Classroom Instruction	☐ Y ☐ N			
2. Hands On Practical Training	☐ Y ☐ N			
3. On the Job Training (OJT)	☐ Y ☐ N			
4. Use of Safety / Support Equipment	☐ Y ☐ N			
5. Computer Generated Training	☐ Y ☐ N			
Exam Given: Written	☐ Y ☐ N	☐Pass ☐Fail		
Practical	☐ Y ☐ N	☐Pass ☐Fail		

SUMMARY OF TRAINING (certificate issued, pending documentation, retraining, etc.):

RETRAINING OR RECERTIFICATION REQUIRED (annual, semi-annual, etc):
☐ **Annual** ☐**Semi-Annual** ☐ **Other:** **Date Due:**

RE-INSPECTION RESULTS: (If required)

SIGNATURES:

I, the undersigned, certify that the above named employee has received training on the subjects listed above and on the date(s) indicated. UXOQCS/UXOSO/SSHO	I acknowledge that I have been trained on the subject listed above and agree to perform my assigned duties in a safe and efficient manner following all approved plans, procedures and SOP's. Employee Signature and Date

Note: This form will be used to document the training status of site personnel, and will also be used to note the current status of personnel qualifications.

WEEKLY QUALITY CONTROL REPORT

CONTRACT WITH DELIVERY ORDER: **N44255-12-C-3003**

SITE: **OUB-2 Adak, Alaska** **DATE:**

USA MOBILE PHONE:

USA SITE OFFICE PHONE:

REPORT SUBMITTED BY: **WEEK ENDING DATE:**

ADMINISTRATIVE: **Personnel On-Site**

	USA		Subcontractors		Total		Visitor	Gov't
WEEKDAY	Assigned	Present	Assigned	Present	Assigned	Present	Present	Present
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								

INSPECTIONS CONDUCTED (See QC Surveillance Tracking Form):

	Inspection Areas						
WEEKDAY	QCI of Overall Site	QCI of Teams	SHI of Overall Site	SHI of Teams	Explosives Storage	QCI of Administration	QCI of DGM
Sunday							
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							

QCI = Quality Control Inspection SHI = Safety and Health Inspection

See Separate Inspection Forms for the Task Checked.

DN/NCR ISSUED:

WEEKDAY	Subject Items					Response	
	Work Plan	Safety Violation	Safety Comment	Quality Control	Other	Action Required and Date	Responsible Party Initials
Sunday							
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
See Attached DN/NCR for Specific Information and Response.							

OPERATIONS:

SITE OPERATIONS (WORKING)						
Grids	**Vegetation**	**OB/OD Areas**	**DGM**	**Reacq.**	**MPPEH Management**	**Other**
Comments:						

QUALITY CONTROL INSPECTION (PASS / FAIL)													
Grids		**Vegetation**		**OB/OD Areas**		**DGM**		**Reacq.**		**MPPEH Management**		**Other**	
See Final Grid Inspection or Three Phase Inspection Forms for Additional Information concerning inspection results.													

PERCENTAGES COMPLETE						
Grids	**Vegetation**	**OB/OD Areas**	**DGM**	**Reacq.**	**MPPEH Management**	**Other**

OPERATIONAL HEAVY EQUIPMENT ON-SITE						
Track-hoe	**Bulldozer**	**Front-end Loader**	**Back-hoe**	**Bob-cat**	**Forklift**	**Crane**

NON- OPERATIONAL HEAVY EQUIPMENT						
Track-hoe	**Bulldozer**	**Front-end Loader**	**Back-hoe**	**Bob-cat**	**Forklift**	**Crane**

INSTRUMENTATION:

DGM Instrumentation						
Display	**Battery**	**Cables**	**Connections**	**Warm Up**	**Cable Shake**	**Operator**
Hand Held Instruments						
Hand Held	**Operational**	**Functions**	**Settings**	**Test Strip**	**Operator**	**Pas/Fail**
Global Positioning Systems						
Display	**Battery**	**Cables**	**Connections**	**Warm Up**	**Tracking**	**Operator**
Monuments or Benchmarks						

WEEKLY EXPLOSIVES USAGE:

	Explosives		**Blasting Caps**		**Tube / Cord**		**Other**	
WEEKDAY	Boosters	Perforators	Elect Caps	Non-Elect Caps	Non-EL	Det Cord	Time Fuse	
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
TOTAL:								
See Explosive Issue / Usage Form and Magazine Data Cards for Accountability and Signatures.								

WEEKLY INVENTORY:

DATE OF INVENTORY	Explosives		Blasting Caps		Tube / Cord		Other	
	Boosters	Perforators	Elect Caps	Non-Elect Caps	Non-EL	Det Cord	Time Fuse	
See Explosive Issue / Usage Form and Magazine Data Cards for Accountability and Signatures.								

SAFETY: Reported Work Related Injuries/Illness On-Site

WEEKDAY	USA						Subcontractor						Total					
	LWD		Restricted		Other		LWD		Restricted		Other		L		R		O	
	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL
Sunday																		
Monday																		
Tuesday																		
Wednesday																		
Thursday																		
Friday																		
Saturday																		
See Individual Accident / Incident Reports for Specific Information.																		

DOWN TIME:

WEEKDAY	Time		Time		Time		Total Hours	Remarks
	From	To	From	To	From	To		
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
See Operations Reports / Logs for Specific Information.								

GENERAL OBSERVATIONS:

DIRECTIVES OR CHANGES TO OPERATIONS:

LESSONS LEARNED:

UXOQCS Signature: _____

DISTRIBUTION:

1 – RPM/NTR
1 - Site Manager
1 - Corporate QC Manager
1 - Site QC File

INSTRUCTIONS
Weekly QC Report

These instructions are intended for use in filling in the Weekly QC Report. Individuals completing the report are to ensure the information (data, numbers, status, etc.) is correct and documented on related forms or other reports.

Contract with Delivery Order: Insert the Contract Number and the Delivery or Task order number for the project being performed.

Site: Insert the project site location or identifier.

USA Site Phone Number(s): Insert the office and/or mobile phone numbers as applicable, include area code.

Report Submitted By: Insert name of individual completing the report.

Report Date: Insert the date the report is being generated.

Week Ending Date: Insert the Week Ending Date as found on the Time Cards.

Administrative: Insert the number of employees assigned and present for work for the contractor and sub-contractor. Insert the number of Government or Visitors on site for the day.

Inspections Conducted: Check the block(s), by category, of the inspections that were performed by Quality Control and Safety throughout the week. Ensure inspection forms document each inspection conducted.

Deficiency Notice/Non-conformance Report: Check the appropriate block(s) the DN/NCR was issued for, insert the date and responsible party (UXOSO, UXOQCS, SUXOS, SM, PM, etc.) for those items requiring action. The “Other” column is for those items listed by the initiator of the DN/NCR in areas not normally contained on the form (i.e., QA acceptance or failure of grids, areas, workmanship, etc.)

Operations: Insert the number by category of work being performed, has been performed, or op/non-op, use the “Other” column if not identified.

> **Quality Control Inspection (Pass/Fail):** Insert the number of inspections performed in the left box of each category. Insert the number of inspection failures in the right box of each category. Ensure each Pass or Failure is properly documented. Failed items must be listed on the DN/FCR Log and returned to operations for corrective action.

Instrumentation: Check the block(s), within each category, of elements observed and recorded on inspection forms. Use the “Other” column for checks not identified.

Weeks Explosive Usage: Insert the amount of demolition materiel, by category and day, used on site.

Safety: Insert the number of **work related** injuries or illnesses sustained by contractor and sub-contractor personnel by work day. The UXOSO or Corporate Safety Office will be able to identify if the injury or illness is LWD, Restricted, or Other. Ensure the appropriate accident forms have been completed and submitted.

Project Down Time: Insert the "From and To" time operations are stopped on site, or at a particular location due to weather, stop work orders, unauthorized personnel in the EZ, client/customer/regulatory reasons, etc. Use the "Remarks" column to identify why.

General Observations: List those observations that are note worthy (severe weather hampering operations, new equipment on site requiring additional training of personnel, work proceeding ahead of schedule, etc.)

Directives or Changes to Operations: List those items which are note worthy (changes in contract requirements, addendums to work plans, new regulatory documents in effect, customer/client requested or mandated changes.

Lessons Learned: List any lessons learned that have been identified which may assist in helping the project. These lessons learned may be included in the final report.

Name and Signature: Insert the name of the responsible QC Specialist and sign the report.

WEEKLY VEHICLE INSPECTION SHEET

Team _____ Project Name _____

Team Leader _____ Project Number _____

Week Ending _____

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Wk. Total
DATE:								
Starting Milage								
Ending Milage								
Total Milage								
Vehicle Condition								
Fuel								
Oil								
Tires								
Lights								
Horn								
Wipers								
Steering								
Mirrors								
Fire Extinguisher/s								
Emergency Flashers								
Body Damage (Explain Below)								
Initials:								

Comments:

Submitted: _____ _____

Print Signature/Date

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	**4. Manifest Tracking Number**

GENERATOR

5. Generator's Name and Mailing Address

Generator's Site Address (if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Facility's Phone:

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1.					
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name — Signature — Month — Day — Year

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name — Signature — Month — Day — Year

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month — Day — Year

VOID

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FINAL

APPENDIX E. ENVIRONMENTAL PROTECTION PLAN (EPP)
and
WASTE MANAGEMENT PLAN (WMP)

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	State of Alaska Department of Environmental Conservation
AOC	Area of Concern
APP	Accident Prevention Plan
ARAR	Applicable or Relevant and Appropriate Requirement
ATF	Alcohol, Tobacco, and Firearms
ATV	all-terrain vehicle
BIP	blow in place
BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C/D 1.1	Class 1, Division 1
CFR	Code of Federal Regulations
CWA	Clean Water Act
cy	cubic yard
DDESB	Department of Defense Explosives Safety Board
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
FS	Feasibility Study
FWCA	Fish and Wildlife Coordination Act
GIS	geographic information system
GPS	global positioning system
MC	munitions constituent
MD	munitions débris
MEC	munitions and explosives of concern
MMR	Military Munitions Rule
MOA	Memorandum of Agreement
MPA	Marine Pollutant Act
MPPEH	material potentially presenting an explosive hazard
MSDS	Material Safety Data Sheet
NAF	Naval Air Facility
NAVFAC NW	Naval Facilities Engineering Command Northwest
NAVSEA	Naval Sea Systems Command
NCP	National Contingency Plan
NEW	net explosive weight
NOSSA	Naval Ordnance Safety and Security Activity
NTR	Navy Technical Representative
NTCRA	non-time critical removal action
OB	open burn

OD	open detonation
OSHA	Occupational Safety and Health Administration
OSR	Off-Site Rule
OU	Operable Unit
PAL	Project Action Limit
PM	Project Manager
PPE	personal protective equipment
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAA	Remedial Action Area
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylene trinitramine
RI	Remedial Investigation
RPM	Remedial Project Manager
RQ	reportable quantity
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
TAC	The Aleut Corporation
TBC	to be considered
TFU	Thermal Flashing Unit
TNT	Trinitrotoluene
USA	USA Environmental, Inc.
USC	United States Code
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
WMP	Waste Management Plan

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1.0 INTRODUCTION

This Environmental Protection Plan (EPP)/Waste Management Plan (WMP) identifies the applicable environmental protection and waste management measures to be implemented during the Operable Unit (OU) B-2 Non-Time Critical Removal Action (NTCRA) at Remedial Action Area (RAA)-02, RAA-03, and RAA-04 located at the former Naval Air Facility (NAF), Adak, Alaska. The action will include clearance of munitions and explosives of concern (MEC) using the digital geophysical mapping approach. The scope of work for the clearance is included in the contractor MEC Quality Assurance Project Plan (QAPP).

This EPP/WMP describes the procedures for compliance with environmental requirements and waste management to ensure that this work does not have an adverse effect on the environment or human health. Waste management procedures for MEC and explosives disposal activities that will be conducted wholly onsite are addressed in Section 4.0, along with applicable or relevant and appropriate requirements (ARARs). Waste management procedures for other project wastes, which likely will be disposed of offsite, are described in Section 5.0. This EPP/WMP also discusses the environmental regulatory requirements for the project activities, including measures to be implemented to ensure compliance with all applicable Navy requirements and substantive compliance with ARARs.

Future changes to this EPP/WMP will be made in accordance with the contractor/client quality control (QC) program through the issuance of field change requests or a more formal revision of the EPP/WMP to reflect significant regulatory changes.

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2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The key parties involved in this project are Naval Facilities Engineering Command Northwest (NAVFAC NW) and USA Environmental, Inc. (USA). Stakeholders include the State of Alaska Department of Environmental Conservation (ADEC), the U.S. Environmental Protection Agency (U.S. EPA), the U.S. Fish and Wildlife Service (USFWS), and The Aleut Corporation (TAC).

The NAVFAC NW Remedial Project Manager (RPM), Mr. Justin Peach, is the primary interface with U.S. EPA, ADEC, and the other stakeholders. The USA Project Manager (PM), Mr. Manok Synakorn, is the primary interface with NAVFAC NW. The project organization and key individuals' responsibilities are described in the MEC and munitions constituents (MC) QAPPs for the OU B-2 NTCRA; however, the responsibilities for environmental protection and waste management are included in this EPP/WMP. The project organization is shown in Worksheet #5 of the MEC QAPP. Personnel responsibilities are detailed in the MEC QAPP, Worksheet #7.

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3.0 EXISTING ENVIRONMENTAL CONDITIONS AND IMPACT PATHWAYS

The project sites include OU B-2 RAA-02, RAA-03, and RAA-04. USA will complete the work in accordance with requirements of the OU B-2 MEC QAPP, MC QAPP and all project plans associated this project.

The regulatory history of the project is discussed in detail in the Final Remedial Investigation (RI) Report for OU B-2 sites, Former Naval Air Facility, Adak, Alaska (USA, 2012) and the Final Feasibility Study (FS) Report for OU B-2 Sites, Former Naval Air Facility, Adak, Alaska (USA, 2012). The RI and FS documents also include a discussion of the environmental pathways and potential impacts.

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4.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

"Applicable requirements" are defined by the National Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300.5) as those cleanup standards, control standards, 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 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site. "Relevant and appropriate" requirements are defined as those cleanup standards, control standards, 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 are well suited for use at a particular site (40 CFR 300.5).

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 (TBC). It is important to note that 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)].

ARARs may be categorized as location-, chemical-, or action-specific:

- Location-specific ARARs set restrictions on activities related to wetlands, floodplains, and shorelines, etc., and depend on the characteristics of the site and its immediate environment.
- Chemical-specific ARARs set health- or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants.
- Action-specific ARARs set controls or restrictions on particular kinds of remedial activities that may be selected to accomplish a remedy. These ARARs may specify performance levels, actions, or technologies to be used to manage hazardous substances, pollutants, or contaminants.

Activities conducted entirely on a site need only comply with the substantive aspects of ARARs and not the administrative aspects such as permitting (specifically exempted under CERCLA Section 121[e]) or administrative reviews. Administrative procedures are not ARARs and, therefore, need not be pursued during the planning or implementation of risk reduction actions. This includes an exemption to the requirement to obtain environmental permits, including Resource Conservation and Recovery Act (RCRA) temporary emergency treatment permits (40 CFR 270.61). The substantive requirements of RCRA, with respect to emergency permits, are met by procedures outlined in this EPP/WMP; by following the MEC/MDEH management and disposal procedures included in standard operating procedure (SOP) SOP 9 (MEC Management and Disposal) and through the proper disposition of material potentially presenting an explosive hazard (MPPEH) per SOP 10 (MDAS Management and Disposal).

Although no remediation activities are planned to occur on Adak outside the boundary of the military reservation, any off-site activities related to the remediation work (e.g., off-site transportation, storage, and disposal of project waste or hazardous materials) must comply with all necessary federal, state, and local requirements. Occupational Safety and Health Administration (OSHA) requirements are also not considered ARARs pursuant to U.S. EPA's adopted final rule on the Oil and Hazardous Substances Pollution NCP. The Oil and Hazardous Substances Pollution NCP identifies specific OSHA requirements that must be complied with during all CERCLA response actions (i.e., 29 CFR 1910 and 1926).

Summaries of the potential location-, action-, and chemical-specific ARARs and TBCs assembled for OU B-2 are presented in Tables 2-1 through 2-3. The ARARs and TBCs are considered potential because the results of the FS-preferred remedial action alternative or alternatives have not been finalized; the location-specific requirements could be overly inclusive; and the action-specific requirements could be incomplete. Final remedial action ARARs will include federal and state water quality, endangered species, and pollution control regulations, as established in the ROD.

Although common RAOs, remedial action goals, and ARARs and TBCs have been identified for all of OU B-2, the following RAA-specific ARAR considerations merit review:

- **RAA-01 (OB/OD-01) –** The presence of wetlands and stream channels in the RAA indicates that location-specific ARARs pertaining to land use, wetlands, the Clean Water Act (CWA), and water quality standards are likely to be key ARARs for remedial actions at the RAA. Location-specific ARARs pertaining to cultural resources will also influence remedial actions at the RAA due to the presence of a WWII-era abandoned bridge over Moffett Creek and collapsed wooden structures.

  Additionally, OB/OD-01, which makes up all of RAA-01, was identified as a hazardous waste treatment unit in a RCRA Part B Permit application submitted to EPA in May 1991. Although a RCRA Part B Permit was never issued, OB/OD-01 is considered an interim status site and, therefore, is subject to closure requirements under RCRA (40 CFR 264, Subpart G, "Closure and Post-Closure"). The remediation of this site under CERCLA will comply with the substantive requirements of RCRA for closure and post-closure (or obtain a waiver). Following remediation under CERCLA, the unit will be administratively closed under RCRA.

  An agency-approved closure plan is required for closure of any RCRA-permitted unit, including interim status units. As summarized in 40 CFR 264.112, closure plans must identify steps necessary to perform partial and/or final closure of the facility at any point during its active life. Once the remedy has been determined for OB/OD-01 and documented in the ROD, it is assumed that the remedial design/remediation action work plan will serve as a closure plan, sufficient for the closure of the unit under RCRA.

- **RAA-02 (C1-01) –** The presence of wetlands and stream channels in the RAA indicates that location-specific ARARs pertaining to land use, wetlands, the CWA, and water quality standards are likely to be key ARARs for remedial actions at the RAA.
- **RAA-03 West (MI-01, MI-02, and MI-03) –** The presence of wetlands and stream channels in the RAA indicates that location-specific ARARs pertaining to land use, wetlands, the CWA, and water quality standards are likely to be key ARARs for remedial actions at the RAA. Location-specific ARARs pertaining to cultural resources will also influence remedial actions at the RAA due to the presence of a WWII-era diversion dam located on Moffett Creek.
- **RAA-03 East (HG-01 and RR-01)-** The presence of wetlands and stream channels in the RAA indicates that location-specific ARARs pertaining to land use, wetlands, the Clean Water Act, and water quality standards are likely to be key ARARs for remedial actions at the RAA. Location-specific ARARs pertaining to cultural resources will also influence remedial actions at the RAA due to the presence of the known-distance rifle range at RR-01 and the grenade range at HG-01.
- **RAA-04 (SA93-01 and SA93-03) –** The presence of wetlands and stream channels in the RAA indicates that location-specific ARARs pertaining to land use, wetlands, the CWA, and water quality standards are likely to be key ARARs for remedial actions at the RAA.
- **RAA-05 (ALDA-01 and ALSW-01) –** The proximity of RAA-05 to Andrew Bay and Andrew Lake indicates that location-specific ARARs pertaining to coastal zone management, the CWA, and water quality standards are likely to be key ARARs for remedial action at RAA-05. Location-specific ARARs pertaining to cultural resources will also influence remedial actions at the RAA due to the presence of WWII-era bunker and Quonset hut foundations.

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Location-Specific ARARs/TBC

Federal and Alaska laws and regulations are the potential location-specific ARARs for any potential remedial action on Adak. Potential location-specific ARARs include federal and Alaska water quality regulations (including wetland provisions), federal and state coastal management regulations, regulations for the protection of fish and wildlife and their habitat, and protection of historic and archaeological resources.

Several endangered or threatened species are found in and around Adak. However, no threatened or endangered plant or animal species are anticipated to be found in the project areas based on past surveys and listings (Environmental Chemical Corporation, 2001; URS Group, Inc, 2012b).

Adak also has historic and archaeological resources and, as a result, a variety of location-specific ARARs may be triggered. A cultural resources survey was conducted within OU B-2 in September 2011 and identified and recorded ten new sites and isolates that have been entered in the Alaska Heritage Resources Survey database. Some of these sites are located with defined RAAs (URS Group, Inc. 2012a) for the NTCRA at OU B-2.

Munitions may be located within streams, riparian zones, lakes, and wetlands. Water quality and wetland requirements contained in the Clean Water Act (CWA) are considered to be ARARs for potential effects on these water resources.

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Table 4-1: Location-Specific ARARs/TBC

Citation	Description of Requirement	Rationale for Use	Potential Relevancy	Possible Application
Archeological and Historic Preservation Act of 1974 (16 USC469 et seq.)				
40 CFR 6.301(c), "Applicant Requirements"	Requires that remedial actions do not cause the loss of any archaeological or historical data. This act mandates preservation of the data; it does not require protection of the actual waste site or facility.	Archaeological and historic sites may be located within the OU B-2 project area.	A	Investigation and remediation activities that occur in or near archeological or historic sites. Evaluate/screen OU B-2 project area for archaeological or historic resources prior to investigation/remediation.
National Historic Preservation Act of 1966 (16 USC 470 et seq.).				
36 CFR 800, "Protection of Historic Properties" 40 CFR 6.301(b), "Applicant Requirements" Executive Order 11593, Protection and Enhancement of the Cultural Environment 36 CFR 65, "National Historic Landmarks Program" 36 CFR 60, "National Register of Historic Places"	Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation, and mitigation processes and consultation with interested parties.	Cultural and historic sites may be located within the OU B-2 project area.	A	Investigation and remediation activities that affect cultural or historic sites. Evaluate/screen OU B-2 project area for cultural and historic sites prior to investigation/remediation.
American Indian Religious Freedom Act (42 USC 1996 et seq.)				
American Indian Religious Freedom Act	Protects religious, ceremonial, and burial sites and the free practice of religions by Native American groups.	Religious, ceremonial, and burial site may be located within the OU B-2 project area.	A	Investigation and remediation activities that affect religious, ceremonial, and burial sites. Evaluate/screen OU B-2 project area for the presence of religious, ceremonial, and burial sites prior to investigation/remediation.
Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001–13)				
43 CFR 10, "Native American Graves Protection and Repatriation Regulations"	Establishes federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects, and items of cultural patrimony. Requires Native American tribal consultation in the event of discovery.	Native American archaeological, cultural, and historic sites may be located within the OU B-2 project area; Native American remains and associated objects may be present.	A	Investigation and remediation activities that affect Native American archaeological, cultural, and historic sites that contain associated remains and objects. Evaluate/screen OU B-2 project area for Native American archaeological, cultural, and historic sites prior to investigation/remediation.
Endangered Species Act of 1973 (16 USC 1531 et seq., 16 USC 1536[c])				
50 CFR 402, "Interagency Cooperation–Endangered Species Act of 1971, as Amended" 40 CFR 6.302(h), "Responsible Official Requirements"	Prohibits actions by federal agencies that are likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of their critical habitat. Mitigation measures must be applied to actions that occur within critical habitats or surrounding buffer zones of listed species to protect the resource.	Federal endangered or threatened species including fish, plants, and mammals and their critical habitat and buffer zones that may occur within the OU B-2 project area.	RA	Investigation and remediation activities that occur within critical habitats or designated buffer zones of federal listed species. Evaluate/screen OU B-2 project area for endangered or threatened species, or their habitat, prior to investigation/remediation.
Migratory Bird Treaty Act of 1918 (16 USC 703 et seq.)				
16 USC 703 et seq., "Migratory Bird Treaty Act"	Implements various treaties and conventions for the protection of migratory birds. Under this act, taking, killing, or possessing migratory birds is unlawful.	Migratory birds occur within the OU B-2 project area.	A	Investigation and remediation activities that have the potential to kill migratory birds or destroy their eggs or nests. Evaluate/screen OU B-2 project area for migratory bird habitat prior to investigation/remediation.
Magnuson-Stevens Fishery Conservation and Management Act				
P.L.109-479, Magnuson-Stevens Act	Primary law governing marine fisheries management in United States federal waters.	Establishes time of year when remedial actions that may affect fisheries can occur.	A	Investigation and remediation activities that occur within fisheries. Evaluate/screen OU B-2 project area for fisheries prior to investigation/remediation.
Marine Mammal Protection Act (50 CFR 216)				
50 CFR 216, Marine Mammal Protection Act	Prohibits, with certain exceptions, the "take" of marine mammals in U.S.	Would apply to Andrew Bay for any whales,	A	Investigation and remediation activities that have the

Citation	Description of Requirement	Rationale for Use	Potential Relevancy	Possible Application
	waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.	seals, etc.		potential to kill marine mammals or destroy their habitats. Evaluate/screen OU B-2 project area for marine mammal habitat prior to investigation/ remediation.
66 FR 3853, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds				
16 USC 668; 50 CFR 22, "Bald and Golden Eagle Protection Act"	Provides for the protection of the bald eagle and golden eagle by prohibiting the unpermitted taking, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export, or import of any bald or golden eagle, alive or dead, including any part, nest, or egg (16 USC 668[a]; 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb (16 USC 688[c]; 50 CFR 22.3).	Bald eagles may occur within the OU B-2 project area.	A	Investigation and remediation activities that may "take" eagles. Evaluate/screen OU B-2 project area for bald eagles or their habitat prior to investigation/remediation.
Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.; 50 CFR 83)	Preserve and promote conservation of non-game fish and wildlife and their habitats.	Non-game wildlife may occur in the OU-B-2 project area.	A	Investigation and remediation activities that may impair non-game wildlife and/or their habitat. Evaluate/screen OU B-2 project area for non-game wildlife and/or their habitat prior to investigation/remediation.
Floodplain Management, Executive Order 11988				
Federal, Executive Order 11988, Protection of Floodplains 40 CFR 6, Appendix A; 10 CFR 1022, "Compliance with Floodplain and Wetland Environmental Review Requirements"	Take action to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values of the floodplain.	Some of the sites within OU B-2 subject to remediation are located within the Moffett Creek floodplain.	A	Investigation and remediation activities that occur within wetlands or a floodplain. Determine whether the OU B-2 area is located within a floodplain or wetland prior to investigation/remediation.
Federal Coastal Zone Management Act (16 USC 1451 et seq., 15 CFR 923)				
Coastal Zone Management Act 16 USC 1451–1464; 15 CFR 921–933 6 AAC 50, Alaska Coastal Management Program administered by Alaska Department of Fish and Game	Requires federal agencies conducting activities affecting the coastal zone be consistent with the approved state coastal zone management program. Federal projects that are anticipated to affect a coastal zone of a state with an approved state coastal zone management program (all coastal states except Georgia, Texas, Ohio, Indiana, Illinois, and Minnesota) must be consistent with the state's plan. Specifies the policies, standards, and limitations applicable to effects to coastal resources.	Some of the sites within OU B-2 subject to remediation are located near coastal zones.	RA	Investigation and remediation activities that occur within the coastal management zone. Determine whether the OU B-2 area is located in a coastal zone prior to investigation/remediation.
Alaska National Interest Lands Conservation Act of 1980				
16 USC 410hh-3233 43 USC 1602-1784 Public Law 96-487	Provides comprehensive management guidance for all public lands in Alaska, including provisions for wilderness, subsistence, transportation and utility corridors, oil and gas leasing, mining, public access, hunting, trapping and fishing, and implementation of the Alaska Native Claims Settlement Act. The Alaska National Interest Lands Conservation Act of 1980 set forth the following major purposes for establishing and managing the Alaska Maritime National Wildlife Refuge. (1) Conserve the refuge's animal populations and habitats in their natural biodiversity including, but not limited to marine mammals, marine birds and other migratory birds, the marine resources upon which they rely, bears, caribou and other animals. (2) Fulfill international treaty obligations of the United States relating to fish and wildlife and their habitats. (3) Provide opportunities for continued subsistence uses by local residents (in a manner consistent with purposes number 1 and 2). (4) Conduct national and international scientific research on marine resources (in a manner consistent with purposes number 1 and 2).	Designated certain public lands in Alaska as units of the National Park, National Wildlife Refuge, Wild and Scenic Rivers, National Wilderness Preservation and National Forest Systems.	A	Investigation and remediation activities that occur in Alaska Maritime National Wildlife Refuge land. Determine whether OU B-2 area includes designated units subject to this Act prior to investigation/remediation.

Citation	Description of Requirement	Rationale for Use	Potential Relevancy	Possible Application
	(5) Ensure water quality and quantity within the refuge (to the maximum extent practicable and in a manner consistent with purpose number 1).			
National Wildlife Refuge System Improvement Act of 1997				
Public Law 105–57 – October 9, 1997	Amend the National Wildlife Refuge System Administration Act of 1966 to improve the management of the National Wildlife Refuge System.	Upon transfer, Adak will incorporate into the National Wildlife Refuge System, created to conserve fish, wildlife, and plants and their habitats and to facilitate enjoyment of wildlife-dependent recreation.	A	Investigation and remediation activities that may impair non-game wildlife and/or their habitat. Evaluate/screen OU B-2 project area for non-game wildlife and/or their habitat prior to investigation/remediation.
Alaska Fish and Game Requirements				
AS 16, 5 AAC 95	Provides for protection and conservation of various species of fish, wildlife, and plants.	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work in or near critical habitats.	RA	Investigation and remediation activities that occur near or in critical habitats. Evaluate/screen OU B-2 project area for critical habitat prior to investigation/remediation.
Waste Management and Disposal Authorization				
AS 46.03, 18 AAC 70, 18 AAC 72,	Prohibits discharge of dredged or fill material into wetlands without a permit. Obtain certification for any discharge into waterways that may be considered a pollutant.	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work in the vicinity of rivers, streams, tidal areas, and wetlands.	RA	Investigation and remediation activities that occur in the vicinity of rivers, streams, tidal areas, and wetlands.
Clean Water Act				
33 USC 1251 et seq. 401, 404, 301, 502 et seq.	Establishes the basic structure for regulating discharges of pollutants into the waters of the United States (including wetlands) and regulating quality standards for surface waters. Section 404 establishes a program to regulate any person; company, tribe, or government agency planning to work in waters of the United States or to discharge dredged or fill material into waters of the United States. Section 401 provides states with the legal authority to review an application or project that requires a federal license or permit (in this case a 404 permit) that might result in a discharge into a water of the United States. Under Sections 301 and 502 of the Clean Water Act, any discharge of dredged or fill materials into "waters of the United States," including wetlands, is forbidden.	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work within rivers, streams, tidal areas, and wetlands.	RA	Investigation and remediation activities that occur near or in bodies of water or wetlands that will result in the discharge of fill material to these waters/wetlands. In lieu of a permit, compliance with the 404 program will involve coordination with the U.S. Army Corps of Engineers to determine specific substantive requirements, including mitigation and restoration requirements, to avoid adverse effects on wetlands and other waters of the U.S. Since no permit would be required for an onsite action, state certification (18 AAC 15.180) is not legally required. However, coordination with ADEC may be required to determine/confirm that a discharge would not violate the requirements of CWA §401(a)(1) or the state water quality standards. A discharge of dredged or fill material that does not comply with the CWA §404(b)(1) guidelines (40 CFR 230.10) or state water quality standards will occur only in accordance with CERCLA waiver criteria for ARARs.
Rivers and Harbors Act of 1899				
33 USC 403; Chapter 425, March 3, 1899; 30 Stat. 1151, Rivers and Harbors Appropriation Act of 1899	Section 9 of the Act prohibits the construction of any bridge, dam, dike or causeway over or in navigable waterways of the U.S. without Congressional approval. Administration of Section 9 has been delegated to the Coast Guard. Structures authorized by state legislatures may be built if the affected navigable waters are totally within one state, provided that the plan is approved by the Chief of Engineers and the Secretary of the Army (33 USC 401). Under Section 10, the building of any wharfs, piers, jetties, and other structures is prohibited without Congressional approval, and excavation or fill within navigable waters requires the approval of the Chief of Engineers. Service concerns include contaminated sediments associated with dredge	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work within rivers, streams, tidal areas, and wetlands.	A	Investigation and remediation activities that occur near or in bodies of water or wetlands that will result in the discharge of fill material to these waters/wetlands. In lieu of a permit, compliance with the 404 program will involve coordination with the U.S. Army Corps of Engineers to determine specific substantive requirements, including mitigation and restoration requirements, to avoid adverse effects on wetlands and other waters of the U.S. Since no permit would be required for an onsite action, state certification (18 AAC 15.180) is not legally required. However, coordination with ADEC may be

Citation	Description of Requirement	Rationale for Use	Potential Relevancy	Possible Application
	or fill projects in navigable waters. Authority of the U.S. Army Corps of Engineers to issue permits for the discharge of refuse matter into or affecting navigable waters under Section 13 of the 1899 Act (33 USC 407; 30 Stat. 1152) was modified by Title IV of P.L. 92-500, October 18, 1972, the Federal Water Pollution Control Act Amendments of 1972 (33 USC 1341-1345; 86 Stat. 877), as amended, which established the National Pollutant Discharge Elimination System Permits.			required to determine/confirm that a discharge would not violate the requirements of CWA §401(a)(1) or the state water quality standards. A discharge of dredged or fill material that does not comply with the CWA §404(b)(1) guidelines (40 CFR 230.10) or state water quality standards will occur only in accordance with CERCLA waiver criteria for ARARs.
Alaska Historic Preservation Requirements				
AS 41.35; 11 AAC 16	Preserves and protects the historic, prehistoric, and archeological resources of Alaska from loss, desecration, and destruction so that the scientific, historic, and cultural heritage embodied in these resources may pass undiminished to future generations.	Cultural and historic sites may be located within the OU B-2 project area.	A	Investigation and remediation activities that affect cultural or historic sites. Evaluate/screen OU B-2 project area for cultural and historic sites prior to investigation/remediation.
Alaska Coastal Management Program				
AS 46.40; 6 AAC 80; 6 AAC 85	Specifies the policies, standards, and limitation applicable to effects on coastal resources.	Some of the sites within the OU B-2 subject to remediation are located near coastal zones.	RA	Investigation and remediation activities that occur within the coastal management zone. Determine whether the OU B-2 area is located within a coastal zone prior to investigation/remediation.
Activities on State Lands				
AS 38, AS 41.17, AS 41.2, AS 41.23	Regulates activities on state-owned lands, including tidelands and submerged lands.	Some of the sites within OU B-2 subject to remediation are located on state lands (e.g., RAA-02 [ALSW-01]).	RA	Investigation and remediation activities that occur within state lands.

$\mu g/m^3$ = microgram(s) per cubic meter
A = applicable
AAC = *Alaska Administrative Code*
CFR = *Code of Federal Regulations*
RA = relevant and appropriate
TBC = to be considered
USC = United States Code

Chemical-Specific ARARs/TBC

Federal and Alaska laws and regulations are the potential chemical-specific ARARs for any potential remedial action on Adak. Potential chemical-specific ARARs include federal and state air and water regulations, coastal zone management regulations, endangered species regulations, and Alaska pollution control regulations.

Potential effects caused by munitions response actions include releases of contaminants into the air, water, or soil. If any activities with the potential to release or discharge contaminants into the environment are planned, the appropriate ARARs must be considered and appropriate control or mitigation measures must be put in place.

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Table 4-2: Chemical-Specific ARARs/TBC

TABLE 2-3
Identification of Potential Federal and State Chemical-specific ARARs and TBCs for OU B-2
Adak OU B-2 Feasibility Study Report, Adak Island, Alaska

Soil				
18 AAC 75.340, Alaska Soil Cleanup Levels	Provides requirements for cleanup levels for hazardous substances in soil. Cleanup levels will be based on an estimate of the reasonable maximum exposure expected to occur under current and future site conditions.	Future land users may be exposed to hazardous substances in soil or sediment.	A	Evaluation of soils to be used for backfill and cover or caps.
Groundwater				
18 AAC 80 Alaska Drinking Water Regulations 18 AAC 70 Alaska Water Quality Standards 18 AAC 75.345 Alaska Groundwater and Surface Water Cleanup Levels	Establish maximum contaminant concentrations for organic and inorganic contaminants in public water systems. These concentrations are equivalent to, or more stringent than, the maximum contaminant limits of the Safe Drinking Water Act. Establish criteria for protected classes of water use including groundwater that discharges to surface water. For toxic and other deleterious organic and inorganic substances, the most stringent of the EPA ambient water-quality criteria and Alaska drinking water standards are to be used. Provide requirements for cleanup levels for hazardous substances in groundwater. Cleanup levels will be based on use of groundwater as a drinking water source.	Groundwater downgradient of sites may be used as drinking water.	A	Possible discharge requirements for groundwater recovered during dewatering activities.
Surface Water				
18 AAC 70 Alaska Water Quality Standards	Establish criteria for protected classes of water use including groundwater that discharges to surface water. For toxic and other deleterious organic and inorganic substances, the most stringent of the EPA ambient water-quality criteria and Alaska drinking water standards are to be used.	Groundwater downgradient of capped or covered waste may discharge to surface water.	A	Possible discharge requirements for groundwater recovered during dewatering activities.
18 AAC 83, Alaska Pollutant Discharge Elimination System	Establishes standards for the prevention of pollutant discharge in stormwater. Standards for stormwater are outlined in General Permits as authorized by this rule. General Permit for Discharges from Large and Small Construction Activities (APDES Permit No. AKR100000) addresses stormwater discharges from land-disturbing activities that disturb greater than one acre.	General Permit No. AKR100000 includes substantive requirements, including the requirement for a Stormwater Pollution Prevention Plan, inspections, and monitoring of stormwater that is discharged during land- disturbing activities.	A	The substantive requirements of the General Permit apply to remediation activities that disturb one or more acres of land.
Air Emissions				
Clean Air Act of 1977 (42 USC 7401 et seq.), 40 CFR 50, "National Ambient Air Quality Standards"				
40 CFR 50.7, "National Primary and Secondary Ambient Air Quality Standards for ambient air quality standards for PM2.5." Adopted by reference in 18 AAC 50.035.	Establishes primary and secondary air quality standards for particulate matter, which are 15 $\mu g/m^3$ annually or 65 $\mu g/m^3$ per 24-hour average concentration. Although National Primary and Secondary Ambient Air Quality Standards are never ARARs, they may be used as other criteria or guidelines on an appropriate basis.	Particulates and dust may be generated during OU B-2 remedial actions.	TBC	Soil remediation actions, including drilling, demolition, and excavation.

$\mu g/m^3$ = microgram(s) per cubic meter
A = applicable
APDES = Alaska Pollutant Discharge Elimination System
DOT = U.S. Department of Transportation
FR = Federal Register

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Action-Specific ARARs/TBC

Federal and Alaska laws and regulations are the potential action-specific ARARs for any remedial action on Adak. Potential action-specific ARARs include federal and Alaska air quality regulations; hazardous waste generation, storage, disposal, and transportation regulations, including specific regulations for MEC-related wastes; solid waste regulations; and water quality regulations.

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Table 4-3: Action-Specific ARARs/TBC

Citation	Description of Requirement	Rationale for Use	Potential Relevancy	Possible Application
RCRA Closure and Post-closure Care				
40 CFR 265 Subpart G, "Closure and Post-Closure"	Sections 265.111 through 265.115 (which concern closure) apply to the owners and operators of all hazardous waste management facilities; and Sections 265.116 through 265.120 (which concern post-closure care) apply to the owners and operators of all hazardous waste disposal facilities.	OB/OD-01 was identified as a hazardous waste treatment unit in a RCRA Part B Permit application submitted to EPA in May 1991. Although a RCRA Part B Permit was never issued, OB/OD-01 is considered an interim status site and therefore is subject to closure requirements under RCRA (40 CFR 265, Subpart G – Closure and Post-Closure).	A	Closure and post-closure care at OB/OD-01.
40 CFR 264, Subpart X Miscellaneous Units	40 CFR 264.603, "Post-closure care." Criteria for post-closure of miscellaneous land-based units, such as OB/OD areas. A miscellaneous unit that is a disposal unit must be maintained in a manner that complies with 40 CFR 264.601 during the post-closure care period. In addition, if a treatment or storage unit has contaminated soils or ground water that cannot be completely removed or decontaminated during closure, then that unit must also meet the requirements of §264.601 during post-closure care. 40 CFR 264.602, Monitoring, analysis, inspection, response, reporting, and corrective action. Standards required that a miscellaneous unit comply with 40 CFR 64.601. 40 CFR 264.601, Environmental performance standards. The basic elements of this standard include: A miscellaneous unit must be closed in a manner that will ensure protection of human health and the environment. Protection of human health and the environment includes, but is not limited to: – Prevention of any releases that may have adverse effects on human health or the environment because of migration of waste constituents in the ground water or subsurface environment. – Prevention of any releases that may have adverse effects on human health or the environment because of migration of waste constituents in surface water, or wetlands or on the soil surface. – Prevention of any release that may have adverse effects on human health or the environment because of migration of waste constituents in the air.	OB/OD-01 was not identified as a disposal unit in the RCRA Part B Permit application; however, it is a land-based treatment unit that could be closed with waste in place.	RA	While not a permitted Miscellaneous Unit or a disposal unit, the post-closure care standards are relevant and appropriate to a land-based miscellaneous unit that is closed with waste in place. Subpart X requires that the unit be closed in a manner that prevents "any releases that may have adverse effects on human health or the environment because of migration of waste constituents in the ground water or subsurface environment…"
18 AAC 70	Discharges of dredged or fill material into a waterbody must meet water quality standards.	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work in the vicinity of rivers, streams, tidal areas, and wetlands.	RA	Investigation and remediation activities that occur in the vicinity of rivers, streams, tidal areas, and wetlands.

Military Munitions Rule (40 CFR Part 266, Subpart M)				
Military Munitions Rule (40 CFR Part, 266 Subpart M)	Identification of hazardous waste munitions and treatment and storage requirements for hazardous waste munitions. The rule clarified when military munitions become solid wastes.	MEC has been found and potential for uncovering or encountering MEC exists during excavation and consolidation activities.	A	Routine range clearance activities at active and inactive ranges are deemed to not render the used munition a regulated solid or potential hazardous waste. However, on-range disposal (for example, recovery, collection, *and* subsequent burial or placement in a landfill) would render the used munition a solid or potential hazardous waste. An unused munition is not a solid waste or potential hazardous waste when it is being repaired, reused, recycled, reclaimed, disassembled, reconfigured, or otherwise subjected to materials recovery actions. While this rule is applicable to active or inactive ranges, it would be relevant and appropriate to a range that will be closed with waste in place.
Clean Air Act (40 CFR 51.40 et seq.)				
National Ambient Air Quality Standard for Particulate Matter (40 CFR 51.40 et seq.) State of Alaska Air Quality Protection (18 AAC 50.110, 18 AAC 50.030)	National Ambient Air Quality Standard for Particulate Matter. Requirements for the prevention of any air emissions that may be injurious to human health or welfare, animal or plant life, or property, or that would unreasonably interfere with the enjoyment of life or property.		RA	Potential for detonation activities that may generate particulate matter emissions.
Clean Water Act				
33 USC 1251 et seq. 401, 404, 301,502 et seq.	Section 404 establishes a program to regulate any person, company, tribe, or government agency planning to work in waters of the United States or to discharge dredged or fill material into waters of the United States. Section 401 provides states with the legal authority to review an application or project that requires a federal license or permit (in this case a 404 permit) that might result in a discharge into a water of the United States. Under sections 301 and 502, any discharge of dredged or fill materials into "waters of the United States," including wetlands, is forbidden	Potential ARAR for material stockpiling, placement of equipment, MEC detonation, and site excavation work within rivers, streams, tidal areas, and wetlands.	RA	Investigation and remediation activities that occur near or in bodies of water or wetlands.
Alaska Institutional Control Regulations				
18 AAC 75.375.	Identifies the circumstances in which institutional controls may be required as part of remedial action, defines the components of ICs, and identifies the procedures for establishing, documenting, and removing ICs.	Manage residual MEC risk remaining at a site, with possible application as a stand-alone response without MEC physical removal.	A	Some form of ICs will be a part of any remedial action that takes place at OU B-2.
DoD Ammunition and Explosives Safety Standards (DoD 6055.09-M)				
DoD Ammunition and Explosives Safety Standards (DoD 6055.09-M)	DoD standard issued under the DDESB that establishes policies and procedures necessary to provide protection to personnel as a result of DoD ammunition, explosives, or chemical agents and contamination of real property currently or formerly owned, leased, or used by DoD.		TBC	Storage of munitions and siting of magazines is under authority of DDESB.
Naval Sea Systems Command (NAVSEA)				
NAVSEA OP5, Ammunition and Explosives Safety Ashore, Volume 1, Seventh Revision (dated March 1, 1995)	The explosives safety policies of the Department of the Navy are directed at providing reliable ammunition and explosives in sufficient quantity to satisfy Navy and Marine Corps requirements in a safe manner. The purpose of this manual is to acquaint personnel with the characteristics and hazards of ammunition, explosives, and other related hazardous materials and to specify standardized safety		TBC	These policies emphasize safe and efficient operating procedures while: Providing the maximum possible protection to personnel and property from the damaging effects of potential accidents involving Department of the

	regulations for all operations where ammunition and explosives are or are intended to be present.			Navy ammunition and explosives. Limiting the exposure of a minimum number of persons, for a minimum time, to the minimum amount of ammunition and explosives consistent with safe and efficient operations.
DOT Hazardous Materials Transportation Regulations (49 CFR 170–173)				
Hazardous Materials Transport Regulations–Hazardous Materials Table (49 CFR 172.101)	Provides information on regulated hazardous materials including hazard classes, packing, and labeling standards.		RA	Potential for the classification of hazardous materials or hazardous wastes generated onsite for transportation purposes.
Hazardous Materials Transportation Regulations–Training (49 CFR 172.700–704)	Requirements for DOT training.		RA	Potential for onsite workers engaged in a DOT function.
U.S. Navy Environmental and Natural Resources Program (OPNAVINST 5090.1B)				
Environmental and Natural Resources Program Manual (OPNAVINST 5090.1B)	U.S. Navy guidance manual on environmental and natural resources operations.		TBC	Potential for operations that may affect environmental and natural resources.
NAVFAC Green Sustainable Remediation, DoD Memorandum August 10, 2009 – Consideration of Green and Sustainable Remediation (GSR) practices in the Defense Environmental Restoration Program				
NAVFAC Green Sustainable Remediation	Pursuant to Executive Order 3514 (October 5, 2009, Federal Leadership in Environmental, Energy, and Economic Performance). GSR to be implemented as part of existing Navy remedy optimization program, with the goal of selecting technologies that will work and are appropriate. GSR should be considered throughout the cleanup process. Sustainability should be considered when developing performance objectives.	TBC for MEC investigation, removal, material stockpiling, placement of equipment, MEC detonation, and site excavation work within rivers, streams, tidal areas, and wetlands.	TBC	Potential for operations that may affect environmental and natural resources.
DoD Institutional Control/LUC Policy (Army)				
Engineering Pamphlet 1110-1-24, "Establishing and Maintaining Institutional Controls for Ordnance and Explosives (OE) Projects."	Provides USACE guidance on the process to be used to develop, implement, and maintain institutional controls on OE project sites.	Manage residual MEC risk remaining at a site, with possible application as a stand-alone response without MEC physical removal.	TBC	Restrictions or other institutional controls evaluation to occur concurrent with intended or site-specific use of the property to assess suitability for transfer.
Policy on Land Use Controls Associated with Environmental Restoration Activities – DoD, January 17, 2001	Provides DoD components with environmental restoration and land use management responsibilities an overall DoD framework for implementing, documenting, and managing LUCs for real property being transferred out of Federal control and for active installations.	Feasibility studies started after October 31, 2000 "shall conform to DoD policies on land use controls."	TBC	Needed when the restoration decision requires controls on, or limits to, property use to prevent or limit exposures and states requirements for LUC databases, LUC modification/termination and MOA/MOU.
Navy Guidance for Planning and Optimizing Monitoring Strategies				
User Guide UG-2081-ENV, Navy Guidance for Planning and Optimizing Monitoring Strategies, August 2008.	Provides comprehensive information for optimizing monitoring programs at remediation sites, includes implementation of land use controls.	Provide strategies, tools, and resources which can be applied to the design and optimization of monitoring programs.	TBC	
Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions.				
Memorandum for Deputy Under Secretary of Defense, dated April 2, 2003.	Presents a set of principles to assist Navy field commands and EPA Regions in better implementing respective CERCLA responsibilities. The principles do not replace or substitute any CERCLA statutory or regulatory requirements, but they serve as a mutually agreed-upon framework to provide a more efficient process for implementing LUCs.	Application of principles for implementation of remedial actions.	ARAR	At sites where contaminants may be left in place, LUCs (engineering and institutional controls) will be used to ensure that the contaminants do not pose an unacceptable risk to human health or the environment.

DDESB= Department of Defense Explosives Safety Board
MOA/MOU = memorandum of agreement, memorandum of understanding
NAVSEA = Naval Sea Systems Command
OPNAVINST = Office of the Chief of Naval Operations Instruction

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Action-specific ARARs/TBC focus primarily on the management of MEC as a potentially reactive (U.S. EPA waste code D003) and/or toxic (U.S. EPA waste code D008) hazardous waste and/or excavated debris that may be contaminated with hazardous waste. However, under the assumption of a potential future land use conversion from military use to a wildlife refuge, the action-specific TBC by the DDESB DoD Manual 6055.09-M, DoD Ammunition and Explosives Safety Standards (DoD 2008), is most useful in providing guidance for on-range remedial activities. This TBC is applicable because it relates to real property contaminated with ammunition, explosives, or chemical agents.

Munitions that would otherwise be classified as hazardous wastes can be managed in accordance with the substantive requirements of RCRA and the Alaska hazardous waste management regulations when treated wholly onsite (on-range). Open detonation (OD) will be available for treatment of MEC and ordnance-related waste within OU B-2. OD activities will take place either at the location where the munition is found or at a consolidation location within the RAAs. On-site detonation will be performed in compliance with the requirements of Naval Sea Systems Command (NAVSEA) OP 5 (Navy, 2007) and applicable Navy Explosive Ordnance Disposal publications as addressed in SOP 9 (MEC Management and Disposal). As required by 18 AAC 50.030, OD will not be used to treat items that could potentially cause black smoke. A general air quality requirement in 18 AAC 50.065 prohibits emissions that are injurious to human health or welfare, animal or plant life, property, or that unreasonably interfere with the enjoyment of life or property.

Potential ARARs and TBC that apply to MEC clearance including MC-contaminated soil excavation and disposal are presented in Tables 4-1, 4-2 and 4-3. The lists of potential ARARs and TBC in this table include numerous citations related to hazardous waste and MEC/MC waste transport and disposal. These are potentially applicable to the transport and disposal of any MC-contaminated soil excavated during remedial activities (MEC will be treated onsite rather than transported offsite). However, these citations would need to be followed should MEC be removed for any reason from the range area for disposal or storage.

The following sections discuss the MEC clearance activities and how compliance with ARARs will be achieved during the project. ARARs related to MEC management are discussed in the balance of this section; other wastes (e.g., MC-contaminated soil) and debris incidental to the clearance are likely to be generated during the clearance activities and will require off-island transport and disposal at the end of the field season. It should be noted that media samples collected during the field activities, though not considered hazardous, may have specific packaging, labeling, and documentation requirements when shipped off-island to the laboratory by air transport, which must be performed by an individual knowledgeable in DOT requirements.

4.1 MEC RELATED ARARS

U.S. EPA's Military Munitions Rule (MMR) (62 Federal Register 6622, 12 February 1997) amended RCRA to regulate the disposal of all types of conventional and chemical ammunition products and their components. Under the MMR, used or fired military munitions are solid wastes when they are removed from their landing spot and then either:

- Managed off-range (i.e., when transported off-range and stored, reclaimed, treated, or disposed);
- Disposed of (i.e., buried or landfilled) on-range; and
- Located off-range due to off-range landing and not promptly rendered safe and/or retrieved (statutory solid waste).

Under current RCRA and DoD regulations, MEC management procedures depend upon the location(s) of the item(s). MEC located on-range will not be considered solid waste (unless transported off-range for disposal), while MEC located or transported off-range will be considered solid waste under RCRA.

A military range is defined under RCRA as "designated land and water areas set aside, managed, and used to conduct research on, develop, test, and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines, lanes and positions, maneuver areas, test pads, detonation pads, impact areas, and buffer

zones with restricted access and exclusionary areas." On 22 April 2000, the Navy identified the military portion (northern half) of Adak as a military range.

DoD 6055.9-M (DoD, 2008) is a framework for completion of the federal land transfer and the requirements in DoD 6055.9-M are relevant and appropriate to this project.

All MEC encountered during the clearance will be positively identified by type and condition and logged into the project database prior to disposition. Information collected will include the quantity, nomenclature, condition, and location of each MEC item found. During the clearance work, MEC found will be disposed of within the boundaries of the military reservation (i.e., on-range), and therefore will not require off-site disposal. The MEC disposal process will be performed in accordance with SOP 9 (see the Appendix A of MEC QAPP for all SOPs). The disposition of all MEC items will be added to the database upon completion of disposal activities. Donor explosives used in the disposal process will be tracked by nomenclature, quantity, and lot number according to SOP 9. Digital photographs will be included in daily reports and presented in subsequent reports. Donor explosives will be transported as necessary on public roads, by air, or by vessel in accordance with all federal and state requirements.

The following sections provide additional information and procedures for the management of MEC during the project.

4.2 DISPOSAL OF MEC

Items found during intrusive investigation must be managed. These items may include MEC or MPPEH. The SUXOS and the UXOSO must determine that the risk associated with movement of MEC is acceptable and that the movement is necessary for the efficiency of the project. The SUXOS and the UXOSO must agree with the risk determination and document this decision in writing prior to movement of the MEC or munitions item. MEC items determined not safe to move will be BIP daily. MPPEH documented as MDEH will be stored in the on-site storage magazine and demolition will be performed weekly. UXO personnel will treat MEC/MDEH and other munitions items using jet perforators to ensure no explosives or reactive material remains. Treatment will take place at the RAA sites as required and consolidated shots of items in the MPPEH magazine will be performed in the former Open Burn/Open Detonation (OB/OD) area adjacent to the RG-01 site. During site setup and training, a notice will be placed on the Adak High School MEC Awareness bulletin board outlining areas for MEC operations and stating that demolition operations may be ongoing daily at the RAAs.

Refer to SOP 9 in Appendix A of the MEC QAPP for procedures on MEC management and disposal. In addition, an Explosives Safety Submission (ESS) will be prepared and approved by the Naval Ordnance Safety and Security Activity (NOSSA) in accordance with NOSSA Instruction 8020.15C prior to on-site operations.

4.3 EXPLOSIVES STORAGE

Refer to SOP 11 (Explosives Storage and Transportation) in Appendix A of the MEC QAPP for procedures on explosive storage. The two existing Navy-owned ATF Type II magazines that were previously sited in the NOSSA approved ESS for the OUB-2 RI/FS in 2008 located in Parcel 4 near the former OB/OD will be used for this project. The magazines are ATF rated portable magazines with attached cap boxes purchased for the Navy in 2006 and 2008. Both magazines were sited in the 2008 RI/FS ESS and remain in the same positions. As Parcel 4 is Navy restricted access, there is no security fencing in place. Both magazines will be properly grounded prior to use on this project. The NEW stored in each magazine will not exceed 100 lbs. If required, ATF will be notified of the on-site storage of explosives in accordance with the requirements of the ATF user license. USA will restrict access to the magazines to those personnel authorized in writing.

4.4 INSPECTION OF MEC TREATMENT RESIDUES

Following each open detonation operation, UXO specialists will visually inspect the area in and immediately around the crater to at least the distance where large, low-ordered (partially detonated) ordnance fragments may be found (if present) to verify that all reactive waste was successfully treated. "Kick-outs," including MEC-containing reactive filler leftovers, will be re-treated the same day or stored for

later re-treatment. Munitions debris (e.g. fragments) will be managed and disposed of in accordance with SOP 10.

4.5 SECURITY (40 CFR 264.14)

Before BIP operations are conducted, exclusion zones will be established around the operation site. The purpose of an exclusion zone is to protect the public and non-essential personnel from unintentional detonations and all personnel from intentional detonations of ordnance. Only personnel essential for the operation will be allowed in the exclusion zone. The number of personnel in the exclusion zone must be restricted to the minimum number consistent with safe and efficient operations and include only those personnel directly engaged in the tasks being performed. To the maximum extent practicable, exclusion zones will be based on the size and amount of the MEC items being destroyed. The use of engineering controls are not anticipated in that there are no inhabited buildings or other structures within or proximate to the RAAs that require protection by the reduction of the ESQD arcs for intentional detonations. MEC Management and Disposal procedures are provided in SOP 9 (in Appendix A of the MEC QAPP).

4.6 MANAGEMENT OF CONTAMINATED SOIL

In the event that potentially contaminated soil is encountered in the vicinity of munitions, the Navy RPM and Navy Technical Representative (NTR) will be notified by the Project Superintendent. Potential contaminants that may be encountered are most likely MC, visually identified by soil staining or the presence of broken [breached] munitions). Although there has been no historical finding of areas where the soil is contaminated with MC, the possibility exists. Potentially MC-contaminated soil is defined as soil associated with breached munitions, discoloration or staining adjacent to a MEC, or unusual odors emanating from the ground during intrusive investigations. During the NTCRA at OU B-2 RAAs, if there is evidence of potentially MC-contaminated soil adjacent to an encountered MEC, procedures defined in Worksheet #17 of Appendix B (MC QAPP) will be implemented.

For areas identified as potentially MC contaminated, an administrative control level of 10% explosives in soil will be used to demonstrate explosive soil conditions. This determination is based on a qualitative visual inspection of the soil content by volume and removal of the explosive soil by qualified UXO technicians. Removal will continue until the explosive content of the soil is visually <10% by volume. Only after the area is deemed to be safe for sampling will the sampling technician proceed with collecting soil samples for laboratory analysis.

Testing for explosive soils will be conducted using field kits for trinitrotoluene (TNT) and cyclotrimethylene trinitramine (RDX). If the soils are found to have explosives in concentrations greater than the project action level (PALs) for TNT and RDX (MC QAPP Worksheet #15, Appendix B of the MEC QAPP), the soil within the diameter of the sampling area will be excavated and held. A composite sample will be sent to the laboratory for analysis by U.S. EPA Method 8330B. Soil excavation, test kit screening, and laboratory analysis will continue until laboratory analysis indicates that the soil remaining after excavation is less than the PALs. Soil determined to be greater than PALs will be held in 55-gallon barrels for subsequent characterization and off-site disposal. Prior to off-site shipment for disposal, composite samples of the contaminated soil held will be collected for laboratory analysis to characterize and confirm the concentration of the material being shipped.

The characterized soil will be removed, properly packaged, and transport for off-site disposal in accordance with the MC QAPP (Appendix B of the MEC QAPP). These wastes would potentially be classified as hazardous and subject to the requirements of RCRA and Title 18 of the AAC. Waste classification and disposal activities are further discussed in Section 5.11.

4.7 GENERAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES (40 CFR 264.17)

All ignitable and/or reactive MEC items will be positively identified based on visual observations made by qualified technicians trained in ordnance identification. Ignitable or reactive MEC items will be kept separate and protected from sources of ignition or reaction, including such items as open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks, heat-producing chemical reactions,

and radiant heat. No smoking will be allowed in areas where explosives or MEC are handled, stored, or treated. The SOPs contained within the MEC QAPP provide further limitations on the handling of MEC items.

USA minimizes to the extent possible the accumulation of ignitable, reactive and incompatible waste items. Ignitable items, such as oily rags, gasoline or diesel soaked rags, and cleaning fluids will be containerized in 5-gallon sealable buckets. The containers will be labeled with the following information:

- Contents
- Combined weight of container and contents

Containers will be segregated from incompatible materials and placed within a containment system. The containment system will be able to retain the contents of all containers with the system.

All accumulated ignitable and reactive waste will be secured and disposed of in accordance with state and federal laws.

4.8 LOCATION STANDARDS (40 CFR 264.18; 18 AAC 63)

4.8.1 Floodplain Protection

Part of the project area is located within the projected 100-year coastal and riverine floodplains. In-place treatment of MEC may be conducted in those areas and the treatment procedures provided in this EPP/WMP (and SOPs) are adequate for the protection of floodplains.

4.8.2 Waste Treatment Facility Siting Standards

Alaska hazardous waste treatment regulations exempt treatment of hazardous waste if the facility is in compliance with the RCRA interim standards set out in 40 CFR Part 265 [18 AAC 63.010(b)(1)]. OD activities are required to be compliant with the requirements of 40 CFR 265.382 as detailed in the following sections.

4.8.2.1 Location and Setback Criteria

Table 4-4 lists Alaska hazardous waste treatment facility set back requirements. The Adak removal activities for OU B-2 are exempt from these requirements under 18 AAC 63.040(e) unless the state determines that a setback is necessary to protect public health. These apply only to the activity or location listed; they are not the exclusion zone distances for personnel as presented in the MEC QAPP.

Table 4-4: Minimum Setback Criteria

Activity or Location	Minimum Distance from Treatment Operations to Activity/Location
Property Line	25-m
Public Right of Way	50-m
Surface Waters	75-m
Water Supply Point of Withdrawal	150-m
Critical Habitat Areas (e.g., game refuges, designated endangered species habitat)	100-m

4.9 ESTIMATED AMBIENT AIR IMPACTS

Previous air emission estimates for munitions disposal operations at Adak have concluded that the point of maximum short-term (24-hour average) air concentrations of contaminants would occur at a point approximately 250-m downwind of the treatment location, with a 1-hour average concentration of 26.2 μg/m3 for an emission rate of 1 gal per second (Tetra Tech, 2007a). On an annual basis, the maximum airborne dust concentration would occur at a point approximately 800-m to the east of the treatment location. For treatment of approximately 3,800 lb of explosives per year, distributed based on the types currently in use on Adak at the time of this calculation, it was estimated that approximately 4.53 lb of carbon monoxide, 6.69 lb of nitrogen dioxide, 57.9 lb of nitric oxides, and considerably smaller amounts of other organic and inorganic compounds would be produced. The NTCRA at OU B-2 activities are not anticipated to add to the previous estimates of ambient air impacts that were performed in this assessment.

4.10 PRELIMINARY RISK ASSESSMENT

Previous preliminary risk assessments have been conducted for normal disposal operations at the OB/OD Range (Tetra Tech, 2007a). For long-term operations, these assessments estimated the hazard index for exposure to non-carcinogens to be 9.43 × 10-4 for a reference individual at a point approximately 1 mile from the OB/OD range. The assessments also concluded that the same individual would experience an excess cancer risk of 6.24 × 10-9. A preliminary evaluation of the ecological risk posed by routine munitions disposal operations indicated little to no adverse impacts. Table 4-5 lists the minimum setbacks from the Navy property boundaries to allow compliant disposal of explosives in the quantity listed.

Table 4-5: Range Limit Distances Based on Net Explosives Weight

Pounds of Waste Explosives or Propellants[1]	Minimum Distance from OB or OD to Property Not Under Navy Control
0 to 100	204-m (670-ft)
101 to 1,000	380-m (1,250-ft)
1,001 to 10,000	530-m (1,730-ft)
10,001 to 30,000	690-m (2,260-ft)
[1] Range limit for former Naval Air Facility, Adak, OB/OD Range is 3,000 pounds net explosives weight (NEW) per detonation, and 500 pounds NEW per burn.	

4.11 ENVIRONMENTAL PERFORMANCE STANDARDS FOR MISCELLANEOUS UNITS (40 CFR 264.601)

4.11.1 Prevention of Adverse Releases to Groundwater or Subsurface Soils

Any visible residue from treatment will be removed from the crater following detonation, characterized if required, and disposed offsite in a manner conforming to state and federal hazardous and solid waste regulations (see Section 5.0). Currently, no groundwater on Adak is used as a drinking water supply source, or is planned for such use.

4.11.2 Prevention of Adverse Releases to Surface Water, Wetlands, or Soil Surface

All detonation operations will be carried out a minimum of 75-m from surface waters, to the extent that this practice is consistent with the safe handling and movement of MEC items. No MEC treatment operations will be carried out in wetland areas, to the extent that this practice is consistent with the safe handling and movement of MEC items. The surface waters within or adjacent to the project sites are currently not used for drinking water purposes.

4.11.3 Prevention of Adverse Releases to Air

The following weather conditions will be met prior to initiating disposal operations:

- Minimum ceiling of 500-ft
- No sand, snow, or dust storms expected within 3 miles of operations.

4.12 AIR QUALITY PROTECTION

A general non-pollution requirement in 18 AAC 50.110 prohibits emissions that are injurious to human health or welfare, animal or plant life, or property, or that unreasonably interfere with the enjoyment of life or property. Only metal objects with potential trace residual explosives will be processed in the TFU. OD operations will produce no adverse impacts as described in Sections 4.9 and 4.10.

4.13 RESOURCE PROTECTION

4.13.1 Coastal Zone Protection

Most of the activities are expected to take place more than 200-ft from the ordinary high water mark and therefore no substantial effects to a coastal zone are anticipated. In the past, the Navy has determined that most remediation-related activities (e.g., limited excavations and backfilling) do not constitute an "impact" to a coastal zone. Although notification is a condition of Nationwide Permit No. 38, this will not be required because it is an administrative requirement.

4.13.2 Cultural and Natural Resource Protection

The status of historic and archaeological resources related to OU B-2 sites on Adak is described in the following sections. The Navy completed consultation required under Section 106 of the National Historic Preservation Act, and the results are documented in a 1998 Memorandum of Agreement (MOA) with the Alaska State Historic Preservation Officer and others. Much of Parcel 4 is located within the boundary of the Cultural Landscape Historic District as documented in the MOA. The Cultural Landscape Historic District includes several prehistoric archaeological sites, sites significant to World War II operations and resources, and miscellaneous sites that are part of the overall cultural landscape. Cultural survey performed by URS in 2011 indicated the presence of these culturally significant items within RAA-03. Evaluations from the 2012 URS report will be considered to protect these identified cultural and natural resources during the NTCRA at OU B-2. In addition, Navy RPM and NTR will be consulted when culturally significant areas/items are encountered for further directions prior to proceeding with the NTCRA activities near or within the cultural areas.

4.13.2.1 National Historic Landmarks

The Adak Army Base and Naval Operating Base are listed in the National Register of Historic Places for their significance during the Aleutian Campaign during World War II.

The Cultural Landscape Historic District comprises areas that include or are adjacent to OU B-2 sites and Parcel 4 in general, as well as abandoned ordnance storage bunkers, depressions remaining from removed Quonset huts and other buildings, dikes and dams (e.g., Nurses Creek Dam), historic roads, and even Andrew Lake because of its use as a water runway for naval amphibious seaplanes.

A cultural resources survey was conducted in August 2012 in the Area of Potential Effects (URS Group, Inc. 2012). The survey identified and recorded ten new sites and isolates (ADK-00296 through ADK-00305) and all ten sites have been entered in the Alaska Heritage Resources Survey database (see Table 4-6). Eight of these resources are associated with the WWII occupation of the island. Seven of the resources are eligible for inclusion in the NRHP as contributing elements to both the NHL and the District. ADK-00301 (debris pile) is not eligible for inclusion in the NRHP. This debris pile does not represent the in-situ ruins of a local structure, but were derived from an unknown location. In addition, two isolates were located; ADK-00304 (yarder) and ADK-00305 (redwood water pipe). These later two isolates are determined not eligible for inclusion in the NRHP.

Table 4-6: Adak Cultural Resources

AHRS #	Location	Item Description	NRHP Eligible	Comment
ADK-00296	RAA-05	Underground bunker and four Quonset hut depressions	Yes	Contributing elements to NHL & District
ADK-00297	RAA-05	Underground bunker	Yes	Contributing elements to NHL & District
ADK-00298	RAA-03	Hand grenade range	Yes	Contributing elements to NHL & District
ADK-00299	n/a	Diversion dams	Yes	Contributing elements to NHL & District
ADK-00300	RAA-01	Collapsed wooden structures	Yes	Contributing elements to NHL & District
ADK-00301	RAA-01	Debris pile	No	Unknown location
ADK-00302	RAA-03	Abandoned bridge	Yes	Contributing elements to NHL & District
ADK-00303	RAA-03	Rifle range	Yes	Contributing elements to NHL & District
ADK-00304	RAA-03	Yarder	No	Isolates
ADK-00305	RAA-03	Redwood Water Pipe	No	Isolates

The proposed undertaking will not adversely affect the identified historic properties or the qualities that make the NHL and the District eligible for inclusion in the NRHP. Vegetation at the identified historic properties will be cut and surface munitions removed that may be around the features. The features will not be altered in order to remove sub-surface anomalies. If it is necessary to remove munitions from berms that define ADK-00303 (rifle range), removal will be by hand tools and the profiles of the berms returned to their original contour. Surface debris that will be collected does not reflect how the area existed during the NHL's and District's periods of significance. This debris is the result of the deterioration of various buildings and structures over the years and distribution by the wind. It also represents materials that have been introduced to the landscape throughout Navy occupation of the island and not necessarily from the NHL's and District's periods of significance. Removal of the debris does not adversely affect the qualities that make the NHL and District eligible for inclusion in the NHL.

4.13.2.2 Archaeological Resources

Surveys have identified at least two eligible archaeological sites located within or adjacent to OU B-2 (Andrew Spit and Andrew Bay). The sites are mainly house foundations and middens containing shell, sea urchin, bone, and artificial detritus. Some of these sites were damaged by military actions on the island; however, a 2001 Amendment to the Memorandum of Agreement (MOA) stated that several sites may have been damaged during construction subsequent to World War II but are essentially intact, and that sites in OU B-2 have considerable potential to yield information important in the history of the Aleutian Islands and are therefore eligible for the National Register of Historic Places. As a resource protection measure, the exact locations of these sites have not been publicized by the USFWS. The Amendment to the MOA also states that archaeological investigations required under the terms of the MOA have been completed. Additional details are available in the MOA.

Cultural and natural resources will be protected to the greatest degree practicable and in accordance with laws and regulations governing the protection and preservation of these resources. In the case of natural resources, this protection will include:

- Minimally disturbing the surface and subsurface soil and vegetation in work areas,
- Backfilling and replanting excavated areas,
- Restricting use of all-terrain vehicles (ATVs) or heavy equipment to established trails, and
- Removing all supplies and materials used by field staff.

It is not anticipated that new suspected archaeological or cultural items will be located with the defined RAA boundaries; if such items are located, however, work in those areas will cease immediately. The Navy RPM and NTR will be immediately contacted so that they can consult with the USFWS. No additional work will be performed in those areas without authorization from the Navy.

4.13.3 Stormwater Pollution Prevention

Any breached (broken open) munitions or munitions that have undergone low order detonation are assumed to have contaminated no more than one cubic meter of soil. Additionally, all excavations or intrusive activities associated with reacquisition and removal will generally be backfilled within 24 hours. Impacts to stormwater will be minimized to the extent practicable through the implementation of BMPs. BMPs for stormwater protection, including potential spills or releases, are included in Section 6.0 of this EPP/WMP.

During project activities, vehicular traffic has the potential to disturb the ground and cause soil erosion. Vehicle trips and the number of “roads” used will be minimized as much as possible during work. Engineering controls will be implemented to mitigate identified erosion, or to prevent erosion from occurring if suspected to occur. Protective mats or drainage culverts will be installed in areas where routine stream crossings are required. In accordance with Alaska Statutes (AS 16.05.841 - AS 16.05.861) regarding fish passages that culvert crossings cross anadromous streams any crossings constructed will be compliant with stream bed / culvert alignment so not to encumber fish passage and be constructed in compliance with applicable regulations. All crossing locations will be restored following completion of activities to original condition. Generally this will involve removal of any material placed to prevent erosion and reseeding the area.

Surface water bodies inside and outside RAA boundaries will be assessed for the presence of siltation caused by project activities. The location of these water bodies will be identified on project mapping using existing topographic maps and global positioning systems (GPSs). Off RAA assessment of siltation will start at the nearest downstream water and work downstream until evidence of siltation is no longer present. If siltation is found, a silt fence or other physical impediment will be implemented immediately to minimize further siltation. Impacted water bodies will be indicated on project mapping, and an assessment report will be prepared with recommended corrective actions with 48 hours.

Vehicle ruts will be repaired at completion of the NTCRA activities at each RAA. Ruts will be smoothed to minimize water flow and to return the areas to match the natural contour of the land surface as much as possible. All required site restoration will not be considered complete until inspected and approved by Navy QA representatives. Sheet water flow caused by project activities will be interrupted with natural materials placed across ruts to divert water back to natural flow patterns. Teams will use shovels, hoes, and other hand tools to smooth the ruts. When appropriate, a drag mat may be used to quickly smooth large areas. Other mechanical tools, such as track loaders, may be used if available and appropriate for use.

All excavations will be backfilled so the land surface matches the surrounding contour as much as possible. The objective of filling excavations is to reduce the safety hazard and possible erosion. Soil removed from excavations will be used to the maximum extent possible to restore each excavation. If not enough material is available to fill an excavation, natural materials in the area may be used to supplement, as appropriate, in addition to cutting (beveling) excavation sides in. Where vegetation was present, ruts and excavations will be re-vegetated to reduce the possibility of future erosion. Grass seed will be added to each rut and excavation. A grass seed mix recommended from the Alaska Plant Materials Center in Palmer, AK should be used. The example mixture should be composed of red fescue and Bering hairgrass with one other species. The Alaska Plant Materials Center, 5310 S. Bodenburg Spur, Palmer, AK 99645 will be contacted for specific recommendations prior to ordering a seed mixture

(ph. 907 745-4469; fax 907 746-1568). Upon completion of all the site restoration activities, all engineering control materials will be removed from the project when completed.

During the field work, data collected will include contractor daily reports of activities (personnel, areas being worked, equipment being used), photographs, description of work areas, and a description of overall repairs. Contractor QC will inspect 100% of all repaired areas and at each outfall to ensure that any siltation present has been corrected. QC will conduct an independent inspection within 24 hours of being notified by production that the areas are completed. QC will pass their inspection results to QA within 24 hours of their determination that the site passes QC. A report of these activities will be submitted within 30 days of the completion of field activities.

4.13.4 Plant and Wildlife Protection

Various federal statutes and regulations have been promulgated to protect and preserve plant and animal species found at Adak including the Endangered Species Act (16 USC 1531 et seq.); the Bald and Golden Eagle Protection Act [16 USC 668-668(d)]; the Migratory Bird Treaty Act (16 USC 701-712); and the Marine Mammal Protection Act (16 USC 1361-1421h). In addition, various federal statutes and regulations [e.g., the Fish and Wildlife Coordination Act (FWCA) of 1934, and the U.S. Fish and Wildlife Conservation Act of 1980] also require consultation with the USFWS on issues related to critical wildlife habitat.

While no threatened or endangered plant specifies have been identified in the project area, the vegetation of the tundra is fragile. Foot travel will be used to the maximum extent practicable consistent with the safe and timely execution of the project (see Section 4.13.5 for protective measures applied to vehicle traffic).

Re-fueling and vehicle maintenance will be conducted in locations that will not impact plants and wildlife even if unintentional spills occur. Spill containment systems will be carried on all vehicles for emergency use.

Project activities will be conducted in a manner that protects the plant and wildlife within the work areas. Where required, engineering controls and setback requirements as defined in Table 4-4will be used to facilitate the NTCRA field activities at OU B-2 and protect the environment.

4.13.5 Off-Road Vehicle Operations

During the course of the work, operation of vehicles off established roads will be required. For off-road field activities, only utility vehicles (UVs) will be used to minimize impacts to the tundra. Argo™ is an eight wheel UVs and by design have ground pressures of 2.1-psi using tires and 0.67-psi using tracks. Argo™ UVs have been successfully used during several field seasons in the past. The following operating guidelines will be strictly enforced:

- Team vehicles (e.g., rental trucks) will not be driven off established roads or trails unless absolutely necessary.
- Only ATVs and Mini-Tracked Excavator are allowed in RAA work areas to facilitate NTCRA field activities.
- All vehicles will remain on established roads and access trails whenever possible.
- Vehicle turns will be gradual, preventing displacement of the tundra.
- Neutral steering of tracked vehicles is not allowed.
- Each vehicle will carry a multi-purpose spill kit to contain/absorb a variety of fluids including oil, grease, coolants, and water. The spill kit is a self-contained 5 gallon reusable plastic pail with two 4-ft general socks, ten perforated pads, and a disposable bag with tie.
- Vehicles will be inspected daily for leaks. Leaks will be repaired prior to further operation.

4.13.5.1 Documentation of Areas Impacted by Off-Road Vehicle Operations

GPS coordinates will be taken for the boundaries of all areas to be repaired that were damaged by off-road vehicle operations. These coordinates will be imported into the project geographic information system (GIS) and used to develop polygons of these areas which will be incorporated into a distinct data layer.

4.13.5.2 Restoration of Areas Impacted by Off-Road Vehicle Operations

Areas impacted by off-road vehicle operations will be repaired according to the procedures outlined in Section 4.13.5.2

4.13.5.3 QC of Restored Areas

QC will use the coordinate information from the GIS polygons to independently re-visit the affected areas after the completion of restoration and will perform and document an independent assessment of the condition at each of the sites. QC documentation will verify that the site was visited, listing the polygon visited, the date of the visit and the results of the independent assessment. Upon completion of the QC verification of the work, provided the site meets the QC requirements, QC will pass its inspection results to QA, who will conduct an independent final inspection. QC will conduct its independent inspection within 24 hours of being notified by production that the areas are completed. QC will pass its inspection results to QA within 24 hours of determining that the site passes QC. A report of these activities to include a brief assessment of long-term sustainability will be provided to the Government within 30 days of the completion of field activities.

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5.0 WASTES REQUIRING OFF-SITE DISPOSAL

This section describes the waste management requirements for the waste streams that are expected to be generated during the clearance and which will be shipped off-island at the end of the project. No disposal of project wastes will be conducted on island, other than office and housing unit wastes covered in rental agreements.

This section includes requirements for the proper characterization of all project wastes, and general waste transport and disposal requirements. Table 5-1 summarizes the anticipated waste streams and quantities. These are described in more detail in the sections immediately following; however, quantities and waste stream characteristics may vary. Waste streams will be further established onsite through project and/or generator knowledge, or through sampling and analysis (the waste characterization process) to ensure that project wastes are properly disposed. The MC QAPP (Appendix B) was prepared as a contingency in the event that breached munitions and/or visually stained soil in the vicinity of munitions are located. Based on work to date in OU B-2, it is not anticipated that contaminated soil requiring off-site disposal will be encountered. It should be noted that it is not anticipated that hazardous wastes will be generated during the conduct of the work (except excess hazardous materials brought on island such as marking paint and partial containers of lubricants); however, all project wastes must be characterized properly at the time of generation to determine the regulatory requirements that apply. All project wastes will be disposed of offsite with the exception of MEC and waste generated at rental housing units and administrative offices, as outlined in the sections below.

Table 5-1: Summary of Anticipated Waste Streams and Quantities

Potential Waste Stream	Estimated Quantity
MDAS	~ 5.2 tons
Scrap metal (non-MD)	~ 3.0 tons
Used personal protective equipment (PPE) and disposable sampling debris	< 1 cy
Wastes from housing units and administrative offices (paper, packaging materials, household trash, etc.)	5 cy
Non-hazardous subtitle D debris (wood, plastic, etc.)1	1 cy
Decontamination wastewaters	20 gal
Oily rags and sorbents	10 gal
Excess hazardous materials brought on-site by contractor or subcontractor that are not consumed on project (i.e., marking paint, partial containers of lubricants, reagent acetone)	TBD
Donor explosives	None (BIP remaining items)
Unanticipated or unknown wastes	TBD

RCRA Subtitle D, non-hazardous solid waste and debris (no free liquids).
cy = cubic yards
TBD = to be determined

Because this project is a CERCLA action, project wastes containing CERCLA hazardous substances, including hazardous wastes being disposed offsite, must be disposed of at a facility approved under the CERCLA Off-Site Rule (OSR) requirements specified in Section 121(d)(3) of CERCLA. The purpose of the OSR is to avoid having CERCLA wastes or hazardous substances from response actions authorized or funded under CERCLA contribute to present or future environmental problems by directing these wastes to management units determined to be environmentally sound.

The following sections will be used as general guidelines for the management of the anticipated waste streams. USA will ensure that the project is in compliance with applicable regulations throughout the duration of the project.

5.1 MPPEH PROCESSING

USA will manage MPPEH in accordance with the requirements in NAVSEA OP 5 Volume 1. USA's key project personnel (UXOTIII and above) will be certified in writing by the Commanding Officer, NAVFAC Northwest as technically qualified to act as signatories in determining the material's explosives safety status and to document, in writing, as MDAS or MDEH.

MPPEH undergoes a three-tiered inspection process. The first inspection is performed by the qualified UXO Technician discovering the item, the second inspection is performed by the MEC Team Leader, and the third inspection is performed by the SUXOS. The SUXOS will inspect 100% of MEC and MDEH. Either the SUXOS or the UXOQCS will inspect 100% of MDAS to ensure there is no explosives hazard prior to transporting for placing it into storage for subsequent consolidated disposal at the OB/OD Area. Material that cannot be certified as MDAS will be certified as MDEH.

MDAS will be weighed (e.g., per grid weight) and containerized in lockable containers (e.g., 55-gallon drum with locking lids) for positive control to prevent other material from being introduced or comingled. The MDAS, once inspected and certified, is placed in the TFU (batch processing) and is flashed according to USA's standard operating procedures.

The TFU is a USA-owned commercial Ammunition and Fireworks Disposal Trailer. This trailer-mounted unit will be stationed at the MAUW. A security fence surrounds the MAUW storage facility and only one gate provides access. The TFU will be operated on the hard top parking area and returned to the leased storage unit when not in operation.

When the flashed material has cooled, it is loaded into a sealed container. This sealed container is then locked, weighed, and labeled, and a chain-of-custody, with numbered seals, is generated. The SUXOS will prepare and sign as certifier a DD Form 1348-1A, and a technically qualified government representative, UXOQCS, or Navy QA will sign as verifier with the following statement:

> "The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard"

The MDAS will be shipped offsite to a recycler under the chain-of-custody procedure. The chain-of-custody will be terminated when the material is smelted or demilitarized by the recycling facility and documentation is returned from the facility attesting to the process.

5.2 SCRAP METAL

Scrap metal found during the clearance that is not classified as MPPEH will be removed from the site if it impacts clearance activities. This scrap metal will be collected in 55-gal drums or other acceptable containers and brought to a central location for shipment to the scrap dealer. If large quantities of scrap are generated, the items may be consolidated into bulk containers of 55-gal drums or other acceptable container (e.g., rolloffs).

5.3 CONTAMINATED PPE AND DISPOSABLE SPENT SAMPLING DEVICES (NON-LIQUID)

Used PPE and used disposable sample equipment from MC sampling operations may consist of used sampling scoops, bailers, used gloves, etc. The majority of used PPE and sample equipment will be considered to be contaminated with MC and to have come into direct contact with potential MC-contaminated soil and will be decontaminated between sample collections. The sampling team will be equipment with portable field decontamination equipment, which will consist of containers of wash water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

This debris will require proper waste characterization for disposal based on site conditions and the levels of MC in soil samples. However, it is anticipated that this waste stream will be characterized as non-hazardous waste, suitable for off-site disposal at a Subtitle D landfill (see Section 5.5) or an approved municipal solid waste landfill.

5.4 ORDINARY TRASH

Ordinary trash (i.e., trash from offices or housing units only) consists of paper materials, plastic cups and bags, trash bags, non-contaminated materials, and food waste. Ordinary trash will be bagged and disposed of in on-site dumpsters as allowed in office or housing unit rental agreements.

5.5 SUBTITLE D DEBRIS

Subtitle D waste debris includes debris that is not characterized as a hazardous waste under RCRA. A Subtitle D permitted landfill accepts non-hazardous solid wastes and debris and non-hazardous industrial wastes. The materials and chemical components that comprise this waste stream will be identified during the waste profiling process to ensure that the waste is acceptable at the intended facility. This category of waste is anticipated to consist of the following types of materials: painted wood and metal debris, treated wood, empty containers (non-aerosol), and non-munitions-related scrap.

In addition, if these materials are characterized at the point of generation as non-hazardous wastes, this waste stream may also contain other waste materials suitable for Subtitle D landfill. These other wastes may include oily waste solids (liners, sorbent materials with no free liquids contaminated with diesel, motor oil, or hydraulic fluid from vehicle maintenance or spill cleanup [not gasoline]); non-hazardous PPE and used disposable sampling equipment; or other non-hazardous debris that has been properly characterized and is approved on the waste profile sheet for this waste stream.

Recyclable items will be recycled to the extent practicable; however, it is anticipated that the amount of materials will not be substantial enough to warrant segregation for recycling, with the possible exception of scrap metal (see Section 5.2).

Open-head drums or bulk containers such as roll-offs may be used to accumulate this waste stream.

5.6 DECONTAMINATION WASTEWATERS

Decontamination waters from personnel or equipment used during sampling will be kept to a minimum to the extent possible by the use of disposable sampling equipment and PPE that will not require decontamination. This will also limit or eliminate having to collect source or rinsate blanks that require laboratory analysis. If generated, decontamination wastewaters will be sampled and analyzed for proper characterization and disposal based on the suspected or known contaminants (e.g., MC, corrosivity from use of acid decontamination, etc.). The disposal facility may have additional sampling requirements; these will be identified before sampling.

It is anticipated that decontamination waters, if generated, will all be non-hazardous waste. Decontamination wastewaters will be accumulated and stored in closed-head (bung-top) drums and will be marked “Decontamination Water from (source).” Drums will be stored at the project sites or at authorized alternative locations pending the disposal decision from the Navy and USA.

5.7 OILY RAGS AND SORBENT MATERIALS

Oily rags and sorbent materials (pads, rags, booms, or cat litter) may be generated in the event of a spill or leak of fuel or oily water, or during routine vehicle maintenance.

Oily sorbent materials will be placed into open-top drums (or equivalent) for disposal offsite or bagged (so they do not cause further contamination by leaching), and placed into the Subtitle D waste stream if approved on the waste profile after proper waste characterization.

Free liquids should not be present in the sorbent materials that are sent to landfills. Also, free liquids must not be allowed to leach back out of the materials or out of containers in which they are stored. Free liquids will be allowed to drain out of the sorbent materials into a separate container, or additional sorbent materials (such as cat litter), will be placed onto the materials so that free liquids are entrained within the sorbent materials and cannot drip. This will be performed in a manner that does not cause spillage into the environment. Because contact with rainwater can cause oil to leach out of oily waste, any containers of oily waste will be kept closed, secured, or otherwise have no holes (i.e., non-hazardous waste containers), and the weight of the contents shall not cause the container to breach and leak.

If any gasoline rags and absorbents are generated (e.g., from a gasoline spill from a gas can or fuel tank), they will be segregated from the diesel- or oil-stained materials and sorbents. Gasoline contains benzene, and these absorbents will be managed as a hazardous waste or will be sampled to determine whether they exhibit a characteristic for benzene or ignitability, causing them to require management as a hazardous waste. The Navy will be notified if gasoline-soaked sorbent materials are generated. These materials will be accumulated in an open-top (non-bung-top) steel drum that is sufficiently sized for the waste so as to not have a high volume of headspace in the container.

5.8 CONTRACTOR HAZARDOUS MATERIALS BROUGHT ONSITE

Hazardous materials brought onsite or used onsite to support project activities (e.g., spray paint, lubricants, grease, etc.) will be properly disposed of or reused at the end of the project, depending on the nature of the materials. USA may retain the materials and ship them offsite for reuse at the end of the project.

The shipment of hazardous materials (even if not waste) offsite must be conducted in accordance with applicable DOT Hazardous Materials Transportation Regulations for either air carrier or vessel shipment, including the applicable dangerous cargo requirements. To the extent possible, the materials will be shipped in their original containers with their original markings and labeling (and with additional markings if required).

If the materials have no further use or become spent during the project, they will be characterized for proper disposal and shipped offsite as a waste, whether hazardous or non-hazardous. Note: As such, it is critical to control the inventory of hazardous materials brought onsite. Inventory control and review of hazardous materials and Material Safety Data Sheets (MSDSs) will be performed for all products brought onsite to support project activities.

Empty containers will be disposed of with the Subtitle D waste materials. The containers will be deemed empty in accordance with RCRA regulations. A container is considered to be empty if it has been emptied by normal means and contains less than 1-in of material, or 3% of the capacity of the container (by weight).

5.9 DONOR EXPLOSIVES

Donor explosives and initiating materials will be transported to the project site for disposal operations. These items will be C/D 1.1. Specific procedures for the purchase, receipt, transport, storage, and accountability for explosives are contained in SOP 11 (Appendix A of MEC QAPP). USA is responsible for explosives receipt, transport, storage, and accountability, planning, directing, and executing all explosive disposal operations and ensuring the safety of all personnel. Explosives remaining after the clearance activities are complete will be detonated onsite.

5.10 UNANTICIPATED OR UNKNOWN WASTES ENCOUNTERED DURING THE PROJECT

During the course of a work activity, unanticipated or sometimes unknown materials or indicators of unknown contamination may be encountered (e.g., strong odors, buried drums and cylinders, visually stained soil in the vicinity of munitions, or breached munitions). Some of these wastes potentially could be immediately harmful, and as such it is important for personnel to relocate to the extent necessary to allow a proper evaluation of potential hazards. Additionally, wastes that may have been left behind by other on-island personnel should be approached with reasonable caution and left alone until the materials are evaluated and proper disposal is determined. The NTR will be notified if such materials are encountered.

The safety procedures and/or emergency procedures and notification protocols identified in the Accident Prevention Plan (APP) should be followed when unknown wastes or odors are encountered or are otherwise not identified in this EPP/WMP or in the project scope of work. The Navy and USA will develop a plan to deal with such waste materials, if encountered.

5.11 WASTE CHARACTERIZATION

To ensure proper disposal, all project wastes must be characterized in accordance with 40 CFR 261–279 (hazardous waste rules) and applicable state laws and regulations. USA will designate properly trained and experienced personnel to assist the Project Superintendent and field personnel to evaluate project wastes for proper characterization and waste management.

Solid wastes must be characterized to determine whether they are wastes regulated under RCRA. Waste is a RCRA hazardous waste if it:

- Appears on the lists of "RCRA listed wastes" (40 CFR 261.31–261.33), or is mixed with or contains a listed waste; and/or
- Exhibits one of the RCRA hazardous characteristics (ignitability, reactivity, corrosivity, or toxicity).

Each RCRA hazardous waste must also be evaluated during waste characterization to identify applicable treatment standards and underlying hazardous constituents in 40 CFR 268, Land Disposal Restrictions.

Additionally, during the course of excavation or site operations, unanticipated wastes could be encountered or generated and will require proper characterization and disposal.

After waste characterization is performed, a waste profile sheet will be prepared and submitted to the intended disposal facility before a permit is issued. Waste profile sheets require signature by the generator (the NTR) and must have supporting documentation (MSDS, generator knowledge, or analytical data) attached. The Navy usually requires this paperwork a minimum of 48 hours in advance, so that it can be reviewed prior to signature. Waste cannot be shipped to a disposal facility (Subtitle D, a hazardous waste facility, or even most recycling facilities) without a permit or authorization after certification by the generator.

After proper characterization and approval in accordance with the waste profile as stated above, some wastes that are similar in nature and disposal method may be combined into one waste stream for disposal purposes. This will be determined with approval by the Navy and USA waste coordinator and will depend on certain project factors (container types and availability, sampling requirements, end facility requirements, etc.).

If a waste material is determined to be a RCRA hazardous waste, on-site management of the waste and off-site transport and disposal must comply with specific requirements. These requirements include specific U.S. EPA and DOT marking and labeling, proper container selection and use, on-site storage and accumulation times, and inspection requirements. They also require special manifesting and profiling procedures. Additionally, personnel who handle these wastes must be specifically trained in RCRA and DOT requirements. The generation of hazardous waste is not anticipated during the conduct of work. However, should hazardous waste be generated during this project, the Navy RPM and NTR will be notified. The USA PM will also be notified and will assist the project team in ensuring that compliance is met for proper handling and disposal.

All hazardous materials, regardless of whether the materials have been determined to be hazardous wastes, must be shipped offsite in accordance with applicable DOT regulations, including samples shipped offsite by aircraft.

5.12 HAZARDOUS MATERIALS (INCLUDING WASTE) TRANSPORTATION

Hazardous materials must be shipped in accordance with DOT requirements. Hazardous materials transported through the United States by land, by air shipment, or by vessel must be properly classed, described, packaged, marked, and labeled for shipment as required by the DOT Hazardous Materials Transportation Regulations, 49 CFR 172.

In addition, samples that are sent to an off-site laboratory may also be considered DOT hazardous materials, depending on what the samples are, the quantity in relation to dangerous cargo requirements, and what preservative chemicals are used (i.e., nitric acid, methanol, and acetone). If samples are (or are tentatively identified as being) DOT hazardous materials, they must be properly packaged and labeled, and the proper shipping papers must be provided for transportation to the laboratory. From

Adak, air shipment to the laboratory will be required. Air shipment requires different procedures than other modes of transportation, including the specific requirements of the airline that must be followed. Packaging, labeling, and documentation requirements for samples collected at Adak are described in the MC QAPP (Appendix B).

If project wastes are transported through Canadian waters (i.e., if project wastes will be shipped beyond Alaskan waters to mainland United States), they must be properly classified in accordance with Canadian Transboundary Movement Division requirements, which include the submittal of Canadian Transit Notices and a Canadian Waste Manifest where required.

5.12.1 Proper Shipping Names

Materials that do not exhibit one of the nine DOT hazard class characteristics [flammable (Class 3), toxic (Class 6), corrosive (Class 8), miscellaneous (Class 9), etc.] are not regulated under DOT rules for the transportation of hazardous materials, and a DOT shipping name cannot be used. In all other cases, proper DOT shipping names must be used.

5.12.2 Marking and Labeling

The shipping name, hazard class, identification number, technical names (if applicable), and consignee/consignor designations must be marked on packages for shipment (49 CFR 172.301). Once the material is identified, reference should be made to the Hazardous Materials Table in 49 CFR 172.101 to determine the appropriate label(s).

It is important that each bulk container being shipped is recognized on an inventory with container number and contents. It is also important that the information is applied to the manifest or bill of lading for tracking purposes.

5.12.3 Placarding

The person offering hazardous materials for shipment must offer placards (49 CFR 172.506). DOT-trained personnel must determine appropriate placards.

Any quantity of material listed in Table 5-2 must be placarded. However, if there is less than 1,000 lb (453 kg) of a material listed in Table 5-3, no placard is required. If a placard is required, it must be affixed on each side and each end of the vehicle or cargo container. Specific placard descriptions are found in 49 CFR 172.521.

Table 5-2: Placards Required for Any Quantity of Hazardous Materials

Category of Material (hazard class or division number and additional description, as appropriate)	Placard	Placard Design Section Reference
1.1	Explosives 1.1	172.522
1.2	Explosives 1.2	172.522
1.3	Explosives 1.3	172.522
2.3	Poison gas	172.540
4.3	Dangerous when wet	172.548
6.1 (PG 1, inhalation hazard only)	Poison	172.554
7 (Radioactive Yellow III label only)	Radioactive(1)	172.556

Radioactive placard also required for exclusive use shipments of low specific activity material in accordance with Section 173.425 (b) or (c) of this subchapter.
PG = packaging group

For hazardous materials (not only wastes) generated onsite in quantities that require placarding, a Hazardous Materials Security Plan [49 CFR 172.800(b)] needs to be prepared and implemented. A Hazardous Materials Security Plan may be required for the shipment of explosives to the island. The criteria for requiring a Hazardous Materials Security Plan also include any hazardous materials shipped in a bulk container equal to or greater than 468 cy. If warranted for this project, a Hazardous Materials

Security Plan will be developed. However, such security plans are confidential and contain sensitive security information, and therefore will not be included with the regular set of project plans.

Table 5-3: Placards Required for 1,000 Pounds or Greater of Hazardous Materials

Category of Material (Hazard Class or Division Number and Additional Description, as Appropriate)	Placard	Placard Design Section Reference
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525
2.1	Flammable gas	172.532
2.2	Non-flammable gas	172.528
3	Flammable	172.542
Combustible liquid	Combustible	172.544
4.1	Flammable solid	172.546
4.2	Spontaneously combustible	172.547
5.1	Oxidizer	172.550
5.2	Organic peroxide	172.552
6.1 (PG I or II, other than PG I inhalation hazard)	Poison	172.554
6.1 (PG III)	Keep away from food	172.553
6.2	(None)	
8	Corrosive	172.558
9	Class 9	172.560
ORM-D	(None)	

PG = packaging group

5.12.4 DOT Shipping Papers

For each DOT hazardous material, the following information must be provided on the manifest or hazardous materials shipment form:

- Generator, transporter, and destination facility (name, address, and telephone number);
- Identification number;
- Proper shipping name;
- Hazard class or division;
- Packaging group;
- Technical and chemical group names entered in parentheses between the proper shipping name and hazard class or following the basic description; and
- Total quantity and type/number of containers (must appear either before or after the above information).

If the material is packaged in a quantity that exceeds the reportable quantity (RQ) for the hazard class or chemical constituent, the RQ must be listed on the shipping paperwork. Other required information includes the following:

- EPA identification numbers (hazardous waste manifests only) for the generator, transporter(s), and destination facility;
- Emergency Response Guidebook numbers;
- The 24-hour emergency response number supplied by the generator or disposal facility and answerable by a knowledgeable person;
- Signatures and dates; and
- Shipper's certification and signatures (generator and first transporter).

5.12.5 Marine Pollutant Act Requirements

Any hazardous material identified as a marine pollutant that is hauled in bulk over water must comply with the Marine Pollutant Act (MPA) (49 CFR 171.4[c]). A bulk package for solids is defined as having a maximum net mass of 882 lb or more and a maximum capacity of 119 gal or more. Requirements under the MPA (e.g., polychlorinated biphenyls are a severe marine pollutant) are as follows:

- "Marine pollutant" must appear in the basic description when the name of the marine pollutant is not identified in the shipping name.
- All four sides of the bulk package must be labeled with the MPA marking (the fish label).

5.12.6 Recordkeeping

All waste characterization information, including analytical data or the generator name/number (whether hazardous or non-hazardous); user knowledge used to perform the waste characterization; and copies of waste profile sheets, waste permits, manifests, and other pertinent paperwork will be retained in project files and will be turned over to the generator (the Navy). Similarly, MPPEH that has undergone thermal flashing and has been certified and verified to be safe will be packaged (to prevent commingling with non-certified MPPEH), sealed, and shipped offsite for demilitarization and recycling. Non-hazardous manifests and/or a bill of lading will accompany the shipment of the scrap metal.

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6.0 RELEASE PREVENTION

6.1 ESTABLISHMENT OF BEST MANAGEMENT PRACTICES

BMPs will be implemented during fueling of equipment and for the storage and handling of recovered fuel product, contaminated soil, solid or hazardous waste materials, and/or other hazardous materials that are stored or used on-site in support of project activities.

This EPP/WMP also includes general BMPs that will be implemented during project activities to protect adjacent land or surface waters from stormwater runoff that could cause sediments or contamination to migrate during project activities.

Throughout the duration of project activities, spill prevention will be addressed by familiarizing the personnel with this EPP/WMP. Each task will be evaluated carefully in the pre-planning phase to determine the potential for causing a spill. When spills are likely or possible (such as during refueling, transferring of liquids to and from treatment system, or excavating contaminated soil), appropriate precautions will be taken to minimize potential spills as described below, and appropriate spill control equipment will be maintained.

6.2 GENERAL BMPs AND PROTECTIVE MEASURES TO BE IMPLEMENTED ONSITE

Good housekeeping practices, as well as other preventive measures and BMPs at the project site and material/waste storage areas, will help maintain a clean and orderly work environment. Inspection and maintenance activities and good housekeeping practices will minimize the possibility of accidental spills and releases. Good housekeeping practices will allow for easier observation of potential releases, including damage or wear and tear on equipment and storage containers. Regular inspections and maintenance of equipment and site facilities provide additional opportunities for detecting potential releases and addressing problems before a release occurs. A clean work environment will also reduce safety hazards to personnel. Table 6-1 summarizes the BMPs for general hazardous materials and petroleum storage and handling that will be used during the project, and outlines protective measures.

Table 6-2 provides a summary of general stormwater BMPs, and Table 6-3 lists the inspection requirements and frequencies as well as the checklists that are provided in Attachment 1 of this EPP/WMP.

The following conservation measures and best management practices (BMPs) were developed to protect and minimize the impact to aquatic species and their habitat that the proposed action may cause.

- Erosion and sediment control BMPs will be used to select, implement, maintain, and remove appropriate temporary erosion and sediment controls.
- An approved construction management plan, which includes soil erosion and sedimentation control, will be implemented to prevent accelerated erosion and off-site migration of soil from occurring during MEC removal. The BMPs include but are not limited to temporary erosion control practices such as the following:
    - Straw wattles or bales
    - Mulching of exposed ground
    - Stabilized construction entrances
    - Spill prevention
- Disturbance of existing vegetation in ditches and at stream crossings will be minimized to the greatest extent possible.
- After project completion, temporary stream crossings will be abandoned and the stream channel restored where necessary.
- Any native vegetation displaced by construction will be stockpiled for use during site restoration.

- When construction is finished, the construction area will be cleaned up and rehabilitated (replanted and reseeded) as necessary to renew ecosystem processes that form and maintain productive fish habitats.
- All waste material, such as construction debris, excess dirt, or overburden resulting from this project will generally be deposited above the limits of flood water in an off-site disposal site.
- Construction-related debris will not be dumped or allowed to enter the stream channel or tributary.
- The number of temporary access roads will be minimized, and roads will be designed to avoid adverse effects such as creating excessive erosion.
- All temporary access ways will be removed (including gravel surfaces) and planted after project completion.
- A supply of emergency erosion control materials will be on hand and temporary erosion controls will be installed and maintained in place until site restoration is complete.
- Heavy equipment will be limited to that with the least adverse effects on the environment (e.g., minimally sized, low ground pressure equipment).
- The approved construction management plan, which includes spill containment procedures, will be finalized before operations begin. The plan will identify containment locations.
- A spill containment kit will be located where equipment is stored and used.
- Heavy equipment that is staged on site will be inspected to ensure that it is free of external petroleum-based products.
- Heavy equipment that is staged on site will be checked daily for leaks, and any necessary repairs will be completed prior to commencing work activities around the water.
- When not in use, vehicles and equipment that contain oil, fuel, and/or chemicals will be stored in a staging area located at least 150 feet from wetlands and water bodies, where feasible.
- Refueling of power equipment will be at a location remote from water bodies (at least 100 feet distant) to prevent direct delivery of contaminants into a water body (or absorbent pads will be used for immobile equipment).

6.2.1 Preventive Maintenance

Preventive maintenance involves the routine inspection and testing of equipment and is essential to keep vehicles in good working condition. Operators of vehicles will inspect them at the beginning of each work day. Any deficiencies will be brought to the attention of the Project Superintendent, who will ensure that required repairs are made before the equipment can be dispatched again. The Project Superintendent will ensure records are maintained of inspections and maintenance.

6.2.2 Visual Inspections

The Project Superintendent or designee will conduct visual housekeeping inspections of work and storage areas on a daily basis. The Project Superintendent will verify that daily equipment inspections have been completed and ensure that deficiencies are corrected.

6.2.3 Recordkeeping and Reporting

Effective recordkeeping increases the efficiency of site operations and helps measure the effectiveness of BMPs. During this project, the recordkeeping system will help site personnel minimize incident recurrence, correctly respond to cleanup needs, and comply with regulatory requirements.

Table 6-1: Summary of BMPs for General Hazardous Materials and Petroleum Storage and Handling

Best Management Practice	Description of Activities
Good housekeeping	Drip pans or equivalents will be used under vehicles or other fuel-driven equipment (e.g., generators) to collect leaking fluids during fueling or fuel transferring activities. Rainwater accumulation in drip pans will be evaluated for sheen; if there is sheen, the rainwater will be containerized for off-island disposal. If there is no sheen, the rainwater will be disposed of on the ground at least 100-ft from the nearest surface water body. Fueling operations will be conducted with a person overseeing the operation. Lock-on nozzles are not to be used.
	Garbage and waste materials or debris will be regularly picked up and disposed of properly.
	Spill kits containing the proper type and quantity of sorbent materials, booms, and tools will be staged in each work area where there is a potential for a spill or release.
Inspections and maintenance	Equipment will be operated and maintained in accordance with manufacturers' recommendations.
	Hazardous materials storage areas will be inspected at least weekly.
	Vehicles or other equipment found to be leaking will be repaired promptly or removed from the site.
	Monthly inspections of spill-response and fire-prevention equipment will be performed.
	Regular housekeeping inspections will be conducted daily, and the site will be maintained in an orderly fashion.
Container management	Hazardous materials will be placed in suitable containers and storage areas that are in good condition. Hazardous wastes (if generated) will be stored in accordance with regulatory requirements. A flammable storage locker will be used for small containers of flammable materials.
	Containers will be kept closed except when being filled/used and will be in good condition.
Training	Personnel will be trained in hazard communication, spill prevention, response, and reporting requirements outlined in this EPP/WMP, stormwater pollution prevention requirements, and hazardous materials storage and handling requirements.

If spills or releases occur, spill reporting procedures will be followed and cleanup responses and notifications will be documented. Spill response and reporting are further discussed in Section 7.0 of this EPP/WMP.

Inspections will be recorded using the checklists provided in Attachment 1, which will be completed at the frequencies noted in Table 6-3. Completed checklists will be maintained at the site office for the duration of site activities and returned to the project file upon project completion.

6.2.4 Hazardous Materials Management

Project vehicles will refuel at the Adak gas station near the bulk fuel terminal. Heavy equipment will be fueled via a fuel delivery service truck as arranged with the Adak fuel provider, or by using a truck-bed-mounted 110-gal fuel tank (maximum size) in a project service vehicle.

Small amounts of hazardous materials stored at the work site for project activities (small gas cans, oils, lubricants, etc.) will be stored in a flammable materials locker unless being carried to the work site in vehicles. Hazardous materials inventory control will be maintained for all hazardous materials brought to and stored at the site. MSDSs for each hazardous material will be maintained at the work site.

Table 6-2: Summary of General Stormwater BMPs

Best Management Practice	Description of Activities
Good housekeeping	During excavation of any contaminated soils, care will be taken not to track out" contaminated soil from the contaminated work area (in equipment tracks, tires, or buckets). Excavation and hauling equipment is to remain on clean soil to the degree possible.
Good housekeeping	Contaminated equipment will be decontaminated (wiped or scraped clean of mud, soil, or debris) before being moved to another location or stored between shifts.
Materials storage	Hazardous materials and contaminated debris will be stored in a manner that does not contribute contaminants to stormwater (e.g., from rain or wind dispersal).
Waterbody protection	Excavation waters will not be released to the environment unless they meet the requirements of the Alaska Water Quality Standards.
Soil stockpile management	Soil stockpiles will be maintained to prevent contaminant or leachate runoff or erosion from wind and rain. Plastic covers and plastic liners (with perimeter berms) and covers will be used to contain leachate and to prevent rain from contacting the soil. Plastic covers will be anchored using sand bags or other appropriate means. Covers shall extend beyond the stockpile footprint (berm).
Good housekeeping	Fugitive dusts will be controlled as needed by using water spray to wet down soils being excavated or roadways used on the site.

Table 6-3: Inspection Requirements and Frequencies

Inspection	Minimum Frequency	Checklist in Appendix A of this EPP/WMP
Stormwater BMPs	Weekly during site activities and after major storm events	Weekly Stormwater BMP Inspection Checklist
Spill prevention, response, and emergency equipment	Weekly during the project	Weekly Spill Prevention, Response, and Emergency Equipment Checklist

6.2.5 Excavations

Excavations will be conducted in a manner that prevents the spread of contamination or sediments to areas on the site or adjacent to the site to the extent practicable. Heavy equipment and other equipment will be decontaminated on an as-needed basis by removing (by wiping, brushing, or scraping) contaminated soil or debris from the bucket and tracks to prevent the spread of contamination from the work area. Vehicles and equipment will use existing roadways and paths unless no other option is available.

Andrew Lake and Andrew Bay, site creeks, ponds, or any potential wetlands are examples of surface waterbodies that must be protected from the effects of sedimentation and contamination from stormwater runoff during the project. Any spill or release to surface waters of oil or hazardous substances is a reportable spill, and sedimentation of a water body (or wetland) is not allowed without specific permit authorization.

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7.0 SPILL RESPONSE AND REPORTING

A spill is any unauthorized release (including leaking, pumping, emitting, emptying, discharging, injecting, escaping, leaching, disposing, or dumping) of oil or a hazardous substance.

In the State of Alaska, the following applies in the event of a spill:

Hazardous Substance Releases

- ***Any*** release of a hazardous substance ***must be reported*** as soon as the person has knowledge of the discharge.

Oil/Petroleum Releases

- TO WATER: ***Any*** release of oil to water ***must be reported*** as soon as the person has knowledge of the discharge.
- TO LAND: Any release of oil in ***excess of 55 gals*** must be reported as soon as the person has knowledge of the discharge. Any release of oil in ***excess of 10 gal but less than 55 gal*** must be reported within 48 hours after the person has knowledge of the discharge. A person in charge of a facility or an operation must maintain, and provide to ADEC on a monthly basis, a written record of any discharges of oil ***from 1 to 10 gal***.
- TO IMPERMEABLE SECONDARY CONTAINMENT AREAS: Any release of oil ***in excess of 55 gal*** must be reported within 48 hours after the person has knowledge of the discharge.

ADEC: (907) 269-3063 (TELEPHONE);
(907) 269-7648 (FAX);
(800) 478-9300 (AFTER HOURS)

If a release could threaten human health or the environment outside the site, if a CERCLA reportable quantity (RQ) has been released, or if oil has been released to a water body in violation of applicable water quality standards or causes a film, sheen, or discoloration of the water or adjoining shorelines, the Project Superintendent should notify the NTR and verify that the National Response Center (800-424-8802) has also been notified.

USA will make a monthly report to ADEC of a discharge (or spill) to land of oil or petroleum products in excess of 1 gal but less than 10 gal after a review of the report by the NTR. All other “immediate” or short duration notifications will be made by notifying the USA site office who will in turn contact ADEC.

Internal notifications (NTR, contractor base station, home office) and other emergency procedures to be followed during a spill or other emergency situation are addressed in the APP.

7.1 SPILL RESPONSE AND EMERGENCY EQUIPMENT

In case of a spill, personnel will initiate actions immediately to contain or control the spill or evacuate the area if the spill is significant and represents an immediate health threat. The following spill response/emergency equipment will be maintained at the project site:

- A working telephone with an outside line and project site radio communications;
- Portable Class ABC fire extinguishers of the amount and size required by the local fire code, staged conspicuously in each site vehicle and at each project site or storage area where flammable materials are stored or used;
- Project-specific spill reporting requirements posted by the telephone and in site vehicles;
- Spill kits, including absorbent pads, absorbent booms, cat litter, and PPE of sufficient quantity and type for the operation at hand;
- Small portable drip pans (inspected daily) for small seal leaks and drips that may be encountered;
- Emergency eye wash stations; and

- Shovels and brooms.

An inventory list will be maintained onsite noting the location, type, and amount of spill/emergency equipment on-hand. Equipment that is used will be replaced to ensure that an adequate on-hand supply is available.

All personnel working at the site will be trained and familiar with this EPP/WMP, the basic emergency spill response procedures, the emergency equipment locations, and the procedures for handling and reporting a release.

For this project, spills have been defined as two types: non-emergency and emergency. All project personnel will be familiar with these response and reporting requirements.

7.1.1 Non-Emergency Spills

A non-emergency spill is defined as a discharge of a known material or hazardous substance that can be cleaned up without posing an immediate threat to human health or the environment. For a non-emergency spill:

- Stop the source of the spill if safe to do so.
- Contain the spill by keeping it away from drains or waterways and blocking off drains located near the spill, if there is a chance the spill will reach them.
- Clean up the spilled material wearing the proper PPE.
- Handle the spill debris/material (including the PPE) in accordance with the waste management sections of this EPP/WMP.
- Immediately notify the NTR or RPM and the PM.

7.1.2 Emergency Spills

An emergency spill is defined as any release that poses an immediate or imminent threat to human health or the environment, any release into any waterway (including storm drains), and any release not classified as a non-emergency spill event.

For an emergency spill:

- For an immediate or imminent threat to human health or the environment, immediately evacuate to a predetermined safe location and call emergency responders.
- If others are in the area, warn them and direct them to the predetermined safe location.
- Immediately notify emergency responders, the NTR or RPM, and the PM.

The Navy will either notify ADEC of the discharge or direct USA to make the initial notification if agency notification is required. Notification numbers and points of contact are provided on the first page of this section.

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8.0 TRAINING AND CERTIFICATION REQUIREMENTS FOR PROJECT PERSONNEL

8.1 RCRA HAZARDOUS WASTE TRAINING

Project personnel involved in hazardous waste management, handling, storage, and disposal, including subcontractors working on-site, will be trained in RCRA generator requirements. This training requires annual refreshers.

8.2 SITE-SPECIFIC TRAINING

Project personnel are required to become familiar with this EPP/WMP, including spill prevention and response measures, stormwater pollution prevention measures, and project-specific waste management procedures.

8.3 DOT HAZARDOUS MATERIALS TRAINING

Project personnel performing a DOT function must be properly trained in DOT Hazardous Materials Management. Additionally, security awareness training must be performed if the project requires a DOT Security Plan. DOT training is required every three years by law; however, training is required every two years for personnel who conduct air shipment of hazardous materials (e.g., sending hazardous material samples to an off-site laboratory). DOT training requirements apply to personnel who select packaging; prepare hazardous materials or wastes for transportation; are responsible for the safe transportation of hazardous materials or wastes; load, unload, or handle hazardous materials or wastes; test, recondition, repair, modify, mark, or otherwise represent containers as qualified for use in transporting hazardous materials or wastes; or operate a vehicle used to transport hazardous materials or wastes.

8.4 TRAINING RECORDS

The records of employee training will be readily available at the project site.

8.5 ADDITIONAL TRAINING REQUIREMENTS

Other training requirements applicable to the project are outlined in the APP and the MEC QAPP for this project.

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9.0 UPDATES OF THIS EPP/WMP

Any required change to this EPP/WMP will be made in accordance with the contractor/client QC Plan through the issuance of field change request or design change notice as appropriate (MEC QAPP Worksheet #32). Revisions will be noted by serial revision numbers.

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10.0 REFERENCES

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11.0 ATTACHMENT 1

INSPECTION CHECKLISTS

This attachment contains the following inspection checklists:

- Weekly Stormwater BMP Inspection Checklist
- Weekly Spill Prevention, Response, and Emergency Equipment Checklist.

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WEEKLY
STORMWATER BMP INSPECTION CHECKLIST

Adak, AK

Inspector Name _____ Date _____

Note: Any requirements not met require comment in the Corrective Action column

BMP	Requirement	Yes	No	Corrective Action
General Stormwater BMPs				
Good Housekeeping	• Care taken not to "off-track" contaminated soils from the contaminated work area (in equipment tracks, tires, or buckets) during excavation of contaminated soils?			
Good Housekeeping	• Equipment decontaminated (wiped or scraped clean of mud, soil, or debris) before moving to another location or storage between shifts?			
Material Storage	• Hazardous materials and contaminated debris stored in a manner that does not contribute contaminants to stormwater (i.e., from rain or wind dispersal)?			
Structural Controls	• Areas (both low lying land or surface water bodies) adjacent to land disturbance activities, including excavations protected from run-on from contaminants or sediment loading through the use of properly designed and maintained stormwater control devices (i.e., silt fence, berms, straw bales, or diversionary structures)?			
Inspections and Maintenance	• Stormwater control structures inspected after each major storm event? Was the last inspection performed within the past week and within 24 hours after any significant rainfall events? Repairs or modifications made for any noted deficiencies?			
Good Housekeeping	• Fugitive dusts controlled as needed by using water spray to wet down roadways used on the site?			
General Hazardous Materials and Petroleum Storage and Handling BMPs				
Good Housekeeping	• Drip pans or equivalent used under vehicles or other fuel-driven equipment (i.e., generators) to collect leaking fluids during fueling or fuel transferring activities?			
Good Housekeeping	• Garbage and waste materials or debris regularly picked up and disposed of properly?			
Good Housekeeping	• Spill kits containing the proper type and quantity of sorbent materials, booms, and tools staged in each work area where there is a potential for a spill or release?			

BMP	Requirement	Yes	No	Corrective Action
Inspections and Maintenance	• Equipment operated and maintained in accordance with manufacturer's recommendations? Daily equipment checklists completed?			
Inspections and Maintenance	• Hazardous material and waste storage areas inspected at least weekly?			
Inspections and Maintenance	• Vehicles or other equipment found to be leaking repaired immediately or removed from the site?			
Inspections and Maintenance	• Monthly inspections of spill-response and fire-prevention equipment performed?			
Inspections and Maintenance	• Regular housekeeping inspections conducted and the site maintained in an orderly fashion?			
Container Management	• Hazardous materials placed in suitable containers and storage areas that are in good condition? Hazardous wastes (if generated) stored in accordance with regulatory requirements? A flammable storage locker available for small containers of flammable materials?			
Container Management	• Containers kept closed except when being filled/used?			
Training	• Personnel trained in hazard communication (Hazcom), spill prevention, response, and reporting requirements outlined in this EPP, stormwater pollution prevention requirements, and hazardous material storage and handling requirements? Any new personnel arrive since last inspection that require this training?			

Inspector's signature _____ Date _____

WEEKLY
SPILL PREVENTION, RESPONSE, AND EMERGENCY EQUIPMENT CHECKLIST
Adak, AK

Inspector Name _____ Date _____

Note: Any requirements not met require comment in the Corrective Action column

Requirements	Yes	No	Corrective Action
Spill Response and Emergency Equipment			
Working telephone with an outside line and project site radio communications available?			
Portable Class ABC fire extinguishers of the amount and size required by the local fire code staged conspicuously in each site vehicle and at each project site or storage area where flammable materials are stored or used?			
Project-specific spill reporting requirements posted by the telephone and in site vehicles?			
Spill kits, including absorbent pads, absorbent booms, kitty litter, and PPE of sufficient quantity and type for the operation at hand?			
Small portable drip pans (inspected daily) available and used for small seal leaks and drips that may be encountered?			
Emergency eye wash stations in place and filled? Any evidence of use?			
Are site personnel trained and familiar with the EPP and basic emergency spill response procedures?			
Spill Preventions			
Drip pans and sorbent pads placed under portable generators and refueling ports to contain small drips or overfilling of the tanks? Does rainwater accumulartion in the drip pans affect the containment capacity of the pans? Rainwater accumulations evaluated for sheen? If there is a sheen, was the rainwater drummed for treatment in the on-site treatment unit or disposal off site? If there is no sheen, was the rainwater disposed of on the ground at least 100 feet from the nearest surface waterbody? Was the rainwater inspected before release?			
Are hazardous materials (i.e., oils, lubricants, and other materials accumulated as part of the operation) stored in lockers or other storage areas? Are fuel or liquid wastes stored within secondary containment structures (bermed and lined with impermeable membrane)?			

Inspector's signature _____ Date _____

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FINAL

APPENDIX F. BASIS FOR TARGET SELECTION THRESHOLDS

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

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Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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Figure 1-4: OU B-2 GPO 81 mm Mortar Responses with Physics-Based Modeling Minimum-Maximum Response for 81mm Mortar 30

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ACRONYMS AND ABBREVIATIONS

AA	Anti-Aircraft
AOC	area of concern
AP	Armor-Piercing
APHE	Armor-Piercing High Explosive
AT	Anti-Tank
cm	centimeter
DGM	digital geophysical mapping
DMM	Discarded Military Munitions
ESTCP	Environmental Security Technology Certification Program
FS	Feasibility Study
GPO	Geophysical Prove Out
GSV	Geophysical System Verification
HEAT	High-Explosive Anti-Tank
HEDP	High Explosive Dual-Purpose
HEI	High Explosive Incendiary
m	meter
MD	Munitions Debris
MEC	munitions and explosives of concern
mm	millimeter
MPPEH	Material Potentially Presenting an Explosive Hazard
mV	millivolt
NAVFAC	Naval Facilities Engineering Command
NTCRA	non-time critical removal action
OU	operable unit
PD	Point Detonating
PTT	Power Time Train
RAA	Remedial Action Area
RI	Remedial Investigation
TPT	Target Practice Tracer
USACE	U.S. Army Corps of Engineers
USA	USA Environmental
UXO	unexploded ordnance
WP	White Phosphorus

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1.0 TECHNICAL BASIS FOR DGM TARGET SELECTION THRESHOLDS

The Naval Facilities Engineering Command (NAVFAC) Northwest is preparing a non-time critical removal action (NTCRA) for munitions and explosives of concern (MEC) in certain Remedial Action Areas (RAAs) within Operable Unit (OU) B-2 at the former Naval Air Facility, Adak, Alaska. Specific proposed activities in the RAAs are listed in Table 1-1.

Table 1-1: Proposed NTCRA Activities in OU B-2

RAA	AOC	Proposed Activity	Acres (approx.)
RAA-01	OB/OD-01	Instrument assisted surface clearance (down to 6-in bgs), vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to the depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	19.3
RAA-02	C1-01	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	73.9
RAA-03 (West)	MI-01, MI-02 and MI-03	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	67.9
RAA-03 (East)	RR-01		74.4
RAA-03 (East)	HG-01		1.8
RAA-04	SA93-01 and SA93-03	Surface Clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 4-ft, with the option to further investigate deeper targets if required by the Navy.	104
RAA-05	ALDA-01	Surface Clearance, vegetation removal, mechanically assisted intrusive investigation of targets to a minimum depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	4.7
RAA-05	ALSW-01	Monthly visual surface sweeps to remove MPPEH items from the cobble beach portion of the defined boundary of RAA-05/ALDA-01. The cobble beach area is defined as the seawall surf zone to the edge of the grassy area on the seawall).	21.4

Note that RAA-03 and RAA-04 contain more than one Area of Concern (AOC). This threshold analysis report is based on the RAA designations shown in Table 1-1.

All of these RAAs will require digital geophysical mapping (DGM), and thus a target selection threshold must be determined. This threshold can be based on a combination of historical data (e.g., unexploded ordnance [UXO] types, depths and DGM amplitudes), from geophysical prove outs (GPOs) or from remedial investigation (RI) surveys. These data, coupled with physics-based modeling, allow the threshold to be tailored for each AOC. This tailored approach is clearly preferred over selecting a single, presumably low threshold for all AOCs, as the number of DGM targets selected and, therefore, the follow-on remedial activities, directly correlate to the threshold. Note that a GPO is not a requirement of the DGM surveys proposed in this current NTCRA. Instead, a geophysical system verification (GSV) and blind seed program will be used. However, information from the GPO installed in OU B-2 in 2008 is used

in this threshold study. The physics-based modeling (Environmental Security Technology Certification Program [ESTCP], 2009) provides for computation of the expected amplitudes for select UXO at various depths, and is calculated assuming the minimum coupling orientation of the target which produces the weakest signal.

There are advantages and disadvantages of the various data sources:

- Previous DGM surveys in the AOC of interest. In most cases, this data source is not very reliable for determining the DGM target selection threshold. These DGM data were primarily taken on widely spaced transects (10 m to 50 m). Transect data, at 1-meter widths, do not reliably cross the target items to generate the best possible response amplitude. Also, much of the data were taken in 1999 with an earlier version of the EM61. Although these data are critical for determining the type and depth of expected UXO in the area, the amplitudes derived for the targets are generally not a good metric. This is illustrated in Figure 1-1, which shows the computed EM61 MK2 Channel 1 amplitude in millivolts (mV) for a 37 mm projectile at a burial depth of 10 cm (~4 inches) at various distances laterally from the center of the coil, as may be expected from a transect survey. The figure shows that the target amplitude is about 44 mV when the target is located under the center of the coil. However, the target amplitude is only about 5 mV when the target is located about 0.2 m (8 inches) outside of the coil. In both cases, this target would be detected on this transect, however the measured amplitude would be quite different, making the transect amplitude an unreliable metric for this target at this depth. Larger targets can be detected even farther from the coil. For this reason, Remedial Investigation DGM data that were taken on mini-grids, where they received 100% sensor coverage, are much more useful, and can be used in a more quantitative role.

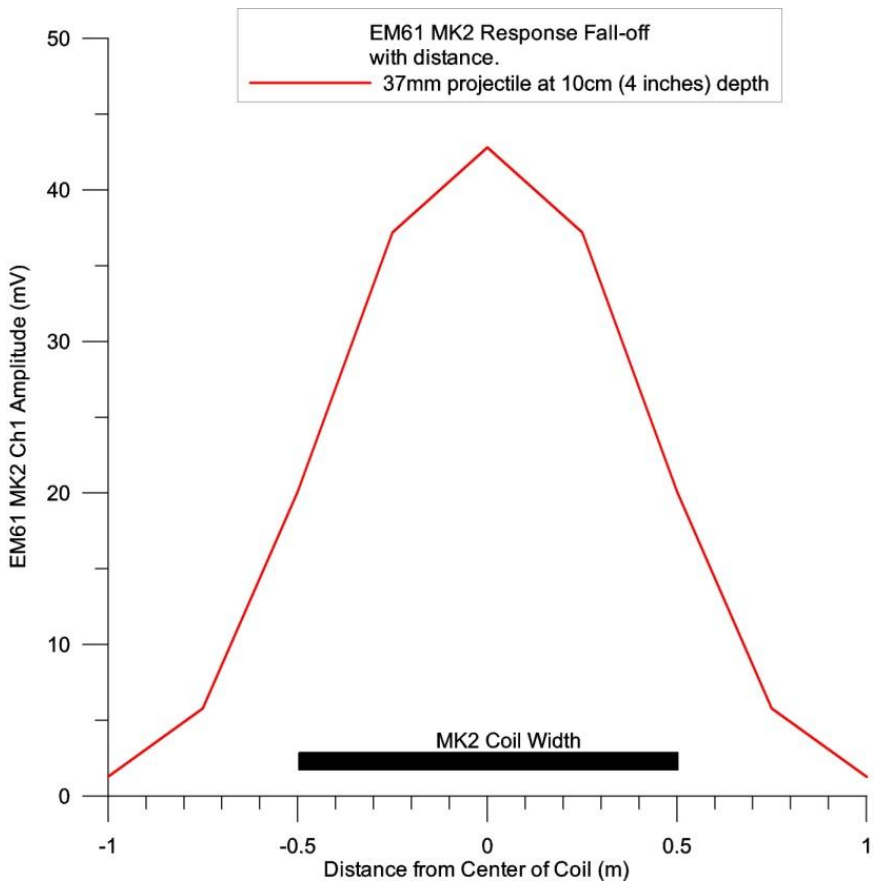

Figure 1-1: Physics-Based Model of EM61 MK2 Response for Buried 37 mm Projectile with Offset Distance

- Previous DGM data from the 2008 OU B-2 GPO. This data source is very good since the DGM data taken over the GPO were obtained with the current model EM61 (MK2) in actual field conditions representative of OU B-2, using typical instrument configurations, and the data were taken in a grid pattern over the targets. In this scenario, the maximum possible amplitude for the target is often obtained. The limitation of this data source is that there are a limited number of UXO simulants, depths and orientations that were installed in the GPO.
- Physics-based modeling of expected UXO. This data source is considered the optimum, since it allows a very good prediction of the minimum UXO response at various depths. The disadvantage of this data source is that not all UXO types are available in the modeling database. An example model calculation for a 37 mm target is shown on Figure 1-2. This figure shows the minimum and maximum response for a 37 mm target using the EM61 MK2 for Channel 1 from the modeling. In this example, at a burial depth of 20 inches, the minimum EM61 MK2 (Channel 1) response is expected to be about 3.4 mV.

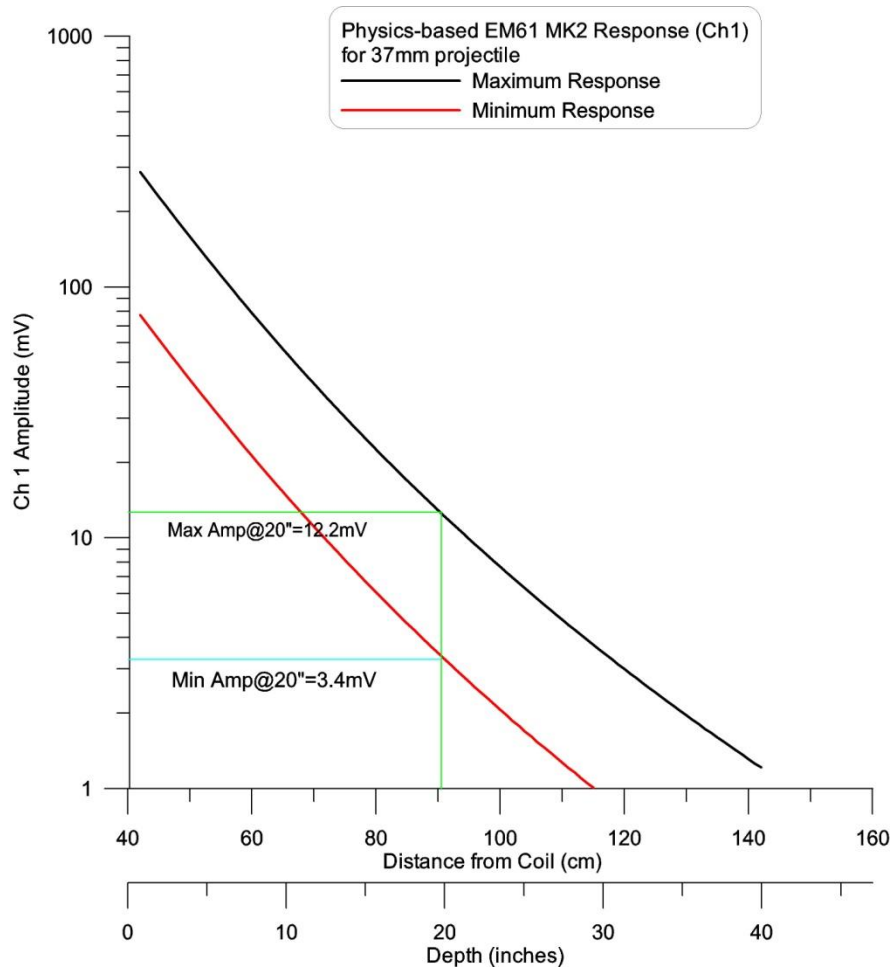

Figure 1-2: Physics-Based Modeling of EM61 MK2 Minimum-Maximum Response for 37 mm Projectile with Burial Depth

In the physics-based model, the minimum response is computed as 3.4 mV for the worst-case orientation of the target (cross line to the coil) at the 20-inch depth. If the target is oriented in the best case coupling orientation (vertical) at the 20-inch depth, the amplitude is computed to be 12.2 mV.

The approach utilized in this document to determine the appropriate target selection threshold is as follows:

1. Determine the most likely type(s) of UXO and their burial depth ranges within each AOC utilizing the target lists generated from the RI and other work in the AOCs. Some of this information is extracted from the Draft Feasibility Study (FS) [USA Environmental (USA), 2011] and those extractions are used in this document. It should be noted that some inaccuracies in MEC nomenclature have been identified in these data (e.g., 40 mm projectiles being referred to as 40 mm grenades and vice versa). For the purposes of this analysis, the data have been extracted "as is" from the Draft FS and no corrections have been made to preserve the historical accuracy of the information. These inaccurate nomenclatures in the tables do not affect the analysis. The correct munitions were identified based on additional information (e.g., 40 mm projectile or 40 mm grenade) and those corrected data were used in the analysis. The DGM amplitudes for these UXO were extracted from the original dig lists and are used qualitatively if acquired on widely spaced transects. If the DGM data were acquired on a grid pattern (e.g., 100% data coverage), the UXO amplitudes were used more quantitatively. The typical maximum detection depth of 11 times (11x) diameter of the UXO was used as a depth criterion when the reported depths are limited or did not seem reasonable. Note that targets selected in the previous RI DGM surveys were typically selected at very low thresholds (2 to 3 mV) as the purpose of the RI was to find target areas and representative targets.
2. If a physics-based model is available for the UXO type, a model study to determine the amplitude of the hardest to detect UXO/depth pairing was performed, and this threshold is used.
3. If a physics-based model is not available for the UXO type, information from the OU B-2 GPO was used to determine a threshold.

It is important to note that the depths of the typical UXO as reported in previous work are a very significant factor in the threshold estimations. These depths are used in the FS recommendations for removal depth as well. The accuracy and consistency of these depth measurements, particularly for the 1999 investigation, are not as well known as for the 2008 RI. For example, in areas with thick tundra, there could be significant variations in the depth measurements between the 1999 data and the 2008 data if the measurements were made from the top or middle of the tundra mat versus the top of the mineral surface, which was the standard for 2008. In those cases the reasonableness of the reported UXO depths can be validated or back-checked from the physics-based modeling.

The rule of thumb known as the "11x depth" has been used to help set the maximum depth of the UXO for determining the threshold for RAA-03 and RAA-04. The 11x depth is a guideline from US Army Corps of Engineers (USACE) Military Munitions Center of Expertise that estimates a munitions' envelope of detectability. Extracts from the USACE document are provided below:

- Despite the uncertainty in Pd due to shadowing and the halo effect, the detailed analysis of the Pds by munition type indicates that targets larger than a 60 mm mortar and above the 11x depth should be found greater than 90% of the time. With optimum data analysis and site coverage, this percentage should be nearer to 100% than 90%. For smaller targets, especially as small as a 20 mm projectile, it is not clear that this percentage will exceed 90% without a search designed particularly for finding small targets. While it would be of great value to regulators and stakeholders in UXO cleanup actions to precisely specify the deviation from 100% detection expected in a particular cleanup scenario, the Standardized UXO Test Site results do not provide such precision. Given the number of identically buried, like-type munitions required to make very precise Pd estimates and the number of possible depth and location configurations, it is difficult to envision a practical test site that probes universal variables of the UXO detection problem with great precision.

Thus, the 11x depth criteria sets a realistic maximum depth for various munitions based on field measurements, assuming a relative high probability of detection.

The following sections provide the rationale and target selection thresholds recommended for the NTCRA AOCs where DGM surveys are planned using these steps. The recommended target selection thresholds are based on the use of the Geonics EM61 MK2 sensor (Channel 1). If other MK2 sensor channels, or combinations of channels (e.g., sum of Channels 2, 3 and 4), are used for target selection, they can be determined from the physics-based model. If a different sensor is proposed, it must be proven in the GSV to be equivalent to or better than the MK2, and a physics-based model developed and validated with the MK2 model. New sensors may also need to be validated in the OU B-2 GPO.

The thresholds recommended in this document are intended to be the initial target picking thresholds for the various RAAs. There is a possibility that these thresholds can be changed, based upon excavation results in the RAAs. An example of this change process is as follows:

- A statistically significant number of the targets (at or near the initial target picking threshold) are excavated over a statistically significant areal extent of the RAA.
- The target types and amplitudes are evaluated and indicate that a change in threshold will not increase risk.
- A written evaluation is submitted and approved by the project team.

Note that either the production contractor or Navy quality assurance can initiate this process.

1.1 RECOMMENDED TARGET SELECTION THRESHOLD FOR RAA-02

A listing of MEC found from previous investigations in this area is provided in Table 1-2. This table was extracted from the Draft OU B-2 FS (USA, 2011).

Table 1-2 shows that eight UXO were found in this AOC during RI work, ranging in size from a 20 mm projectile to an 81 mm mortar. All of the UXO found in previous work were at depths of 2 ft or less. The objectives in this RAA (Table 1-1) are removal of targets to a depth of 2 ft below the mineral surface.

Since the target removal depth is limited to 2 ft, the most difficult target to detect in this RAA is the 20 mm projectile. That is, larger targets (i.e., 60 mm and 81 mm mortars) will always display higher DGM amplitudes than the 20 mm in this depth range.

The ESTCP modeling software does not include calculations for a 20 mm projectile. However, several 20 mm projectiles were installed in the OU B-2 GPO. Table 1-3 tabulates the response of these 20 mm projectiles for Channel 1 of the EM61 MK2.

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Table 1-2: Summary of MEC Investigation Results for RAA-02 (AOC C1-01)

C1-01	Surface	Near-Surface- (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface- (-2 to -4 feet)	Total
UXO					
UXO, Mortar	2	1	2	-	5
UXO, Projectile	3	-	-	-	3
DMM					
DMM, Misc. Explosive Devices	-	1	-	-	1
MPPEH					
MPPEH, Bomb	-	-	2	-	2
MPPEH, Misc. Explosive Devices	-	1	-	-	1
MPPEH, Mortar	-	-	2	-	2
MPPEH, Projectile	4	3	-	-	7
MD	50	178	105	4	337

Items Found: *

DMM	MK45 VT fuze
UXO	81-mm mortar, HE, no fuze, fired
	20-mm HEI, fired, armed
	20-mm M253 HEI projectile, armed (2)
	81-mm mortar;
	20-mm projectile, w/ fuze, fired, armed
	60-mm mortar, PD fuze, fired
	81-mm mortar, HE, fired, no fuze
	60-mm mortar, HE, M49 (possible w/M52 PD fuze)
MPPEH	60-mm mortar, HE, no nose fuze, no tail boom, mortar cavity mostly hollow w/ pieces of HE
	81-mm WP, tail boom cracked off, exposing WP, fired
	40-mm MK27 projectile fuze
	20-mm projectile (5)
	37-mm projectile w/ tracer element
	Fire bomb weight (2)
	Bottom half of 37-mm projectile
	40-mm projectile, no fuze, HE residue
	M100 series bomb fuze w/M14 primer detonator

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
HEI = high explosive incendiary
PD = point detonating

Data Source: (USA, 2012b

Table 1-3: EM61 MK2 Response for 20 mm Projectiles in OU B-2 GPO

ID	Depth (inches)	Dip (degrees from horizontal)	Azimuth (degrees)	Channel 1 (mV)
139	8	90 (vertical)	N/A	4.6
140	8	45	45	5.5
138	8	90 (vertical)	N/A	6.2
38	3	0 (horizontal)	180	3.0
32	8	45	210	4.9
33	6	45	180	8.6
31	8	90 (vertical)	N/A	8.9

This table shows that the signal strength of the 20 mm is highly dependent upon the orientation and depth of the target. Orientation has the biggest influence on signal amplitude as shown by the comparison of target 38 (horizontal @ 3 inch depth) with Channel 1 amplitude of 3 mV, with any of the other targets (non-horizontal @ depths of 6 or 8 inch) showing Channel 1 amplitudes ranging from 4.6 to 8.9 mV. These target amplitudes were derived from parallel transect measurements (grid type) over the GPO, and therefore approximated maximum amplitudes should be expected for these targets at these depths and orientations.

Based on analysis of the responses of 20 mm targets from the OU B-2 GPO, the recommended target selection threshold for RAA-02 (AOC C1-01) is 3 mV (Channel 1, EM61 MK2). This amplitude is typically the lowest amplitude threshold that can be selected for the EM61 MK2 for production surveys. Typical noise levels in the GPO grid and in production surveys were about 0.75 mV, and thus the 3 mV threshold results in a reasonable signal to noise ratio of about 4. 100% data coverage (e.g., line separation of 1 m or less) and tight measurement separation (15 cm) is critical for detection of these small targets.

1.2 RECOMMENDED TARGET SELECTION THRESHOLD FOR RAA-03 (WESTERN AOCS: MI-01, MI-02, AND MI-03)

These three areas comprise the western portion of RAA-03 which requires DGM and removal of targets to a depth of 2 ft below mineral surface.

AOCs MI-02 and MI-03 are relatively small (0.7 and 18 acres, respectively) and are essentially surrounded by AOC MI-03 (~30 acres). Listings of MEC found from previous investigations in MI-01, MI-02 and MI-03 are provided on Tables 1-4, 1-5 and 1-6, respectively. These tables were extracted from the Draft OU B-2 FS (USA, 2011).

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Table 1-4: Summary of MEC Investigation Results RAA-03 (AOC MI-01)

MI-01	Surface	Near-Surface- (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface - (-2 to -4 feet)	Total
UXO					
UXO, Grenade	-	15	5	-	21
UXO, Projectile	-	1	-	-	1
UXO, Rocket	-	16	10	-	26
MPPEH					
MPPEH, Projectile	-	1	-	-	1
MPPEH, Rocket	-	14	5	-	19
MD	-	167	26	-	193

Items Found: *

UXO	Rifle grenade, HEAT, M9 (12)
	Rifle grenade, WP, M19 (7)
	Rifle grenade, WP, M9 (2)
	40-mm projectile, HE, MKII
	2.36-in rocket, HEAT, M6 (23)
	3.5-in rocket, HEAT, M28
	3.5-in rocket, HEAT, M6
MPPEH	2.36-in rocket motor (4)
	3.5-in rocket motor (20)
	40-mm projectile MKII w/ self-destruct only

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

HEAT = high explosive anti-tank

Data Source: (USA, 2012b

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Table 1-5: Summary of MEC Investigation Results RAA-03 (AOC MI-02)

MI-02	Surface	Near-Surface (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface- (-2 to -4 feet)	Total
UXO					
UXO, Mortar	-	-	1	-	1
UXO, Projectile	1	7	5	-	13
UXO, Rocket	-	3	-	-	3
MPPEH					
MPPEH, Mortar	-	1	1	1	3
MPPEH, Projectile	-	3	-	-	3
MPPEH, Pyrotechnic	-	1	-	-	1
MD	2	164	163	-	329

Items Found: *

UXO	2.36-in rocket, AT, armed
	2.36-in rocket, HEAT, M6
	40-mm projectile, no fuze, possible HE
	40-mm projectile HE fragment
	40-mm projectile, HE, fuzed, armed (5)
	40-mm HET w/ PD fuze, armed
	40-mm projectile, HET, fuze MK27 (armed)
	60-mm mortar body (no fuze)
	75-mm projectile, HE M48
MPPEH	81-mm fragment and 60-mm fins and M52 PD nose fuze
	81-mm tail boom and fuze parts
	40-mm projectile HET – fuze component missing, HE exposed
	81-mm illumination (body and fuze only) w/M84 PTT fuze
	Fuze M557 PD (component part) projectile fuze
	Tracer w/self-destruct for 40-mm AA

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
AA = anti-aircraft
AT = anti-tank
PTT = power time train

Data Source: (USA, 2012b

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Table 1-6: Summary of MEC Investigation Results RAA-03 (AOC MI-03)

MI-03	Surface	Near-Surface (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface - (-2 to -4 feet)	Total
UXO					
UXO, Grenade	1	3	4	-	8
UXO, Mortar	-	2	-	-	2
UXO, Projectile	-	3	1	-	4
UXO, Rocket	-	3	1	-	4
DMM					
DMM, Fuze	-	2	1	-	3
DMM, Rocket	-	2	-	-	2
MPPEH					
MPPEH, Projectile	-	3	2	-	5
MPPEH, Pyrotechnic	-	1	-	-	1
MPPEH, Rocket	-	3	2	-	5
MD	14	208	183	-	405

Items Found: *

DMM	2.36-in rocket, practice, not fired (2)	
	Fuze, rocket, MK131	
	Fuze, rocket, MK152	
	Fuze, projectile, PD, M46	
UXO	3.5-in rocket, WP, fired	Rifle grenade, WP, M19 (3)
	40-mm projectile, HE, fuzed, armed	81-mm mortar (live) w/nose fuze and tail boom
	40-mm projectile, HET, MK27, PD (armed)	60-mm mortar, HE, M49
	40-mm projectile, AP	40-mm projectile, HE, M406
	Grenade, hand, HE, MKI	Rifle grenade, WP
	Rifle grenade, HEAT, M9	2.36-in rocket, HEAT, M6 (3)
MPPEH	Fuze M557 PD (parts)	2.36-in rocket, practice M7A1
	Zuni rocket motor (5)	40-mm projectile TPT (2)
	2.36-in rocket motor section and tail	Projectile tracer w/self-destruct for 40-mm AA MK 2 (2)
	3.5-in rocket motor	40-mm projectile AP fragment
	Trip flare	

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
AP = armor piercing
TPT = target practice tracer

Data Source: (USA, 2012b)

These tables show that during the previous investigations, 47 UXO were found in AOC MI-01, 16 UXO were found in AOC MI-02, and 16 UXO were found in AOC MI-03. During the 2008 RI work, several DGM mini-grids (100% coverage) were completed in these AOCs, and nearly 100% of AOC MI-01 was covered by mini-grids. UXO found in these AOCs range in size from a hand grenade and 40 mm projectiles to an 81 mm mortar. All but one of the UXO found in previous work were at depths of 2 ft or less. Table 1-7 lists the UXO found from the 1999 DGM surveys. These surveys were conducted on relatively widely spaced (~60 m or greater) transects using the EM61 MK1.

Table 1-7: Summary of MEC Found in RAA-03 (From 1999 DGM Surveys)

Anomaly ID	Description	Comments	Depth (inches)	Channel 1 (EM61 MK1, Measured)	Channel 1 (EM61 MK2, Calculated)
MI10002	Projectile	40 mm HET Fuzed -- Armed -- Flagged for EOD	8	2.7	6.9
MI10014	Projectile	40 mm HET -- alternate for MI10004	12	2.8	7.4
MI06002	Projectile	40 mm -- HE -- Fuzed -- Armed -- Flagged for EOD	10	2.9	7.5
MI09007	Projectile	40 mm HET, FUZE MK27 (ARMED) FLAGGED FOR EOD	24	3.6	9.3
MI09006	Projectile	40 mm NO FUZE - POSSIBLE HE LEFT IN PROJO - FLAGGED FOR EOD	24	4.2	10.8
MI10007	Projectile	40 mm HET - fuzed - armed condition - flagged for EOD	6	4.4	11.5
MI10016	Projectile	40 mm HET -- Fuze component missing -- HE is exposed -- flagged for EOD	4	5.1	13.4
MI09001	Projectile	40 mm HET FUZED ARMED FLAGGED FOR EOD	10	5.9	15.3
MI10027	Projectile	40 mm HET with PD fuze -- Armed -- flagged for EOD	4	7.0	18.1
MI09018	Projectile	40 mm HE FUZED - ARMED - UNDER WATER - FLAGGED FOR EOD	2	8.6	22.3
MI02004	Projectile	40 mm HET -- MK 27 PD fuze (armed) nose up -- flagged for EOD	6	11.2	29.2
MI16041	Grenade	Rifle grenade - WP. Alternate for MI16045.	0	14.6	37.9
MI10023	Rocket	2.36 inch AT Rocket -- Armed	6	21.2	55.1
MI01030	Grenade	RIFLE GRENADE M19 (WP)	10	29.1	75.7
MI16044	Rocket	3.5 WP - fired. Recovered and flagged for EOD.	2	86.6	225.1
MI17013	Rocket	2.36 INCH PRACTICE ROCKET (NOT FIRED) -VERY ENCRUSTED - FLAGGED FOR EOD	3	87.5	227.6
MI18053	Mortar	LIVE - 81 mm MORTAR WITH NOSE FUZE AND TAIL BOOM	6	118.0	306.8

These UXO targets were sorted by DGM amplitude, and the lowest amplitude targets were identified as 40 mm projectiles ranging in depth from 2- to 24- inches with MK1 amplitudes from 2.7 to 11.2 mV. The table also shows the approximate, calculated amplitude that would have been recorded in Channel 1 of the EM61 MK2 instrument. This relationship is approximately MK2 Channel 1 equals 2.6 times MK1 Channel 1. The basis for this derivation is described in Attachment 1.

Table 1-8 lists the UXO found from the 2008 DGM surveys. These surveys were conducted on fairly regular, parallel transects (~25 m separation) and over seven mini-grids (100% DGM coverage) using the EM61 MK2.

These UXO targets were sorted by DGM amplitude (Channel 1), and the lowest amplitude targets were identified as a rifle grenade (12 inches depth at 7.8 mV), a 2.36 inch rocket warhead (2.4 inches, 7.8 mV), and a 40 mm projectile (6 inches, 9 mV). Note that all of the UXO targets found from the 2008 RI were at depths of 24 inches or less. The UXO found from the 2008 DGM mini-grid (100% coverage) surveys are highlighted on Table 1-8. The DGM amplitudes derived for these UXO/depths should be more representative of the modeled response since the DGM data were taken in a mini-grid using the MK2 instrument.

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Table 1-8: Summary of MEC Found in RAA-03 (from 2008 DGM Surveys)

Anomaly ID	Description	Comments	Depth (Feet)	Depth (inches)	Ch1	Ch2	Ch3	Ch4
MI01G6186	rifle grenade	Grenade	1.0	12.0	7.8	3.3	0.9	0.4
MI01G5110	2.36 warhead	2.36 rocket	0.2	2.4	7.8	4.1	1.5	0.3
MI01G5109	Projectile, 40mm, AP-T	Projectile	0.5	6.0	9.0	5.6	2.9	1.2
MI01TX2_7	rifle grenade	Grenade	0.5	6.0	10.5	6.4	3.6	3.3
MI01G6162	Rifle grenade, AT, M9	Grenade	0.5	6.0	16.9	11.3	5.5	2.2
MI01TX3_12	rifle grenade	Grenade	0.5	6.0	18.3	12.0	7.5	4.0
MI01G6160	Rifle grenade, WP, M19	Grenade	1.0	12.0	18.5	12.1	5.0	1.7
MI01G6153	rifle grenade	Grenade	0.5	6.0	21.4	14.1	7.3	3.0
MI01G5082	2.36 rocket	2.36 rocket	0.2	2.4	26.4	17.0	8.8	3.8
MI01G6145	Rifle grenade, AT, M9	Grenade	0.2	2.4	27.9	17.9	9.0	3.5
MI01G6144	2.36 rocket, M6	2.36 rocket	1.0	12.0	29.7	21.0	11.2	6.4
MI01G6143	Projectile, 40mm, HE, M406	Projectile	0.5	6.0	29.8	18.1	7.4	1.8
MI02G4013	2.36 rocket	Rocket Motor	0.8	9.0	30.3	19.8	9.6	3.6
MI01G6140	2.36 rocket	2.36 rocket	1.0	12.0	32.7	24.1	14.7	7.5
MI01G6138	Rifle grenade, WP, M19	Grenade	0.5	6.0	34.7	22.6	11.8	6.1
MI02G3009	Projectile, 75mm, HE	Projectile	0.8	9.0	40.6	28.9	17.5	9.8
MI01G6132	rifle grenade	Grenade	1.0	12.0	43.5	27.7	14.0	6.5
MI01G5068	2.36 rocket	2.36 rocket	0.1	1.2	43.6	24.8	10.4	3.8
MI01G6130	Rifle grenade, AT, M9	Grenade	0.5	6.0	44.6	22.5	11.4	4.8
MI02G4008	2.36 rocket	Rocket Motor	0.5	6.0	46.3	35.1	21.6	11.1
MI01G5062	2.36 rocket	2.36 rocket	1.0	12.0	51.7	32.8	17.1	7.3
MI01G6125	Rifle grenade, AT, M9	Grenade	0.5	6.0	53.9	36.4	19.1	8.1
MI01TX3_5	rifle grenade	Grenade	0.5	6.0	55.6	33.5	15.5	6.4
MI01G5054	2.36 rocket	2.36 rocket	1.0	12.0	59.0	37.1	20.1	10.3
MI01G5053	2.36 rocket	2.36 rocket	1.0	12.0	59.7	43.1	25.1	11.6
MI01G6116	Rifle grenade, AT, M9	Grenade	0.5	6.0	62.3	39.8	20.9	8.9
MI01G6115	Rifle grenade, AT, M9	Grenade	0.2	2.4	63.8	36.0	20.1	9.3
MI01G6112	Rifle grenade, AT, M9	Grenade	0.2	2.4	72.3	44.7	21.7	8.9
MI01G6108	Rifle grenade , WP, M19	Grenade	1.0	12.0	76.7	46.4	24.0	11.3
MI01G5049	2.36 rocket	2.36 rocket	0.2	2.4	78.0	51.1	26.8	12.0
MI01G6105	rifle grenade	Grenade	1.0	12.0	79.1	43.7	26.8	12.9
MI01G6101	3.5 rocket, AT	3.5 rocket	1.0	12.0	84.7	56.2	29.2	13.5
MI01TX3_4	rifle grenade	Grenade	0.8	9.0	92.1	60.4	33.2	17.1
MI01G5041	2.36 rocket	2.36 rocket	0.2	2.4	96.1	60.4	33.2	14.8
MI01G6096	Rifle grenade, AT, M9	Grenade	0.5	6.0	103.0	52.2	23.5	6.4
MI01G6094	2.36 rocket	2.36 rocket	1.5	18.0	103.4	74.9	45.7	24.7
MI01G6093	Rifle grenade, AT, M9	Grenade	0.2	2.4	105.1	57.1	28.9	11.3
MI01G6092	rifle grenade	Grenade	0.5	6.0	105.3	72.1	39.8	18.7
MI01G6090	2.36 rocket	2.36 rocket	1.0	12.0	111.3	78.4	47.8	25.9
MI01G5037	2.36 rocket	2.36 rocket	0.2	2.4	113.9	85.6	54.2	31.4
MI01G6089	rifle grenade	Grenade	1.0	12.0	114.7	76.9	42.3	20.3
MI01G6086	2.36 rocket	2.36 rocket	0.2	2.4	115.6	84.7	49.4	26.3
MI01G5036	2.36 rocket	2.36 rocket	0.5	6.0	118.7	82.8	49.7	25.8
MI01G5033	2.36 rocket	2.36 rocket	1.0	12.0	122.8	88.1	55.7	33.2
MI01G5032	2.36 rocket	2.36 rocket	0.5	6.0	123.4	81.7	43.5	19.7
MI01G6076	Rifle grenade, WP, M19	Grenade	0.2	2.4	145.9	94.3	48.3	20.6
MI01G5027	2.36 rocket	2.36 rocket	0.5	6.0	149.9	106.1	63.1	31.4
MI02T12001	2.36 rocket	Projectile	0.2	2.4	153.1	104.8	58.5	31.5
MI01G6075	2.36 rocket	2.36 rocket	1.0	12.0	159.9	112.6	63.4	29.2
MI01G5022	2.36 rocket	2.36 rocket	0.5	6.0	162.5	86.1	49.7	21.5
MI01G6074	rifle grenade	Grenade	0.5	6.0	167.1	119.0	62.8	25.2
MI02G3003	Mortar, 60mm, HE	Mortar	0.8	9.0	172.8	83.6	49.5	25.9
MI01G6070	2.36 rocket , M6	2.36 rocket	1.0	12.0	174.8	112.1	60.1	27.4
MI01G5020	2.36 rocket	2.36 rocket	2.0	24.0	176.0	111.5	65.5	33.1
MI01G5019	3.5 rocket	3.5 rocket	0.1	1.2	176.3	128.8	78.1	43.9
MI01G6068	Rifle grenade, AT, M9	Grenade	0.5	6.0	181.2	113.0	52.6	21.8
MI01G5018	2.36 rocket	2.36 rocket	0.5	6.0	209.9	136.7	77.9	39.1
MI01G5015	2.36 rocket	2.36 rocket	2.0	24.0	262.8	187.6	114.3	60.5
MI01G5014	2.36 rocket	2.36 rocket	0.1	1.2	359.4	224.4	128.2	58.3
MI01TX3_2	2,36 rocket	Rocket	0.2	2.4	541.6	370.2	198.1	90.2
MI01TX3_1	2.36 rocket	Rocket	0.2	2.4	1631.5	1206.8	753.6	416.8

UXO found in mini-grids

From Tables 1-7 and 1-8, the UXO types showing the lowest amplitude were selected and then the greatest depth that those items were found was selected, regardless of amplitude. The resulting items are:

- Rifle grenade (from Table 1-8)
- 40 mm projectile (from Tables 1-7 and 1-8)
- 2.36 inch rocket (from Table 1-8)

The tables show obvious inconsistencies between EM61 amplitudes and target depths for identical targets. For example, in Table 1-7, the amplitude of the 40 mm projectile #MI10002 at a depth of 8 inches is 6.9 mV (adjusted to MK2), whereas the amplitude of the 40 mm projectile #MI09007 at a depth of 24 inches (three times deeper) is higher (at 9.3 mV :adjusted to MK2). Another example is in Table 1-8, where the amplitude of the 2.36 inch rocket #MI01G5110 at a depth of 2.4 inches is 7.8 mV, compared to the 2.36 inch rocket #MI01G5015 at a depth 10 times greater (at 24 inches) of 262.8 mV. Some of these apparent inconsistencies may be due to target orientation; however, most of the inconsistency has to be attributed to inaccurate reported depth values. Given these inconsistencies in reported depths, the most difficult to detect UXO (40 mm projectile) was used to determine the threshold in this RAA, and the maximum depth of the UXO was set at the 11x depth.

The ESTCP modeling software does not provide calculations for the 40 mm projectile. However, the software does provide calculations for a 37 mm projectile which can be used to simulate the 40 mm projectile. Note that using a smaller (37 mm) projectile to simulate a slightly larger (40 mm) projectile should provide additional confidence as the physics-based model for the smaller projectile will show lower amplitudes than the actual (larger) projectile.

The recommended target selection threshold for the western portion of RAA-03 (AOCs MI-01, MI-02 and MI-03) is 4.8 mV (Channel 1, EM61 MK2), based on the computed minimum response of a 37 mm projectile (used to simulate a 40 mm projectile) at a depth of 17 inches (11x diameter). This amplitude is the lowest (either computed or measured in mini-grids) for the realistic depths expected for the dominant targets in the AOCs. This target will be detected at greater depth in any other orientation. Table 1-9 compares the physics-based computed minimum and maximum depth of detection of the typical UXO in RAA-03 West (for which models are available) using the recommended 4.8 mV threshold. This table shows that the maximum depth of detection for the 40 mm projectile using a 4.8 mV threshold is about 27 inches. 100% data coverage (line separation of 1 meter or less) and tight measurement separation (15 cm) is critical for detection of the small (i.e., 40 mm) targets.

Table 1-9: Computed Minimum and Maximum Depth of Detection for Typical UXO at AOCs MI-01, MI-02 and MI-03 using Recommended Threshold (4.8 mV)

UXO	Minimum Computed Depth of Detection (inches)	Maximum Computed Depth of Detection (inches)
40 mm projectile (simulated by 37 mm projectile in the physics-based model)	17	27

Table 1-10 and Figure 1-3 tally and plot (respectively) the 37 mm simulants utilized in the OU B-2 GPO grid. Figure 1-3 also shows the minimum and maximum computed response (from physics-based modeling) for a 37 mm projectile. This figure shows that nearly all of the 37 mm simulants in the GPO fall within the computed minimum-maximum envelope. This fact supports the use of the modeling. Also shown on this figure is the recommended threshold (4.8 mV). All of the 37 mm simulants used in the GPO have amplitudes much higher than the recommended threshold.

Table 1-10: Tally of 37 mm Simulants Installed in OU B-2 GPO Grid

Target ID	GPO Target Type	Target Depth (inches)	Target Orientation (Dip)	Target Azimuth	Amplitude (Ch 1)
70	37mm Simulant	12	0	270	13.4
4	37mm Simulant	16	90	N/A	19.6
15	37mm Simulant	16	90	N/A	21.2
69	37mm Simulant	8	90	N/A	24.7
16	37mm Simulant	8	0	180	25.5
67	37mm Simulant	6	0	220	32
9	37mm Simulant	16	90	N/A	33
3	37mm Simulant	8	45	280	39.4
14	37mm Simulant	8	45	200	41.3
10	37mm Simulant	8	0	360	42.3
6	37mm Simulant	8	90	N/A	43.3
18	37mm Simulant	3	0	270	47
17	37mm Simulant	8	90	N/A	49.4
5	37mm Simulant	8	0	350	53.6
2	37mm Simulant	3	0	100	62.6
68	37mm Simulant	12	90	N/A	64.6
11	37mm Simulant	8	90	N/A	66.1
8	37mm Simulant	8	45	115	66.4
36	37mm Simulant	6	45	0	92.2
12	37mm Simulant	3	0	90	93.3

1.3 RECOMMENDED TARGET SELECTION THRESHOLD: RAA-03 (EASTERN AOC: RR-01)

AOC RR-01 is part of RAA-03 East and is spatially separated from most of the other AOCs (MI-01, MI-02 and MI-03) that make up this RAA. This AOC surrounds AOC HG-01, which is discussed in the following section. During investigative DGM surveys, AOC RR-01 was mapped by roughly parallel transects in 1999 and again in 2008. A small area of 100% coverage (DGM mini-grids) extends into RR-01 from HG-01. A listing of MEC found from previous investigations in RR-01 is provided on Table 1-10. This table was extracted from the Draft OU B-2 FS (USA, 2011) and includes targets found in AOC HG-01.

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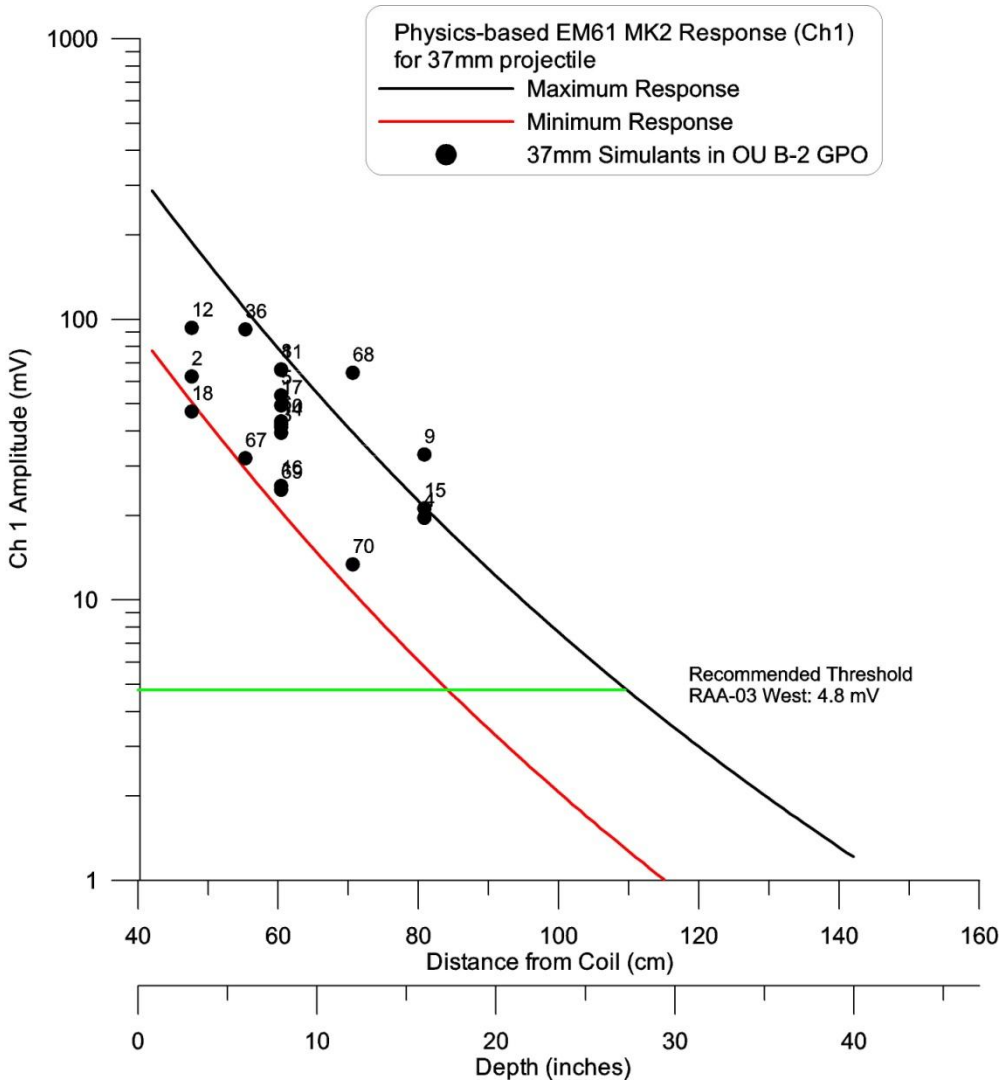

Figure 1-3: OU B-2 GPO 37 mm Simulant Responses with Physics-Based Modeling Minimum-Maximum Response for 37 mm

Table 1-11 shows that during the investigative work, 29 UXO were found in AOC RR-01. UXO found in this AOC ranges in size from a 37 mm projectile and 40 mm grenades to a 5 inch rocket. All of the UXO found in previous work were at depths of 2 feet or less. DGM and removal of targets to a depth of 2 ft below mineral surface are proposed for this AOC.

Table 1-12 lists the UXO found from the 1999 DGM surveys. These surveys were conducted from semi-parallel transects using the EM61 MK1. These UXO targets were sorted by DGM amplitude, and the lowest amplitude target was a 40 mm grenade at a depth of 10 inches with a MK1 amplitude of 3.8 mV. The table also shows the approximate calculated amplitude that would have been recorded in Channel 1 of the EM61 MK2 instrument or about 9.9 mV (Factor 2.6 times MK1).

Table 1-13 lists the UXO found from the 2008 DGM surveys. These surveys were conducted using the EM61 MK2 on fairly regular, parallel transects at roughly 20 m separation and small portions of mini-grids (100% DGM coverage).

These UXO targets were sorted by DGM amplitude (Channel 1), and the lowest amplitude targets were 40 mm projectiles at 6 inches and 1.2 inches depth (4.7 and 5.5 mV, respectively). All of these UXO targets were found at depths of 6 inches or less.

Table 1-11: Summary of MEC Investigation Results RAA-03 (AOC RR-01)

RR-01	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Grenade	1	-	-	-	1
UXO, Projectile	-	10	-	-	10
UXO, Rocket	-	7	-	-	7
DM					
DMM, Small Arms	2	4	1	-	7
MPPEH					
MPPEH, Grenade	-	7	1	-	8
MPPEH, Pyrotechnic	-	3	-	-	3
MPPEH, Rocket	-	2	-	-	2
MD	15	431	119	-	565

Items Found: *

DMM
- M16 (30) round w/ 5.56-mm ammunition load (5)
- Numerous bullets AF 7.62 rounds
- Small arms clips
- Fuze, projectile, PD, M48 series

UXO
- 2.36-in rocket (2)
- 2.36-in rocket, HEAT, M6 (4)
- 37-mm projectile w/base fuze (possible M58) in fired condition
- 40-mm grenade
- 40-mm grenade HEDP (2)
- 40-mm projectile, HE, MKII (2)
- 40-mm projectile, HE, M406 (3)
- 40-mm projectile, HEDP, M433 (3)
- 40-mm projectile, HE, M381
- 40-mm projectile, HE, M397
- 40-mm projectile, HE, MK 3
- 5-in rocket, APHE, MK 34

MPPEH
- MKII hand grenade, without fuze, HE residue
- Full head of 40-mm practice grenade w/ dye marker (4)
- Practice grenade for the M67 w/live practice Fuze
- M228 (M69 practice grenade)
- Inner projectile of slap-type flare
- Remnants of signal slap flare
- 60-mm mortar painted orange
- Base of 4-mm practice grenade and M60 fuze igniter
- 2.36-in rocket, practice
- 40-mm HE M397, explosive ball separated from grenade body
- Flare, aircraft, model unknown

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

APHE = armor-piercing high explosive
HEDP = high explosive dual purpose

MD = munitions debris

MEC = munitions and explosives of concern

MPPEH = material potentially presenting an explosive hazard

UXO = unexploded ordnance

WP = white phosphorus

Data Source: (USA, 2012b)

Table 1-12: Summary of MEC found RAA-03 (in AOC RR-01 from 1999 DGM Surveys)

Anomaly ID	Description	Comments	Depth (inches)	Channel 1 (EM61 MK1, Measured)	Channel 1 (EM61 MK2, Calculated)
RR20008	Grenade	40 mm HE M397 - EXPLOSIVE BALL SEPERATED FROM GRENADE BODY	10.0	3.8	9.9
SA03033	Projectile	37 mm PROJECTILE WITH BASE FUZE (POSSIBLE M58) IN FIRED CONDITION WITH FORWARD SECTION RUSTED AND STOCK IN DEBRIS. LEFT AT LOCATION AND MARKED	2.0	5.7	14.9
RR18007	Grenade	40 mm HAND GRENADE - LEFT IN PLACE FOR EOD	0.0	12.5	32.4
RR20005	Rocket	2.36 INCH AT ROCKET - MOTOR EXPENDED - ROCKET WAS EXPLOSIVELY DEMILED THIS DATE	5.0	47.4	123.3

Table 1-13: Summary of MEC Found in RAA-03 (in AOC RR-01 from 2008 DGM Surveys)

Anomaly ID	Description	Comments	Depth (Feet)	Depth (inches)	Ch1	Ch2	Ch3	Ch4
RR01T11032	Projectile, 40mm, HE	Projectile	0.5	6.0	4.7	3.0	1.4	0.8
RR01T6017	Projectile, 40mm, HE, M406	Projectile	0.1	1.2	5.5	4.8	2.3	0.9
RR01T6006	2.36 rocket AT M6	2.36 rocket	0.5	6.0	15.4	11.1	6.2	3.4
RR01T12009	M406	Projectile	0.5	6.0	18.7	12.5	5.9	2.3
RR01T6005	2.36 rocket AT, M6	2.36 rocket	0.2	2.4	26.1	19.2	11.6	6.4
RR01T8010	flare	Pyrotechnic	0.2	2.4	27.6	26.7	17.0	10.0
RR01T13008	40mm HE	Projectile	0.5	6.0	34.5	24.8	15.6	8.6
RR01T6004	Projectile, 40mm, HE, M406	Projectile	0.2	2.4	37.5	22.8	9.7	3.1
RR01T3004	Projectile, 40mm, HE, M397	Projectile	0.5	6.0	39.5	28.7	16.4	7.1
RR01T18010	BOOSTER		0.5	6.0	42.5	28.5	14.5	6.4
RR01T12004	Projectile, 40mm, HEDP, M433	Projectile	0.2	2.4	54.1	34.4	15.7	4.5
RR01T24003	Projectile, 40mm, HE, M397	Projectile	0.3	3.6	59.9	41.2	23.5	11.9
RR01T13004	2.36 Rocket	Rocket Motor	0.4	4.8	207.7	148.1	87.0	48.4
RR01T7003	Rocket, 2.36, HEAT	Rocket Motor	0.5	6.0	223.1	156.2	91.3	49.4
RR01T3001	2.36 rocket AT, M6	2.36 rocket	0.5	6.0	400.4	284.9	177.8	95.4

From Tables 1-13 and 1-14, the following UXO/depths were used to evaluate the threshold for this AOC:

- 40 mm grenade, maximum found depth of 10 inches (from Table 1-13)
- 37 mm projectile, maximum found depth of 2 inches (from Table 1-13)
- 40 mm projectiles, maximum found depth of 6 inches (from Table 1-14).

The RR-01 area is not considered to be a target area. UXO found in this area were expected to be due to kick-outs from the adjacent open burn/open detonation area which is directly to the west or possibly mis-fires into the adjacent range area RG-01. The relative shallow depths of the UXO found in this area from the RI work support this interpretation. Thus, the threshold analysis is not bounded by the maximum detection depth (11x diameter) of the expected UXO. The ESTCP modeling software provides calculations for the 40 mm grenade and the 37 mm projectile. However, the software does not provide calculations for the 40 mm projectile; the 37 mm projectile has been used to simulate the 40 mm projectile. Table 1-14 lists these UXO types, the maximum depths found during the RI and the minimum computed response for those types and depths. Also shown on this table is the modeled minimum response for these targets at a depth 20% greater than the maximum depth found during the RI. The maximum depth plus 20% provides a margin of safety in the calculations.

Table 1-14: Computed and Measured (RI) Minimum Response for Typical UXO/Depths at AOC RR-01

UXO	Maximum Depth found during RI (inches)	Modeled Minimum EM61 MK2 response (Ch.1, mV) at Maximum found Depth	1.2 x Maximum Depth found during RI (inches)	Modeled Minimum EM61 MK2 response (Ch.1, mV) at 1.2 x Maximum Depth found during RI
40 mm Grenade	10	9.9	12	7
37 mm projectile	2	62	2.4	57.4
40 mm projectile (simulated with 37mm projectile)	6	30	7.2	24.3

This table shows that the lowest amplitude modeled for the typical UXO at the maximum found depth plus 20% is 7 mV (for the 40 mm grenade at a depth of 12 inches). The previous (2008) remedial action at the adjacent AOC (RG-01) also utilized a target selection threshold of 7 mV.

The recommended target selection threshold for AOC RR-01 is 7 mV (Channel 1, EM61 MK2) based on the computed minimum response of a 40 mm grenade at a depth of 12 inches, and the target selection threshold used in the remedial action for nearby RG-01. This target will be detected at a greater depth in any other orientation. Table 1-15 compares the physic-based computed minimum and maximum depth of detection of the typical UXO in AOC RR-01 (for which models are available) using the recommended 7 mV threshold. This table shows that the maximum depth of detection for the 40 mm grenade using a 7 mV threshold is about 19 inches. 100% data coverage (line separation of 1 meter or less) and tight measurement separation (15 cm) is critical for detection of the small (i.e., 37 mm and 40 mm) targets expected in this AOC.

Table 1-15: Computed Minimum and Maximum Depth of Detection for Typical UXO at AOC RR-01 Using Recommended Threshold (7 mV)

UXO	Minimum Computed Depth of Detection (inches)	Maximum Computed Depth of Detection (inches)
37/40 mm projectile	14.8	24
40 mm grenade	12	18.7

1.4 RECOMMENDED TARGET SELECTION THRESHOLD: RAA-03 (EASTERN AOC HG-01)

AOC HG-01 is part of RAA-03 East and is surrounded by AOC RR-01, which is also part of RAA-03 East. This AOC was almost entirely mapped during 1999 DGM surveys, and was partially re-mapped by 2008 DGM mini-grids. This AOC is very small, roughly 1.8 acres, and was segregated from the surrounding AOC as it was determined to be a hand grenade range.

Table 1-16 lists the UXO found from the 1999 DGM surveys. These UXO targets were sorted by DGM amplitude, and the lowest amplitude target was a 40 mm grenade at a depth of 5 inches with a MK1 amplitude of 6.5 mV. The table also shows the approximate calculated amplitude that would have been recorded in Channel 1 of the EM61 MK2 instrument or about 16.8 mV (Factor 2.6 times MK1).

Table 1-16: UXO Finds in AOC HG-01 from 1999 DGM Surveys

Anomaly ID	Description	Comments	Depth (inches)	Channel 1 (EM61 MK1, Measured)	Channel 1 (EM61 MK2, Calculated)
HG08017	Projectile	40 mm GRENADE M441	5.0	6.5	16.8
HG03009	Grenade	M441 40mm grenade.	0.0	7.1	18.5

Table 1-17 lists the UXO found from the 2008 DGM surveys. These surveys were conducted using the EM61 MK2 on small portions of mini-grids (100% DGM coverage). These UXO targets were sorted by DGM amplitude (Channel 1), and the lowest amplitude target was a 40 mm projectile at 6 inches depth (21.7 mV).

Table 1-17: UXO Finds in AOC HG-01 from 2008 DGM Surveys

Anomaly ID	Description	Depth (Feet)	Depth (inches)	Ch1	Ch2	Ch3	Ch4
HG01G9058	Projectile, 40mm, HE, M406	0.5	6.0	21.7	10.1	3.3	0.9
HG01G9027	Projectile, 40mm, HE, M406	0.5	6.0	53.4	37.7	22.0	12.4

Note that all of the UXO targets (1999 and 2008) were found at depths of 6 inches or less. Table 1-18 shows the computed minimum amplitude (MK2 Channel 1) for a 40 mm grenade at 6 inches, as well as 12 inches (two times the maximum found depth).

Table 1-18: Computed Minimum Response for 40 mm Grenade (AOC HG-01)

UXO	Modeled Minimum EM61 MK2 response (Ch.1, mV) at Maximum found Depth (6 inches)	Modeled Minimum EM61 MK2 response (Ch.1, mV) at 2X Maximum found Depth (12 inches)
40mm Grenade	19.5	7

The recommended target selection threshold for AOC HG-01 is 7 mV (Channel 1, EM61 MK2) based on the computed minimum response of a 40 mm grenade at a depth of 12 inches. This amplitude (computed for two times the maximum found depth) provides a large margin of safety for this AOC. Note that this recommended threshold is identical to that recommended for the surrounding AOC (RR-01) which is discussed in Section 1.3, and thus alleviates potential confusion in DGM surveying and target selection in this RAA (RAA-03 East). 100% data coverage using line separation of 1 meter or less and tight measurement separation (15 cm) is critical for detection of the small (i.e., 40 mm) targets expected in this AOC.

1.5 RECOMMENDED TARGET SELECTION THRESHOLD: RAA-04 (AOCS SA93-01, SA93-02 AND SA93-03)

A listing of MEC found from previous (1999-2008) work in this area (SA93-01) is provided in Table 1-19. This table was extracted from the Draft OU B-2 FS (USAE, 2011).

Table 1-19 shows that 47 UXO were found in this AOC during RI work, ranging in size from a 37 mm projectile to a 75 mm projectile. These UXO finds were based on 1999 and 2008 DGM surveys. Most (44 of the 47) of the UXO found in previous work were at depths of 2 ft or less. However, three of the UXO were found at depths between 2 and 4 ft. The primary objectives in this RAA (Table 1-1) are DGM surveys and removal of targets to a depth of 4 ft below mineral surface.

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Table 1-19: Summary of MEC Investigation Results for RAA-04 (AOC SA93-01)

SA93-01	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Mortar	2	1	2	1	6
UXO, Projectile	6	17	13	2	38
UXO, Rocket	-	3	1	-	4
DMM					
DMM, Fuze	-	1	-	-	1
DMM, Misc. Explosive Devices	-	2	-	-	2
MPPEH					
MPPEH, Misc. Explosive Devices	2	5	-	-	7
MPPEH, Projectile	1	2	-	-	3
MPPEH, Pyrotechnic	-	1	-	-	1
MPPEH, Rocket	-	2	-	-	2
MD	44	293	125	-	462
Items Found:*					
DMM	Fuze, PD, M48 series PD57 fuze (2)				
UXO	2.36-in rocket, HEAT, M6 (3) 2.36-in rocket (armed) 37-mm projectile, HE 37-mm projectile, HE w/ M58 BD fuze, armed 37-mm projectile, fired, fuzed, armed 37-mm projectile, HE, fired, w/ base fuze 37-mm projectile, HE, M63 37-mm projectile, HE, MK II 57-mm projectile, HEAT 57-mm projectile, HEAT cartridge without fuze 57-mm HEAT warhead and small pieces of frag 57-mm projectile, HE 57-mm projectile, HEAT, M307 (12) 60-mm illumination round(2) 60-mm mortar, illum, M83 75-mm projectile, HEAT (2) 75-mm projectile, HEAT, full up w/ fuze	75-mm projectile, HE fuzed and armed M564 MTSQ 75-mm projectile, APT 75-mm projectile, HE, armed, fired 81-mm mortar, possible WP, small pieces of fuze 60-mm mortar, illum., M83 81-mm mortar, WP 81-mm mortar, WP, M370 75-mm projectile, HEAT, T39 (4) 76-mm projectile, APHE, M62 37-mm projectile, APHE, M62 37-mm projectile, HE, M63 37-mm projectile, HE, MK II 57-mm projectile, HEAT, M307 (11) 75-mm projectile, APHE, M61 75-mm projectile, HE, M48 (2) 75-mm projectile, HEAT, T39 (2) 75-mm projectile, WP, M311			
MPPEH	2.36-in rocket motor (2) Signal, illumination, ground M19A PD 57 fuze remnants (3) 37-mm projectile Fuze – M557 (2) PD 57 fuze remains PD M57 fuze (incomplete) Remains of fuze Tail fuze				

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

Data Source: (USA, 2012b

Table 1-20 lists the UXO found from the 1999 DGM surveys. These surveys were conducted using the EM61 MK1 on relatively widely spaced transects (~60 m or greater).

Table 1-20: Summary of MEC found in RAA-04 (in AOC SA93-01 from 1999 DGM Surveys)

Anomaly ID	Description	Comments	Depth (inches)	Channel 1 (EM61 MK1, Measured)	Channel 1 (EM61 MK2, Calculated)
9324010	Projectile	75 mm HEAT projectile	9	2.7	7.0
9314002	Projectile	37 mm HE	8	2.8	7.2
9321011	Projectile	37mm projectile, HE, fired, w/base fuze	6	3.3	8.6
9317002	Mortar	81mm mortar, possible WP; 81mm mortar frag, small pieces of fuze residue scrap	36	7.5	19.5
9321010	Projectile	57mm HEAT warhead and small pieces of frag. Left item in place.	24	8.2	21.2
9324014	Mortar	60 mm Illumination round	4	8.2	21.3
9329013	Projectile	57mm cartridge, HEAT, with fuze, armed	6	10.2	26.5
9313003	Projectile	37mm projectile, fired, fuzed, armed	0	10.3	26.7
9329015	Projectile	75mm projectile, HE, armed, fired	30	10.7	27.8
9319005	Projectile	37mm HE with an M58 BD Fuze - armed Flagged for EOD personnel	2	10.8	28.0
9328014	Projectile	75 mm HEAT	0	14.1	36.7
9324008	Projectile	57 mm HEAT	0	14.1	36.7
9321008	Projectile	57mm HEAT cartridge without fuze	0	21.4	55.5
9316008	Projectile	57 mm HE projectile	3	24.0	62.4
9309002	Rocket	2.36 rocket motor section	2	27.5	71.4
9328005	Projectile	37 mm projo	4	28.9	75.2
9324011	Mortar	60 mm Illumination round	0	52.9	137.6
9309003	Rocket	2.36 rocket - armed. Flagged for EOD.	2	62.1	161.5
9319004	Projectile	75mm HE / Fuzed and armed M564 MTSQ (Note 2 Spanner holes on base of round) Flagged for EOD personnel	3	117.1	304.4
9325008	Projectile	75 mm HEAT full up with fuze	10	187.4	487.2

These UXO targets were sorted by DGM amplitude, and the lowest amplitude targets were a 75 mm (9 inches depth at 2.7 mV), a 37 mm (8 inches depth at 2.8 mV), and a 37 mm (6 inches depth at 3.3 mV). The table also shows the approximate (calculated) amplitude that would have been recorded in Channel 1 of the EM61 MK2 instrument (factor 2.6 times MK1).

Table 1-21 lists the UXO found from the 2008 DGM surveys. These surveys were conducted using the EM61 MK2 on fairly regular, parallel transects (~20 m separation).

These UXO targets were sorted by DGM amplitude (Channel 1), and the lowest amplitude targets were a fuze (4 inches depth at 3.4 mV), and two 75 mm projectiles (12 inches and 30 inches depth at 5 and 5.1 mV). Note that a 57 mm heat projectile was reported at a depth of 3 ft (36 inches) with a DGM amplitude of 7.8 mV. This reported depth is not reasonable for this UXO or DGM amplitude, and thus this UXO/depth pair was not used in the threshold analysis.

The ESTCP modeling software provides calculations of primary UXO types of interest (37 mm projectiles, 75 mm projectiles, 81 mm mortars) in this AOC. Table 1-22 lists these UXO types, the maximum depths found during the RI, the 11x diameter depth, and the minimum computed response for those types and depths.

Table 1-21: Summary of MEC found in RAA-04 (in AOC SA93-01 from 2008 DGM Surveys)

Anomaly ID	Description	Comments	Depth (Feet)	Depth (inches)	Ch1	Ch2	Ch3	Ch4
SA9301T11029	Fuze, PD, M48		0.3	4	3.4	1.9	1.1	0.4
SA9301T31024	Projectile, 75mm, HE, T-39	Projectile	1	12	5.0	3.4	2.0	1.0
SA9301T10016	75mm wp m311	Projectile	2.5	30	5.1	2.7	1.3	0.6
SA9301T20019	Projectile, 57mm, Heat	Projectile	3	36	7.8	5.3	3.0	1.5
SA9301T17017	Projectile, 81mm, WP	Pyrotechnic	0	0	8.9	5.7	2.8	0.9
SA9301T17013	Projectile, 37mm, HE	Projectile	1	12	13.4	9.4	5.8	3.5
SA9301T10007	57 mm recoilles	Projectile	0.5	6	14.7	10.1	5.9	2.9
SA9301T31012	Rocket, 2.36, Mortor	Rocket Motor	0.3	4	21.0	14.7	7.5	3.0
SA9301T17010	Projectile, 37mm, HE	Projectile	1	12	32.3	21.9	12.6	7.1
SA9301T21004	Projectile, 57mm, Heat, M307A1	Projectile	0.1	1	38.8	25.5	13.2	5.7
SA9301T15007	projectile heat 57mm m307	Projectile	0.5	6	78.2	53.6	27.7	13.1
SA9301G13004	2.36 rocket	Rocket Motor	1.5	18	90.5	62.3	37.5	19.2
SA9301T17004	Projectile, 57mm, HEAT, M307	Projectile	0.5	6	91.6	61.1	33.1	14.8
SA9301T13002	Projectile, 57mm, HEAT	Projectile	0.4	5	94.9	67.9	38.4	20.0
SA9301T14003	Projectile, 57mm, HEAT, M307	Projectile	1	12	106.1	72.0	38.3	18.2
SA9301G13002	2.36 rocket	Rocket Motor	0.25	3	111.0	71.0	36.4	15.2
SA9301T17003	Projectile, 75mm, HE	Projectile	1	12	113.9	75.5	42.4	20.7
SA9301T16004	projectile heat m307	Projectile	0.5	6	136.2	88.5	46.0	20.8
SA9301T8001	57 mm heat	Projectile	0.1	1	145.8	96.2	50.0	23.8
SA9301T7001	Projectile, 75mm, HE	Projectile	0.75	9	150.0	104.2	61.0	33.3
SA9301T12005	Projectile, 60mm, Illum	Pyrotechnic	1	12	183.4	124.3	61.5	25.0
SA9301T12004	Projectile, 57mm, HEAT	Misc Explosive Device	0	0	188.4	129.1	69.9	34.0
SA9301T17002	Projectile, 75mm, HEAT	Projectile	1	12	203.9	140.3	82.6	44.2
SA9301T23001	Projectile, 76mm aphe m62	Projectile	0.4	5	208.3	142.7	79.9	41.2
SA9301G13001	2.36 rocket	Rocket Motor	0.3	4	228.4	150.4	83.2	38.8
SA9301T9002	Projectile, 57mm, Heat, M307	Projectile	0	0	302.7	196.0	102.4	46.4
SA9301T12002	Projectile, 75mm, HEAT	Misc Explosive Device	0.5	6	420.9	278.9	150.0	71.7
SA9301T4001	Projectile, 75mm, HE	Projectile	0.2	2	1005.4	666.8	362.0	182.0

Table 1-22: Computed EM61 MK2 (Channel 1) Minimum Response for Typical UXO/Depths at AOCs SA93-01, SA93-02 and SA93-03

UXO	Maximum Depth Found During RI (inches)	Computed Minimum MK2 Response (Channel 1, mV) at Maximum RI Depth	11x Diameter Depth (inches)	Computed Minimum MK2 Response (Channel 1, mV) at 11x Depth
37 mm projectile	12	10.4	16	5.7
75 mm projectile	30	12.2	32.5	8.9
81 mm mortar	36	3.1	35	3.4

This table shows that the 81 mm mortar at a reported (RI) depth of 36 inches will have the lowest EM61 MK2 response (3.1 mV). Note that this measured (RI) depth is greater than the typical 11x depth (35 inches). The actual (RI) EM61 MK1 (Channel 1) response over this UXO was 7.5 mV (Table 1-22), corresponding to approximately 19.5 mV for the MK2. This difference between the computed and measured (RI) amplitudes may be partly due to target orientation, but is more likely caused by an error in measuring the depth of the UXO during the RI. Given this apparent discrepancy, the modeling results for this UXO at the RI reported depth (36 inches) are not utilized for the threshold selection.

The recommended target selection threshold for RAA-04 (AOCs SA93-01, SA93-02 and SA93-03) is 3.4 mV (Channel 1, EM61 MK2) based on the minimum response of an 81 mm mortar target at 11x diameter depth. This threshold will also detect 37 mm and 75 mm projectiles buried at the 11x diameter depths.

These targets will be detected at greater depths in any other orientation. Table 1-23 compares the physics-based computed minimum and maximum depth of detection of the typical UXO in RAA-04 (for which models are available) using the recommended 3.4 mV threshold. This table shows that the maximum depth of detection for the 81 mm mortar using a 3.4 mV threshold is about 60 inches. The maximum depth of detection for the 37 mm projectiles using a 3.4 mV threshold is about 30 inches. 100% data coverage (line separation of 1 m or less) and tight measurement separation (15 cm) is critical for detection of the small (i.e., 37 mm) targets.

Table 1-23: Computed Minimum and Maximum Depth of Detection for Typical UXO at RAA-04 using Recommended Threshold (3.4 mV)

UXO	Minimum Computed Depth of Detection (inches)	Maximum Computed Depth of Detection (inches)
37 mm projectile	19.9	30
75mm projectile	42	48
81mm mortar	35	60

Table 1-24 and Figure 1-4 tally and plot the fit to model for the 81 mm mortars installed in the OU B-2 GPO grid. This figure shows that all of the 81mm mortars in the GPO fall within the computed minimum-maximum envelope. This fact supports the use of the modeling. Also shown on this figure is the recommended threshold (3.4 mV). All of the 81 mm mortars installed in the GPO grid have amplitudes much higher than the recommended threshold.

Table 1-24: Tally of 81 mm Mortars Installed in OU B-2 GPO Grid

Target ID	GPO Target Type	Target Depth (inches)	Target Orientation (Dip)	Target Azimuth	Amplitude (Ch 1)
59	81mm Mortar	35	0	40	8
54	81mm Mortar	32	0	230	9.9
53	81mm Mortar	32	90	N/A	10.9
60	81mm Mortar	35	90	N/A	11
56	81mm Mortar	24	0	320	20.6
61	81mm Mortar	24	0	35	24.4
55	81mm Mortar	24	90	N/A	47.2
62	81mm Mortar	24	90	N/A	72.2
64	81mm Mortar	12	90	N/A	197.1
63	81mm Mortar	12	0	20	321.2
57	81mm Mortar	12	90	N/A	369

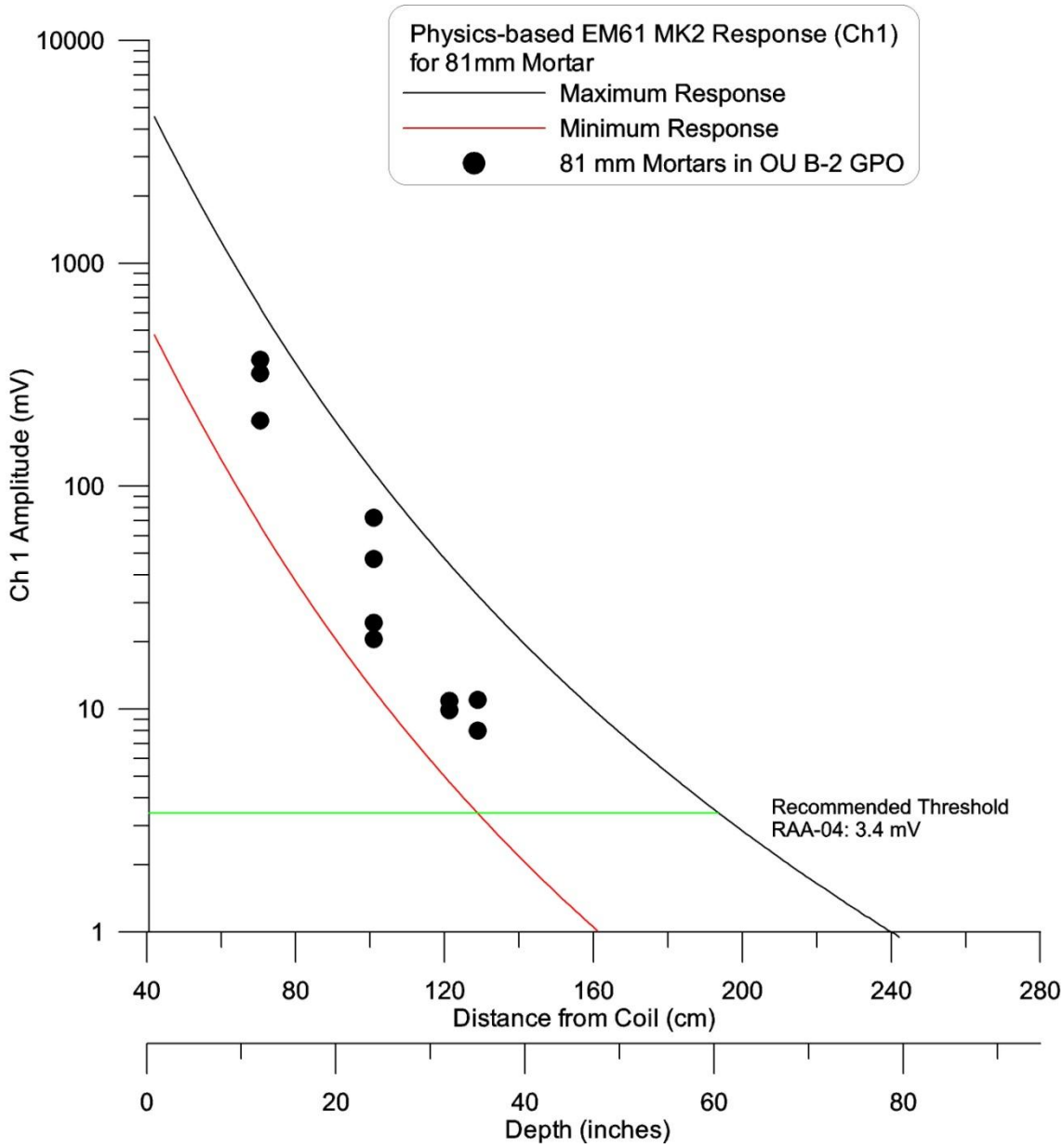

Figure 1-4: OU B-2 GPO 81 mm Mortar Responses with Physics-Based Modeling Minimum-Maximum Response for 81mm Mortar

2.0 SUMMARY OF RECOMMENDED TARGET SELECTION THRESHOLDS FOR NTCRA IN OU B-2

Table 2-1 provides a summary of the recommended target selection thresholds for proposed DGM surveys for the NTCRA in OU B-2. These thresholds are based on the use of the EM61 MK2, Channel 1.

Table 2-1: Proposed NTCRA Activities and Recommended Target Selection Thresholds in OU B-2

RAA Name	Former AOC Name	Proposed Activity	Acres (approx.)	Proposed DGM Threshold (Ch1, mV)
RAA-01	OB/OD-01	Instrument assisted surface clearance (down to 6-in bgs), vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to the depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	19.3	7
RAA-02	C1-01	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	73.9	3
RAA-03	MI-01, MI-02 and MI-03	Surface clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 2-ft, with the option to further investigate deeper targets if required by the Navy.	67.9	4.8
	RR-01		74.4	7
	HG-01		1.8	7
RAA-04	SA93-01, SA93-02 and SA93-03	Surface Clearance, vegetation removal, DGM, target selection, target reacquisition, and intrusive investigation of targets to a minimum depth of 4-ft, with the option to further investigate deeper targets if required by the Navy.	104	3.4
RAA-05	ALDA-01	Surface Clearance, vegetation removal, mechanically assisted intrusive investigation of targets to a minimum depth of 2-ft (0.6-m), with the option to further investigate deeper targets if required by the Navy.	4.7	n/a

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3.0 REFERENCES

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Attachment 1.

Derivation of Approximate Relationship between Geonics EM61 MKI and EM61 MK2 Time Gates

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Previous DGM data were acquired in the OU B-2 RAA areas during the 1999, 2000, and 2008 field seasons. All of the DGM data collected in 1999 and 2000 were acquired with the Geonics EM61 MKI. DGM data collected in 2008 were acquired with the Geonics EM61 MK2. The MKI system records two channels; however, only the first channel (lower coil) is used for target detection. Target selection thresholds during 1999 and 2002 were variable, but generally used a minimum of about 2 mV. The MK2 is typically configured to record four time gates (all lower coil) for target detection. During the 2008 field season, targets were generally picked at a MK2 Channel 1 threshold of 3 mV. Measurements from these two channels of sensors are not equivalent. DGM data taken from the OU B-1 GPO can be used to derive an approximate relationship between these two versions of DGM sensors. Table A-1 and Figure A-1 show data and a plot of the MK2 channel amplitudes over seed items in the GPO in OU B-1.

Table A-1 provides MK2 amplitudes over a variety of seed targets in the GPO and illustrates the relationship between the MKI Channel 1 and MK2 channels (i.e., MKI Channel 1 = MK2 Channel 3). This table shows that, on average, the amplitude of MK2 Channel 1 is about 2.6 times greater than MK2 Channel 3/MK 1 Channel 1. This relationship can be used to help compare targets detected from these two instruments. Figure A-1 illustrates MK2 amplitudes (four time channels) for Target 8, and the equivalent MKI (Channel 1) for this target.

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Table A-1. MKII DGM Data from Geophysical Prove Out Targets

MK I Channel (1999, 2000)	MKII Channel (2008)	Time	Target 1 Amplitude	Target 2 Amplitude	Target 3 Amplitude	Target 4 Amplitude	Target 5 Amplitude	Target 6 Amplitude	Target 7 Amplitude	Target 8 Amplitude
	1	216	7.9	91.5	23.4	3.7	21.3	10.3	14.8	28.4
	2	366	5.23	60.38	15.23	2.47	13.75	8.14	11.37	20.68
1	3	660	3.06	30.64	8.22	1.5	7.32	4.63	6.97	12.6
	4	1266	1.34	14	3.74	0.45	3.06	2.47	3.89	6.25
	Ratio MKII ch1/ch3		2.58	2.99	2.85	2.47	2.91	2.22	2.12	2.25

Average Ratio MKII ch1/ch3= 2.55

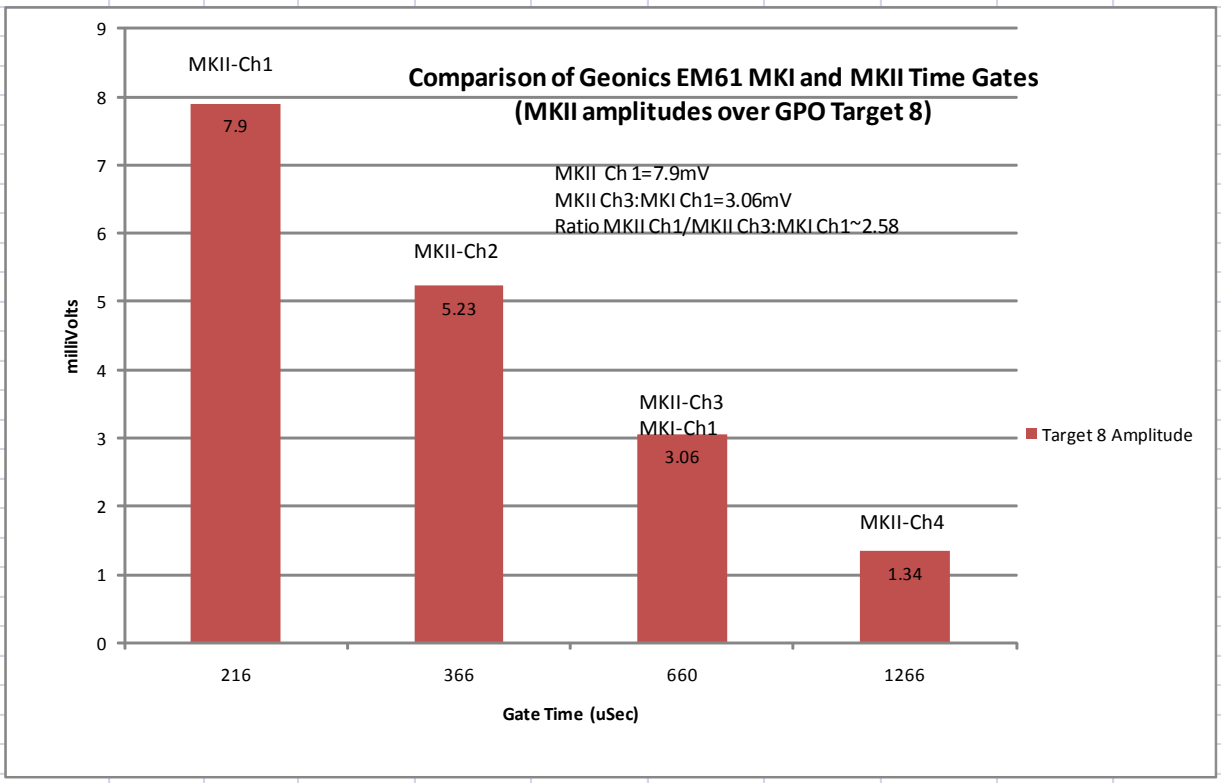

Figure A-1. Plot of MK2 Channel Amplitudes over Target 8 in the Geophysical Prove Out in OU B-1 (Note: gate time is not to scale)

FINAL

APPENDIX G. GEOPHYSICAL SYSTEMS VERIFICATION PLAN

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

September 2012

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Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
DGM	Digital Geophysical mapping
DGPS	Differential Global Positioning System
DQO	Data Quality Objective
ESTCP	Environmental Security Technology Certification Program
FS	Feasibility Study
GPO	Geophysical Prove Out
GPS	Global Positioning System
GSV	Geophysical System Verification
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
NAF	Naval Air Facility
NAVFAC	Naval Facilities Engineering Command
NRL	Naval Research Laboratory
NTCRA	Non-time Critical Removal Action
OU	Operable Unit
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QASP	Quality Assurance Surveillance Plan
QC	Quality Control
RAA	Remedial Action Area
RI	Remedial Investigation
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
USA	USA Environmental

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1.0 INTRODUCTION

The Naval Facilities Engineering Command (NAVFAC) Northwest is conducting a non-time critical removal action (NTCRA) for munitions and explosives of concern (MEC) in certain Remedial Action Areas (RAAs) within Operable Unit (OU) B-2 at the former Naval Air Facility (NAF), Adak, Alaska. This Geophysical System Verification (GSV) Installation and Operations Plan is a component of the NTCRA work plans and documents the steps necessary to construct and operate the project-specific GSV for the planned work.

All of the RAAs and GSV test components are located within the boundary of the current military reservation known as Land Transfer Parcel 4 (Parcel 4), which is shown on Figure 1-1.

Specific proposed activities in the RAAs are listed in Table 1-1. Three RAAs (RAA-02, RAA-03 and RAA-04) will be the subject of the NTCRA, and all of these areas will require digital geophysical mapping (DGM). Temporary roads will not be constructed to access the RAAs during the blind seed placement. Access for the GSV plan purposes will be minimal and will utilize existing access routes that have had lighter use with minimal over-land travel planned. The RAAs often comprise several defined areas based on the RI/FS results. The RAAs can encompass multiple former named areas of concern (AOCs). Figure 1-1 shows the outlines of the RAAs and relationship to the former AOCs.

The GSV process will be used by contractors performing the fieldwork to demonstrate that the DGM instrumentation (sensors and positioning), instrument operators, data acquisition methodologies, and data processing and analysis procedures meet the specific data quality objectives (DQOs) established for the project. The results of the GSV testing will demonstrate that the appropriate equipment is being used, and that technically sound processes have been applied to the investigation process. The procedures and processes described in this plan closely follow (and often quote, in part or whole) those proposed by the Environmental Security Technology Certification Program (ESTCP, 2009).

This plan contains procedures and metrics for both the installation and operation of the GSV components for application at the RAAs listed in Table 1-1. This plan is organized as follows:

- Section 2 of this plan describes the overall GSV approach.
- Section 3 describes the instrument verification strip (IVS) installations for this project.
- Section 4 outlines the IVS operations procedures.
- Section 5 describes the blind seed installation.
- Section 6 outlines the blind seed approval metrics.
- Section 7 provides references cited in the document.

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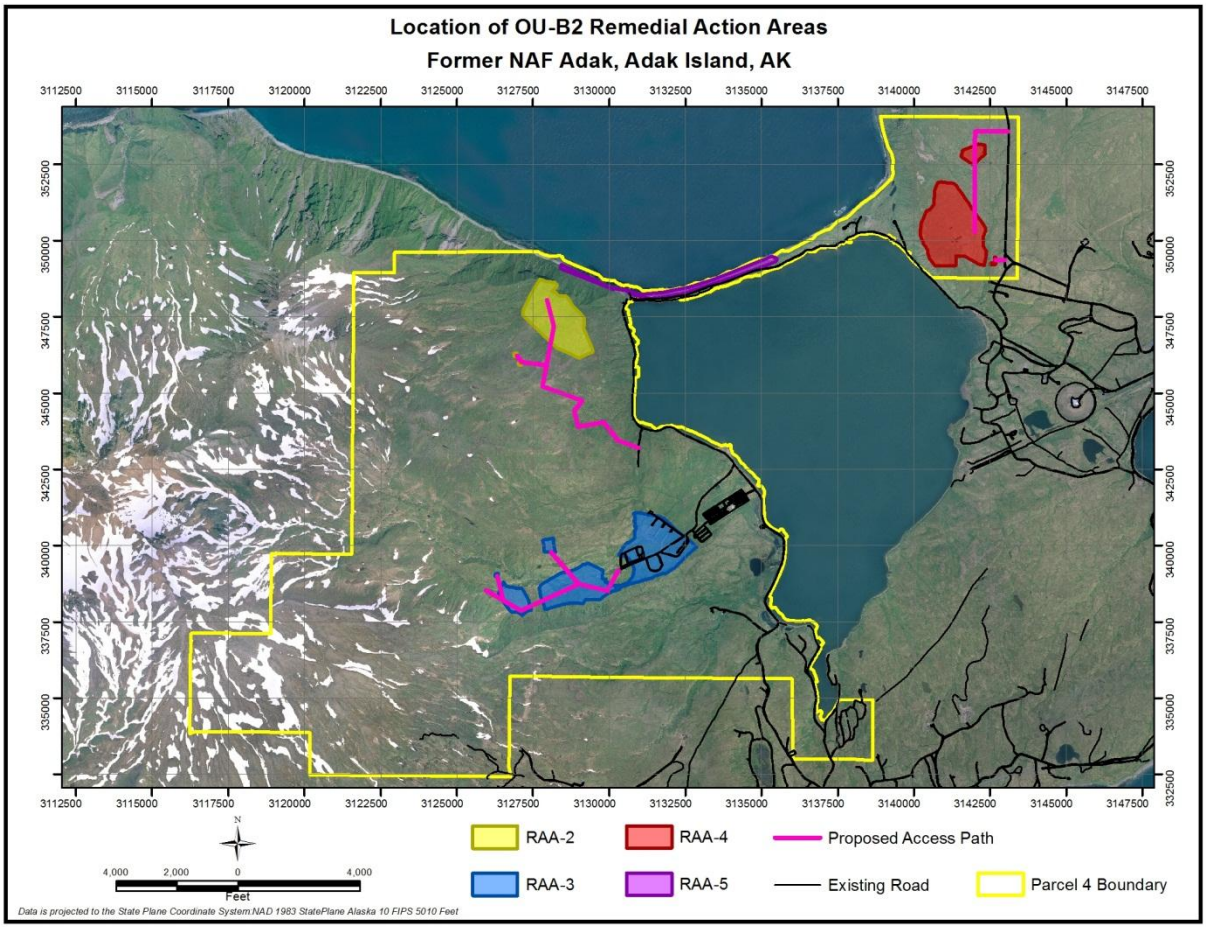

Figure 1-1: Location of OU B-2 RAAs and AOCs, Adak Island, AK

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Table 1-1: Proposed NTCRA Activities in OU B-2

RAA Name	Former AOC Names	Proposed Activity	Acres (approx.)
RAA-02	C1-01	Surface sweep/removal, DGM survey, selection of targets, removal of targets to depth of 2 feet.	73.70
RAA-03	Western AOCs: MI-01, MI-02, MI-03 Eastern AOCs: RR-01, HG-1	Surface sweep/removal, DGM survey, selection of targets, removal of targets to depth of 2 feet.	146.85
RAA-04	SA93-01 and SA93-03	Surface sweep/removal, DGM survey, selection of targets, removal of targets to depth of 4 feet.	104

2.0 GEOPHYSICAL SYSTEM VERIFICATION DESCRIPTION

The GSV process is comprised of two main components:

- An IVS, which is comprised of a line of a few (typically five or six) objects buried in a representative, open area convenient to the location where the geophysical survey equipment is set up or operated. The objective of the IVS is to verify that the geophysical detection system is operating properly at the onset of the project. It is also used as an ongoing check during the project (at the beginning and end of each data collection day). The objects should be observed in the data with signals that are consistent with both historical measurements and physics-based model predictions. The IVS also serves to verify that the geo-location system provides accurate sensor location data. The IVS typically contains a nearby noise strip that does not contain buried targets. The noise strip is used to characterize and check the noise level of the geophysical instrument and site background noise.
- Blind seeds are targets buried in the production site at surveyed locations that are blind to the data collection and processing teams. Seeds provide ongoing monitoring of the quality of the geophysical data collection, target selection, and anomaly resolution process as it is performed in the production survey areas.

The GSV process is intended to be used in lieu of a Geophysical Prove-Out (GPO) for this project. An extensive GPO site was installed in OU B-2 during the 2008 field season, and utilized for geophysical and reacquire teams performing the remedial investigations (RIs) during 2008. This GPO will be available for use or testing of geophysical equipment and procedures for contractor teams, but is not anticipated to be a required component of the project unless new, uncharacterized geophysical systems are utilized. Historically, GPOs have been used to document the performance of geophysical systems and to help determine target selection criteria (i.e., millivolt thresholds). Typically, the GPO is run at the beginning of the project (and subsequently whenever significant repairs or modifications are made to the equipment or crew members are changed). The present GPO grid in OU B-2 is a relatively large area (about 0.6 acres) with more than 70 buried targets. Thus, it is not trivial to obtain geophysical data over the GPO area, and it is not practical to utilize as a daily instrument check. With the advent and validation of physics-based modeling of the typical geophysical sensors (i.e., Geonics EM61 MK2), it is now feasible to install only a few targets (or Industry Standard Objects [ISOs]) in an IVS to confirm the proper performance of the geophysical systems.

Some of the advantages of using an IVS instead of a GPO are:

- Only a few targets need to be installed. These targets may be inert ordnance items, or more often are ISOs (standard lengths/diameters of steel pipe). Depending upon site size and access, multiple IVSs can be utilized to optimize logistics.

- Since the IVSs contain relatively few targets, geophysical data acquisition is relatively trivial. Thus, they can also be used on a daily basis (morning and evening) to verify proper geophysical equipment operation on an ongoing basis.

The IVS ensures that the geophysical equipment is operating properly and that dynamic noise conditions are documented. The IVS may be used to determine target selection criteria in the production data by establishing an acceptable signal to noise ratio. However, the target selection criteria (millivolt threshold) can often be determined from previous production work (i.e., RIs) or physics-based modeling, or a combination thereof. Determinations of the target selection threshold for AOCs that require DGM are discussed in the MEC Quality Assurance Project Plan (QAPP).

This plan is based on the assumption that DGM crews will utilize the Geonics EM61 MK2 geophysical detector in two-man litter mode. USA Environmental, Inc. (USA) has determined that this data acquisition platform is capable of meeting project data quality objectives. However, alternate EM61 MK2 based data collection methods, such as two-man tethered carry, towed array, sled, etc. may be utilized if conditions warrant. In all cases, the data collection method will be verified as providing acceptable performance before being placed into production use.

The GSV relies on physics-based modeling and historical measurements of the response of this instrument. The EM61 MK2 system response has been modeled and proven to compare very well to measured data. Also, this detector has been proven through prior fieldwork experience on Adak. While this plan is specific to the use of the EM61 MK2, it does not preclude the use of a different geophysical sensor. If a towed array of EM61 MK2s or a different sensor or sensor technology (e.g., Advanced Sensor and MEC Classification software) is proposed and/or used, a physics-based model will need to be developed and validated for the sensor, and the performance must be proven to meet or exceed that of the EM61 MK2. If a towed array of EM61-MK2 sensors or other sensor configuration is proposed, modifications to one or more IVS may be necessary to validate each sensor in the array, or other sensor configuration, is performing as designed.

2.1 IVS TECHNICAL DISCUSSION

The intent of the GSV concept is to introduce a more rigorous, transparent, timely and cost-effective process while ensuring that no critical historical GPO functions are lost. The primary information required to confirm geophysical system performance and ensure that the DQOs can be met are:

- Verify that the geophysical system is performing correctly by measuring the sensor responses of a small number of well-characterized items and confirming that the responses lie within expected parameters, and that the measured locations of the detected items are within requirements (i.e., IVS).
- Measure the site noise and determine whether targets of interest can be detected reliably to their depth of interest under the site conditions present (i.e., noise strip).

Both of these requirements can be met with a relatively small test strip of known, well-characterized objects, with an accompanying noise strip. The essential elements required for the necessary quantitative measurements include:

- Well-characterized sensor. Knowledge of sensor specifications, such as transmitter moment, coil geometry and measurement gates, allows physics-based modeling. Experience with the EM61 MK2 confirms that physic-based modeling closely matches observed data.
- Well-characterized test objects. Test objects may include munitions of interest, but that is not essential for confirming that the instrument is operating properly. Use of ISOs, such as sections of steel pipe, is more common. ESTCP has conducted measurements using three ISOs (1 inch, 2 inch and 4 inch schedule 40 pipe nipples), and confirmed that these items produce consistent results regardless of where they are obtained. These three ISOs can also be used to roughly simulate many of the small to medium munitions that might be expected at a site. An additional advantage of ISOs is, because they are easy to obtain and are well-characterized, they make ideal blind seeds, and are benign if left unrecovered.

- Digital data collection. The physics-based approach relies on the ability to demonstrate that a measured signal for a known object is consistent with the physical model predictions, and that the signal is above measured site noise. This requires digital geophysical data with geo-located positioning.

The Naval Research Laboratory (NRL, 2008; NRL, 2009) has measured the EM61 MK2 response over standard munitions items and ISOs and compared these to physics-based models with excellent results. Thus, the EM61 MK2 is well-characterized over typical munitions and ISOs. In addition, ESTCP provides access to the physics-based modeling software (EM61-MK2 Response) on its Web site (http://www.serdp-estcp.org/Tools-and-Training/Munitions-Response/Geophysical-System-Verification) so that sensor response curves can be computed for IVS applications on actual projects.

The EM61-MK2 Response software can be used in two modes:

- Computing the physics-based (model) response of standard munitions or ISOs at various offsets from the EM61 MK2 coils. This computation is done for the worst (lowest amplitude) target orientation (typically perpendicular or cross-track), and thus is the expected minimum signal expected for that target at that depth.
- Computing the minimum response curve for any actual munition or ISO, based on a few measurements of the EM61 MK2 over the target in the worst target orientation.

In this project, the IVSs will utilize ISOs and thus the first mode of the software will be utilized. Figure 2-1 shows the minimum response curve computed by the EM61-MK2 Response software for the small ISO (1 inch pipe nipple, 4 inches long) for Channel 1 (Gate 1) of the EM61 MK2.

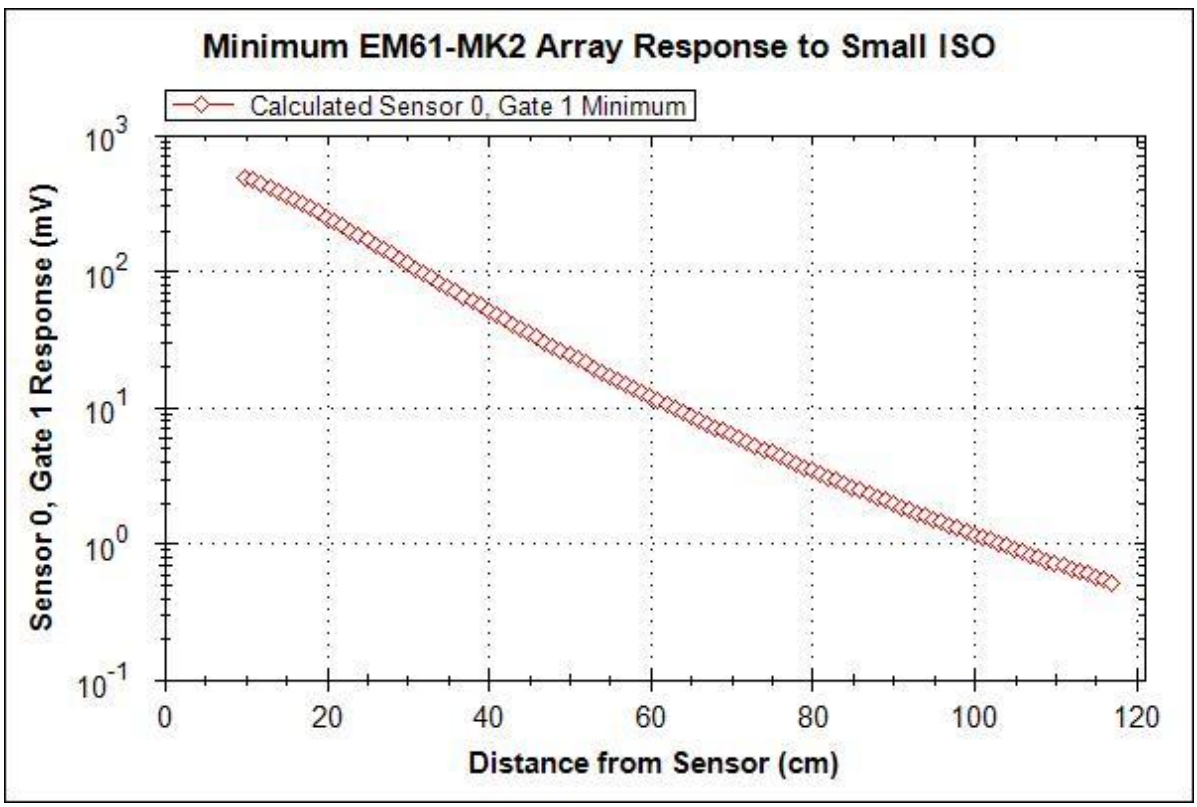

Figure 2-1: Computed Minimum Amplitude/Response for EM61 MK2, Channel 1, Small ISO

This figure shows the minimum response computed for the small ISO, and thus field measurements with the EM61 MK2 over this ISO should plot on or above this line. Although this figure shows Channel 1, the computations are made for all four channels of the EM61 MK2, and thus the threshold can be evaluated for any combination of channels. The plot shows response versus distance from the EM61 MK2 sensor (coil). The normal operating height of the EM61 MK2 is 40 cm, and this distance on the plot corresponds to a target on the surface.

As shown on Figure 2-1, small variations in distance (depth) from the sensor will result in relatively large changes in amplitude. These variations or errors (if unknown) can be partially accounted for by placing approximate error bars on the measured values. Figure 2-2 shows an example of field ISO measurements, showing error bars (in distance) that accommodate the typical survey errors (+/- 2.5 cm) measured with Real Time Kinematic Differential Global Positioning Systems (RTK DGPS) commonly used in MEC surveys.

The variation in target amplitude with lateral distance is much less, and can be characterized by measurements made on parallel transects, and repeat measurements along transects in the IVS. These measurements are described in Section 4 of this report.

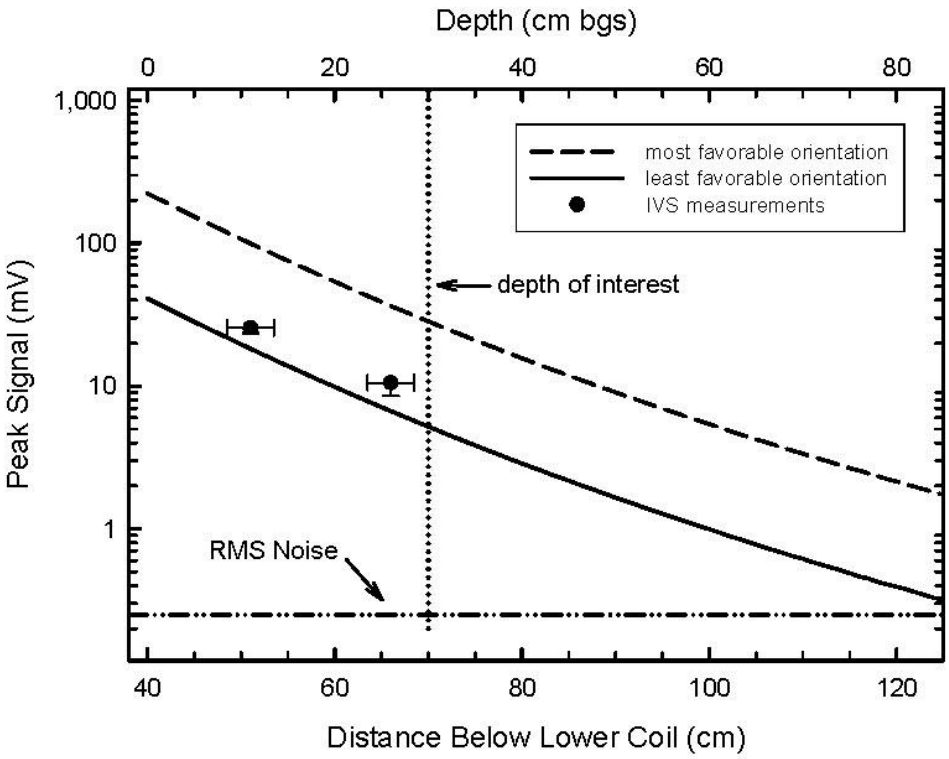

Figure 2-2: Calculated Minimum Response in Channel 2 of an EM61 MK2 for a 37 mm Projectile (solid line), Showing IVS Measurements and Expected Error Bars (ESTCP, 2009)

To reliably detect a target in the IVS (and production surveys), the signal from the target needs to be above the typical noise encountered in the survey area. In this setting, noise is defined as instrument measurement variations unrelated to a target response. These variations can be due to sensor electronics, sensor motion, geologic structure, noise in the atmosphere (natural and man-made), and interference from small metallic debris near the surface and/or metal carried by the operator (or on the operating system). To characterize this noise, typically system measurements are made in a dynamic mode over a transect parallel to the IVS (noise strip). This noise strip is “cleared” or selected such that there are no buried or surface metallic objects in the strip which would affect the noise measurements.

Figure 2-3 shows a schematic typical IVS setup.

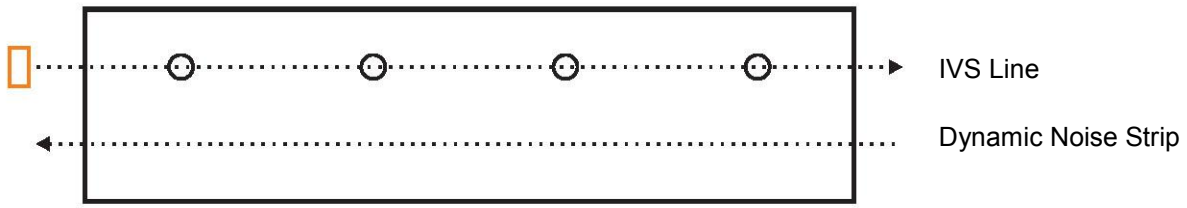

Figure 2-3: Schematic IVS Setup (ESTCP, 2009)

On this schematic, four buried targets (i.e., ISOs) are shown as circles. The minimum data collection would involve a measurement transect directly over the top of the targets to capture target amplitudes (IVS), and a measurement transect parallel (but offset from the targets) to capture noise (noise strip). Additional transects between the IVS and noise strip can be used to help determine/confirm proper line spacing in the production work.

3.0 IVS INSTALLATION

Recent (2008) investigations at the former NAF Adak used the following geophysical and positional instruments, equipment, platforms, personnel, and data processing techniques:

- EM61 MK2 geophysical sensors
- High-resolution DGPS rigidly mounted on the EM61 MK2
- Two-person litter carry (refer to Figure 3-1)
- Unexploded ordnance (UXO) technicians, craft labor, and geosciences field operators
- Digital data processing with automatic and manual anomaly selections.

The reacquire system has included the following:

- Handheld Vallon (VMX2 family), handheld White's and EM61 MK2 sensors
- High-resolution DGPS
- UXO technicians, geosciences field operators.

Figure 3-1: Two-Man "Litter Mode" Configuration

This GSV plan is based on the application of the geophysical system components listed above. The system will be used in the two-man litter mode, with the lower coil approximately 15 inches (±1 inch) above the walking surface. This distance will be measured and verified by field personnel prior to each data acquisition session. If terrain or vegetation characteristics prevent the lower coil from being used at the intended height, the actual coil height used will be documented by the field crew. Personnel qualifications of DGM and reacquire teams will be outlined in the contractor work plans and Standard Operating Procedures (SOPs).

Alternate geophysical system configurations may be implemented if site conditions dictate that use of an alternate EM 61 MK2 data acquisition platform may be more effective. Any change from the planned two-man litter mode will be fully vetted and approved before being placed in production.

This plan does not cover testing or certification of the reacquire systems as these are covered in the contractor SOPs. Note that if EM61 MK2 sensors are utilized in the reacquire system, they will be subject to IVS testing as described in this document.

3.1 IVS LOCATIONS

DGM surveys are planned in three geographically separate areas as shown on Figure 1-1. These areas surround Andrew Lake and can be divided as follows:

- Southwest Andrew Lake: RAA-03 East (AOCs RR-01 and HG-01) and RAA-03 West (AOCs MI-01, MI-02 and MI-03).
- Northwest Andrew Lake: RAA-02 (AOC: C1-01).
- Northeast Andrew Lake: RAA-04 (AOCs: SA93-01 and SA93-03).

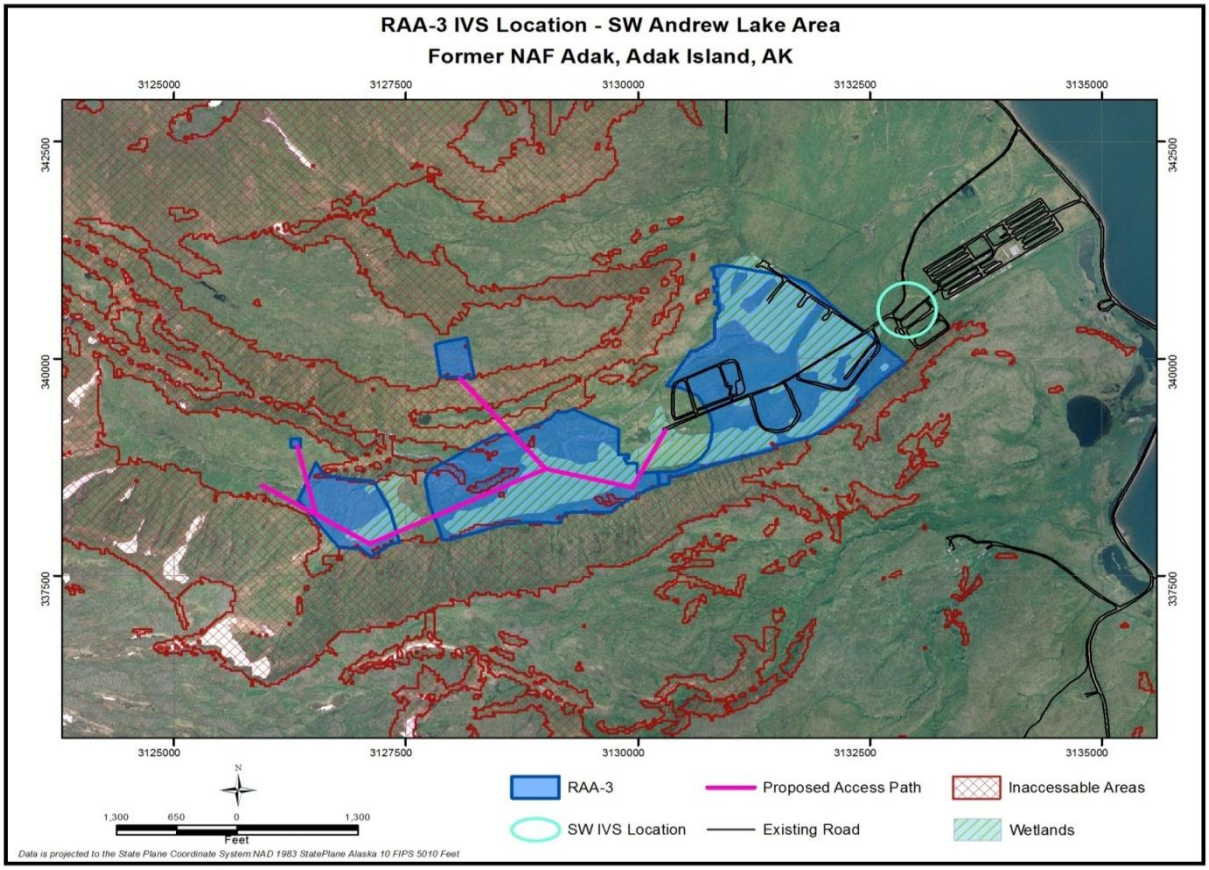

Figure 3-2: IVS Location at RAA-03

The IVS will be used for initial DGM testing and verification as well as daily DGM verification. Installation of the IVS is relatively simple, and thus three separate IVS test areas (one for each geographic area) will be established to improve logistics. The production contractor is responsible for installing the IVSs. Criteria for selection of the IVS test areas are:

- Terrain, vegetation and geology similar to the investigation areas
- Proximity to the investigation areas to improve logistics
- Easy (road) access for field crews.

Figure 3-2 shows the general location for the RAA-03 IVS (Southwest Andrew Lake).

The Southwest Andrew Lake IVS will be located on the east side of AOC RR-01 so that it will accommodate DGM operations proposed in RAA-03 East and West (AOCs RR-01, HG-01, MI-01, MI-02 and MI-03). The IVS will be located within about a 350 ft radius of coordinate 3132893 E, 340614 N (AK State Plane zone 10, US Survey Feet), which has direct established road access from Andrew Lake.

Figure 3-3 shows the general location for the RAA-02 IVS (Northwest Andrew Lake).

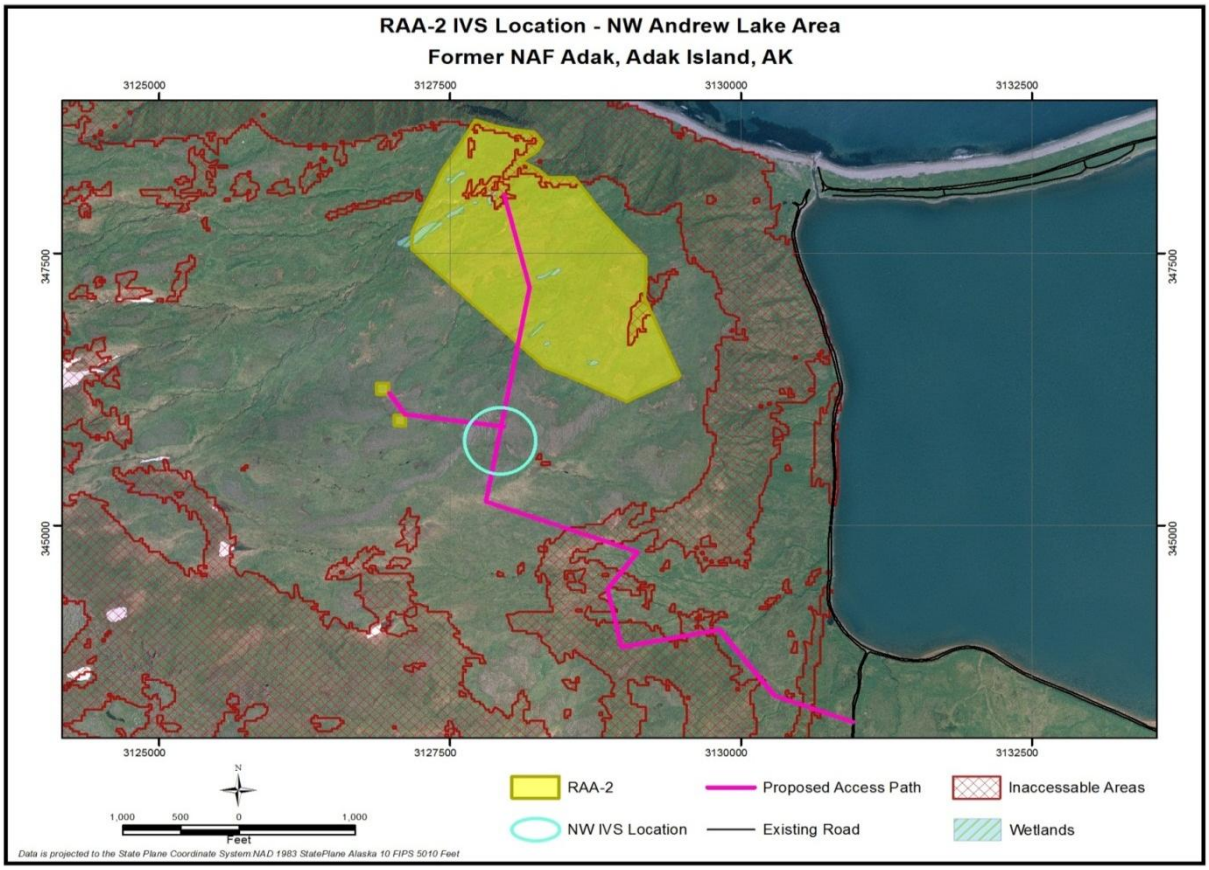

Figure 3-3: IVS Location at RAA-02

The Northwest Andrew Lake IVS will be located within the AOC C1-01 boundary near the proposed temporary road so that it will accommodate DGM operations proposed in RAA-02. The IVS location will be located within about a 300 ft radius of coordinate 3127915 E, 345830 N (AK State Plane zone 10, US Survey Feet).

The Northeast Andrew Lake IVS will be located near the proposed temporary road in the SA93 area so that it will accommodate DGM operations proposed in RAA-04 (AOCs SA93-01 and SA93-03). The IVS

location will be located within about a 350 ft radius of coordinate 3142640 E, 353579 N (AK State Plane zone 10, US Survey Feet).

All three IVS locations are approximate; installation crews will have the flexibility to position the IVS to optimize the selection criteria. IVS test areas in the northwest and northeast are also dependent upon the location and installation of planned temporary roads. Figure 3-3Figure 3-4 shows the general location for the RAA-04 IVS (Northeast Andrew Lake).

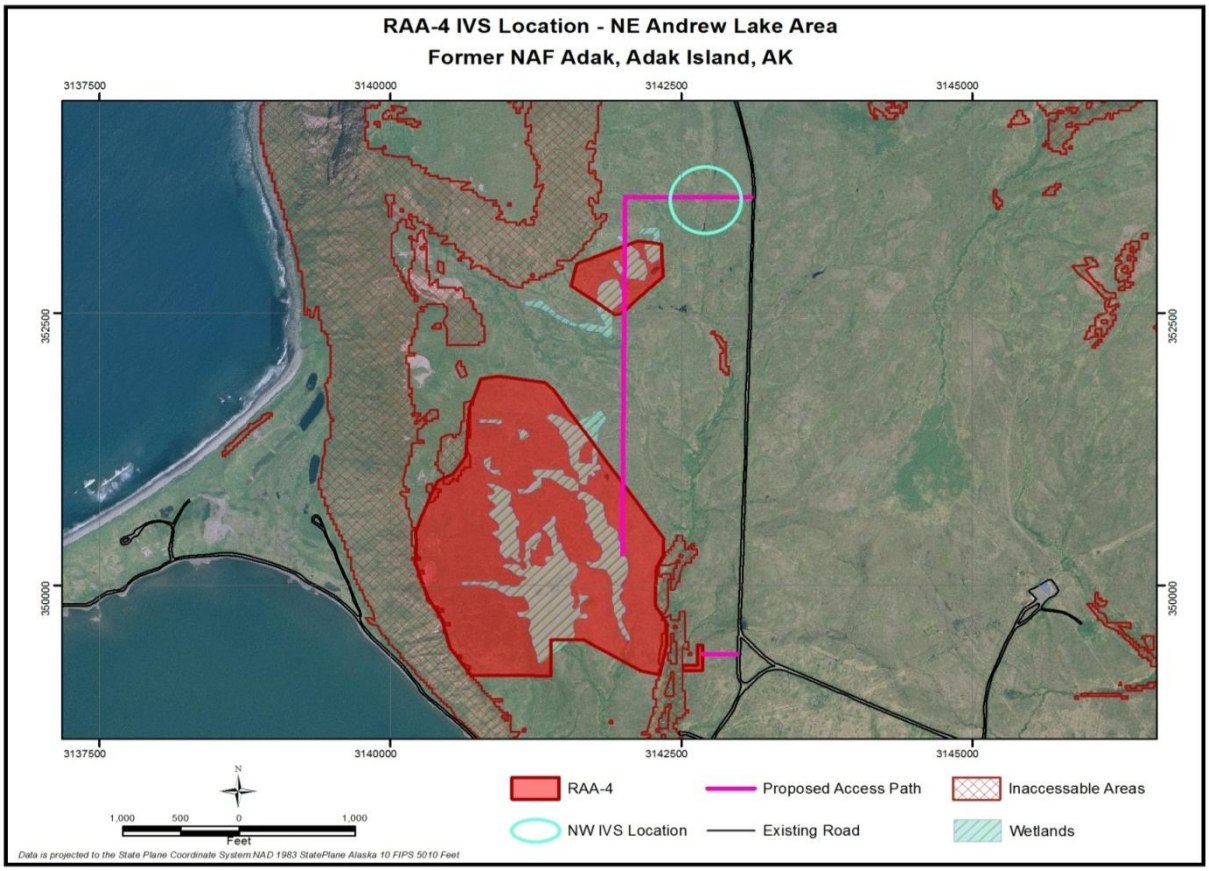

Figure 3-4: IVS Location at RAA-04

3.2 IVS CONFIGURATION

The targets installed in the IVS are simply used to validate that the DGM instrumentation (EM61 MK2) is functioning according to manufacturer specifications. Thus, IVS targets do not need to simulate actual UXO (and other) finds at the various AOCs, or the depths at which they were found. The use of ISOs such as standard lengths of steel pipe (pipe nipples) is advantageous since they are well-characterized (modeled), readily accessible, and inexpensive. Nonetheless, the IVS configuration plan will utilize ISOs that somewhat approximate the size of the UXO (and other) finds at the various RAAs/AOCs. Table 3-1 provides detailed information on the ISOs to be used in the IVSs. IVS seed items will be buried below the mineral ground surface. The surface on Adak Island has been determined to be the top of the mineral soil, and in some cases, up to two feet of tundra may exist over the soil. The height of any tundra overburden is measured and recorded at each IVS seed item location. The seed item is then emplaced at the approved depth in the mineral soil and the full distance from the tundra surface and mineral soil surface to the center of the IVS seed item is measured with a tape measure and recorded. Note that the walking surface elevation will typically be lower than the tundra elevation as the tundra will be compacted by the weight of the operators and equipment. Each IVS seed item will be evaluated to the published NRL ISO response tables for the adjusted depth to walking surface. If tundra thickness requires that the

IVS seed item is buried below measurable responses on the DGM instrument, the seed item depth will be adjusted to a shallower depth to provide the necessary daily validation response. Coil height will be maintained at 15 (+/- 1) inches above the walking surface and checked daily in accordance with previous DGM efforts on Adak and to reduce potential geologic noise. Due to tundra compaction from the weight of the DGM instrument and operators, the daily IVS results will be compared to a running average for each IVS seed item to accommodate change over time due to compaction of the tundra due to instrument and operator weight.

Table 3-1: ISOs to Be Used in IVSs

Item	Nominal Pipe Size	Outside Diameter	Length	Part Number (1)	ASTM Specification
Small ISO	1 in.	1.315 in. (33 mm)	4 in. (102 mm)	44615K466	A53/A773
Medium ISO	2 in.	2.375 in. (60 mm)	8 in. (204 mm)	44615K529	A53/A773
Large ISO	4 in.	4.5 in. (115 mm)	12 in. (306 mm)	44615K137	A53/A773

(1) *Part number from the McMaster-Carr catalog. Source: ESTCP, 2009*

3.2.1 IVS Configuration Southeast IVS

The Southeast IVS will serve DGM operations proposed in RAA-03 East and West, within AOCs RR-01, HG-01, MI-01, MI-03 and MI-03 as shown on Figure 3-2. A listing of MEC found from previous (1999-2008) work in these areas is provided in Tables 3-2 through 3-5. These tables were extracted from the Final OU B-2 Feasibility Study (FS) (USA, 2012).

Tables 3-2 through 3-6 show that UXO found in these AOCs ranges in size from a 37 mm projectile (AOC RR-01) to a 75 mm projectile (AOC MI-02). All of the UXO was found at depths of 2 ft or less. The most difficult item to detect with DGM is the 37 mm projectile, and the IVS utilizes the small ISO (reference Table 3-1) to simulate this UXO. Table 3-7 lists the relative locations, depths and orientations of the ISOs that will be installed in the southwest IVS. Figure 3-5 shows a schematic, plan view of the ISO installation.

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Table 3-2: Summary of MEC Investigation Results (RAA-03 East: RR-01)

RR-01	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Grenade	1	-	-	-	1
UXO, Projectile	-	10	-	-	10
UXO, Rocket	-	7	-	-	7
DM					
DMM, Small Arms	2	4	1	-	7
MPPEH					
MPPEH, Grenade	-	7	1	-	8
MPPEH, Pyrotechnic	-	3	-	-	3
MPPEH, Rocket	-	2	-	-	2
MD	15	431	119	-	565

Items Found: *

DMM
- M16 (30) round w/ 5.56-mm ammunition load (5)
- Numerous bullets AF 7.62 rounds
- Small arms clips
- Fuze, projectile, PD, M48 series

UXO
- 2.36-in rocket (2)
- 2.36-in rocket, HEAT, M6 (4)
- 37-mm projectile w/base fuze (possible M58) in fired condition
- 40-mm grenade
- 40-mm grenade HEDP (2)
- 40-mm projectile, HE, MKII (2)
- 40-mm projectile, HE, M406 (3)
- 40-mm projectile, HEDP, M433 (3)
- 40-mm projectile, HE, M381
- 40-mm projectile, HE, M397
- 40-mm projectile, HE, MK 3
- 5-in rocket, APHE, MK 34

MPPEH
- MKII hand grenade, without fuze, HE residue
- Full head of 40-mm practice grenade w/ dye marker (4)
- Practice grenade for the M67 w/live practice Fuze M228 (M69 practice grenade)
- Inner projectile of slap-type flare
- Remnants of signal slap flare
- 60-mm mortar painted orange
- Base of 4-mm practice grenade and M60 fuze igniter
- 2.36-in rocket, practice
- 40-mm HE M397, explosive ball separated from grenade body
- Flare, aircraft, model unknown

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

APHE = armor-piercing high explosive
HEDP = high explosive dual purpose
MD = munitions debris
MEC = munitions and explosives of concern
MPPEH = material potentially presenting an explosive hazard
UXO = unexploded ordnance
WP = white phosphorus

Table 3-3: Summary of MEC Investigation Results (RAA-03 East: HG-01)

HG-01	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Grenade	1	1			2
UXO, Mortar			1		1
UXO, Projectile		1			1
MPPEH					
MPPEH, Misc. Explosive Devices			2		2
MD	16	83	3		102

Items Found: *

UXO 40-mm projectile, HE, M406

60-mm mortar HE – unfuzed

40-mm grenade M441 (2)

MPPEH CAD (4)

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

Table 3-4: Summary of MEC Investigation Results (RAA-03 West: MI-01)

MI-01	Surface	Near-Surface- (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface - (-2 to -4 feet)	Total
UXO					
UXO, Grenade	-	15	5	-	21
UXO, Projectile	-	1	-	-	1
UXO, Rocket	-	16	10	-	26
MPPEH					
MPPEH, Projectile	-	1	-	-	1
MPPEH, Rocket	-	14	5	-	19
MD	-	167	26	-	193

Items Found: *

UXO Rifle grenade, HEAT, M9 (12)
Rifle grenade, WP, M19 (7)
Rifle grenade, WP, M9 (2)
40-mm projectile, HE, MKII
2.36-in rocket, HEAT, M6 (23)
3.5-in rocket, HEAT, M28
3.5-in rocket, HEAT, M6

MPPEH 2.36-in rocket motor (4)
3.5-in rocket motor (20)
40-mm projectile MKII w/ self-destruct only

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

HEAT = high explosive anti-tank

Table 3-5: Summary of MEC Investigation Results (RAA-03 West: MI-02)

MI-02	Surface	Near-Surface (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface- (-2 to -4 feet)	Total
UXO					
UXO, Mortar	-	-	1	-	1
UXO, Projectile	1	7	5	-	13
UXO, Rocket	-	3	-	-	3
MPPEH					
MPPEH, Mortar	-	1	1	1	3
MPPEH, Projectile	-	3	-	-	3
MPPEH, Pyrotechnic	-	1	-	-	1
MD	2	164	163	-	329

Items Found: *

UXO	2.36-in rocket, AT, armed
	2.36-in rocket, HEAT, M6
	40-mm projectile, no fuze, possible HE
	40-mm projectile HE fragment
	40-mm projectile, HE, fuzed, armed (5)
	40-mm HET w/ PD fuze, armed
	40-mm projectile, HET, fuze MK27 (armed)
	60-mm mortar body (no fuze)
	75-mm projectile, HE M48
MPPEH	81-mm fragment and 60-mm fins and M52 PD nose fuze
	81-mm tail boom and fuze parts
	40-mm projectile HET – fuze component missing, HE exposed
	81-mm illumination (body and fuze only) w/M84 PTT fuze
	Fuze M557 PD (component part) projectile fuze
	Tracer w/self-destruct for 40-mm AA

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
AA = anti-aircraft
AT = anti-tank
PTT = powder train time

Table 3-6: Summary of MEC Investigation Results (RAA-03 West: MI-03)

MI-03	Surface	Near-Surface (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface - (-2 to -4 feet)	Total
UXO					
UXO, Grenade	1	3	4	-	8
UXO, Mortar	-	2	-	-	2
UXO, Projectile	-	3	1	-	4
UXO, Rocket	-	3	1	-	4
DMM					
DMM, Fuze	-	2	1	-	3
DMM, Rocket	-	2	-	-	2
MPPEH					
MPPEH, Projectile	-	3	2	-	5
MPPEH, Pyrotechnic	-	1	-	-	1
MPPEH, Rocket	-	3	2	-	5
MD	14	208	183	-	405

Items Found: *

DMM	2.36-in rocket, practice, not fired (2) Fuze, rocket, MK131 Fuze, rocket, MK152 Fuze, projectile, PD, M46	
UXO	3.5-in rocket, WP, fired 40-mm projectile, HE, fuzed, armed 40-mm projectile, HET, MK27, PD (armed) 40-mm projectile, AP Grenade, hand, HE, MKI Rifle grenade, HEAT, M9	Rifle grenade, WP, M19 (3) 81-mm mortar (live) w/nose fuze and tail boom 60-mm mortar, HE, M49 40-mm projectile, HE, M406 Rifle grenade, WP 2.36-in rocket, HEAT, M6 (3)
MPPEH	Fuze M557 PD (parts) Zuni rocket motor (5) 2.36-in rocket motor section and tail 3.5-in rocket motor Trip flare	2.36-in rocket, practice M7A1 40-mm projectile TPT (2) Projectile tracer w/self-destruct for 40-mm AA MK 2 (2) 40-mm projectile AP fragment

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
AP = armor piercing
TPT = target practice tracer

Table 3-7: Southwest IVS, ISO Installation Specifications

Item	ID	Position (along line)	Depth to Center	Orientation
1	Small ISO	10 ft.	4 inches (3X outside diameter)	Horizontal across line/track
2	Small ISO	25 ft.	9.2 inches (7X outside diameter)	Horizontal across line/track
3	Small ISO	40 ft.	6.6 inches (5X outside diameter)	Horizontal across line/track
4	Small ISO	55 ft.	4 inches (3X outside diameter)	Horizontal along line/track
5	Small ISO	70 ft.	9.2 inches (7X outside diameter)	Horizontal along line/track

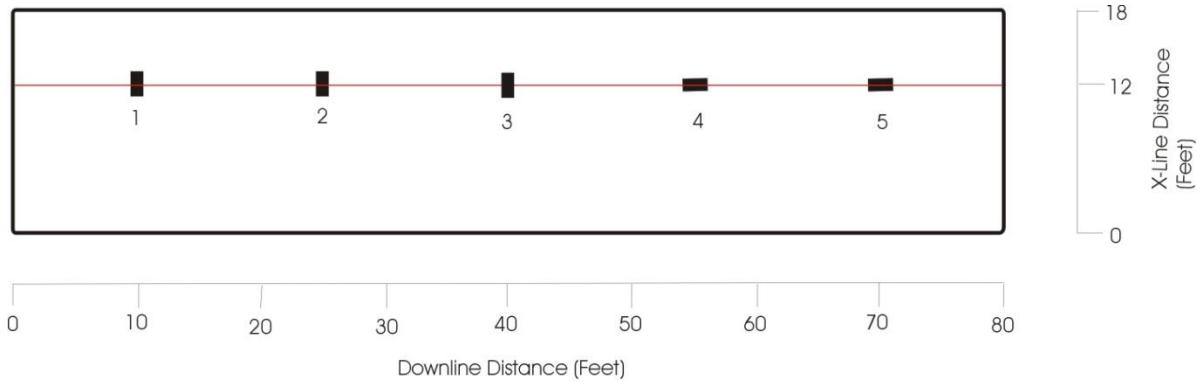

Figure 3-5: Schematic, Plan View of Southwest IVS

3.2.2 IVS Configuration Northwest IVS

The northwest IVS will serve DGM operations proposed in RR-02 in AOC C1-01 (Figure 3-3). A listing of MEC found from previous (1999-2008) work in this area is provided in Table 3-8. This table was extracted from the Final OU B-2 FS (USA, 2012).

Table 3-8 shows that UXO found in this AOC ranges in size from a 20 mm projectile to an 81 mm mortar. All of the UXO found in previous work was at depths of 2 ft or less. The objectives in this RAA (Table 1-1) are removal of targets to a depth of 2 ft below mineral surface. The most difficult item to detect with DGM is the 20 mm projectile, and the IVS utilizes the small ISO (reference Table 3-1) to simulate this UXO. Table 3-9 lists the relative locations, depths and orientations of the ISOs that will be installed in the northwest IVS. Figure 3-6 shows a schematic, plan view of the ISO installation.

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Table 3-8: Summary of MEC Investigation Results (RAA-02: C1-01)

C1-01	Surface	Near-Surface- (0 to -0.5 foot)	Subsurface- (-0.5 to -2 feet)	Subsurface- (-2 to -4 feet)	Total
UXO					
UXO, Mortar	2	1	2	-	5
UXO, Projectile	3	-	-	-	3
DMM					
DMM, Misc. Explosive Devices	-	1	-	-	1
MPPEH					
MPPEH, Bomb	-	-	2	-	2
MPPEH, Misc. Explosive Devices	-	1	-	-	1
MPPEH, Mortar	-	-	2	-	2
MPPEH, Projectile	4	3	-	-	7
MD	50	178	105	4	337

Items Found: *

DMM	MK45 VT fuze
UXO	81-mm mortar, HE, no fuze, fired 20-mm HEI, fired, armed 20-mm M253 HEI projectile, armed (2) 81-mm mortar; 20-mm projectile, w/ fuze, fired, armed 60-mm mortar, PD fuze, fired 81-mm mortar, HE, fired, no fuze 60-mm mortar, HE, M49 (possible w/M52 PD fuze)
MPPEH	60-mm mortar, HE, no nose fuze, no tail boom, mortar cavity mostly hollow w/ pieces of HE 81-mm WP, tail boom cracked off, exposing WP, fired 40-mm MK27 projectile fuze 20-mm projectile (5) 37-mm projectile w/ tracer element Fire bomb weight (2) Bottom half of 37-mm projectile 40-mm projectile, no fuze, HE residue M100 series bomb fuze w/M14 primer detonator

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.
HEI = high explosive incendiary
PD = point detonating

Table 3-9: Northwest IVS, ISO Installation Specifications

Item	ID	Position (along line)	Depth to Center	Orientation
1	Small ISO	10 ft.	4 inches (3X outside diameter)	Horizontal across line/track
2	Small ISO	25 ft.	9.2 inches (7X outside diameter)	Horizontal across line/track
3	Small ISO	40 ft.	6.6 inches (5X outside diameter)	Horizontal across line/track
4	Small ISO	55 ft.	4 inches (3X outside diameter)	Horizontal along line/track
5	Small ISO	70 ft.	9.2 inches (7X outside diameter)	Horizontal along line/track

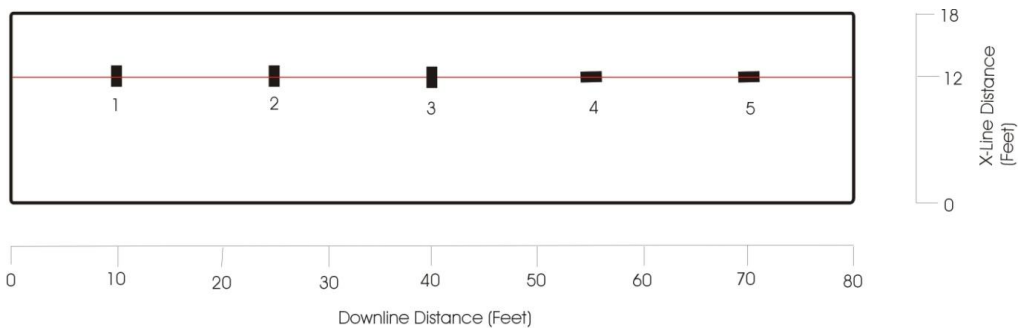


Figure 3-6: Schematic, Plan View of Northwest IVS

3.2.3 IVS Configuration Northeast IVS

The northeast IVS will serve DGM operations proposed in RAA-04 (AOCs SA93-01 and SA93-03: Figure 3-5). A listing of MEC found from previous (1999-2008) work in this area is provided in Table 3-10. This table was extracted from the Final OU B-2 FS (USA, 2012).

Table 3-10 and

Table 3-11 show that UXO found in this AOC ranges in size from a 37 mm projectile to a 75 mm projectile. Several of the UXO found in previous work were at depths between 2 and 4 ft. The objectives in this AOC (Table 1-1) are removal of targets to a depth of 4 ft below mineral surface. The most difficult item to detect with DGM is the 37 mm projectile, and the IVS utilizes the small ISO (reference Table 3-1) to simulate this UXO. Table 3-12 lists the relative locations, depths and orientations of the ISOs that will be installed in the northwest IVS. Figure 3-7 shows a schematic, plan view of the ISO installation.

Table 3-10: Summary of MEC Investigation Results (RAA-04: SA93-01)

SA93-01	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Mortar	2	1	2	1	6
UXO, Projectile	6	17	13	2	38
UXO, Rocket	-	3	1	-	4
DMM					
DMM, Fuze	-	1	-	-	1
DMM, Misc. Explosive Devices	-	2	-	-	2
MPPEH					
MPPEH, Misc. Explosive Devices	2	5	-	-	7
MPPEH, Projectile	1	2	-	-	3
MPPEH, Pyrotechnic	-	1	-	-	1
MPPEH, Rocket	-	2	-	-	2
MD	44	293	125	-	462
Items Found:*					
DMM	Fuze, PD, M48 series PD57 fuze (2)				
UXO	2.36-in rocket, HEAT, M6 (3) 2.36-in rocket (armed) 37-mm projectile, HE 37-mm projectile, HE w/ M58 BD fuze, armed 37-mm projectile, fired, fuzed, armed 37-mm projectile, HE, fired, w/ base fuze 37-mm projectile, HE, M63 37-mm projectile, HE, MK II 57-mm projectile, HEAT 57-mm projectile, HEAT cartridge without fuze 57-mm HEAT warhead and small pieces of frag 57-mm projectile, HE 57-mm projectile, HEAT, M307 (12) 60-mm illumination round(2) 60-mm mortar, illum, M83 75-mm projectile, HEAT (2) 75-mm projectile, HEAT, full up w/ fuze	75-mm projectile, HE fuzed and armed M564 MTSQ 75-mm projectile, APT 75-mm projectile, HE, armed, fired 81-mm mortar, possible WP, small pieces of fuze 60-mm mortar, illum., M83 81-mm mortar, WP 81-mm mortar, WP, M370 75-mm projectile, HEAT, T39 (4) 76-mm projectile, APHE, M62 37-mm projectile, APHE, M62 37-mm projectile, HE, M63 37-mm projectile, HE, MK II 57-mm projectile, HEAT, M307 (11) 75-mm projectile, APHE, M61 75-mm projectile, HE, M48 (2) 75-mm projectile, HEAT, T39 (2) 75-mm projectile, WP, M311			
MPPEH	2.36-in rocket motor (2) Signal, illumination, ground M19A PD 57 fuze remnants (3) 37-mm projectile Fuze – M557 (2) PD 57 fuze remains PD M57 fuze (incomplete) Remains of fuze Tail fuze				

* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.

Table 3-11: Summary of MEC Investigation Results (RAA-04: SA93-03)

SA93-03	Surface	Near-Surface (0 to -0.5 foot)	Subsurface (-0.5 to -2 feet)	Subsurface (-2 to -4 feet)	Total
UXO					
UXO, Rocket	2	6	8	-	16
MPPEH					
MPPEH, Projectile	-	1	-	-	1
MPPEH, Rocket	-	2	2	-	4
MD	4	15	19	-	38
Items Found:*					
UXO	2.36-in rocket (6) 2.36-in rocket, HEAT, M6 (8) 2.36-in rocket, practice				
MPPEH	2.36-in rocket motor (3) 2.36-in rocket, practice projectile, 37-mm, AP				
* Information in this table is provided to identify the type and depths of ordnance recovered only. It is not intended to be a formal inventory. During review and update of OU B-2 database for the FS, item classification was updated based on field description and nomenclature. As a result, possible discrepancies exist between classifications presented in the RI and FS.					

Table 3-12: Northeast IVS, ISO Installation Specifications

Item	ID	Position (along line)	Depth to Center	Orientation
1	Small ISO	10 ft.	4 inches (3X outside diameter)	Horizontal across line/track
2	Small ISO	25 ft.	9.2 inches (7X outside diameter)	Horizontal across line/track
3	Small ISO	40 ft.	6.6 inches (5X outside diameter)	Horizontal across line/track
4	Small ISO	55 ft.	4 inches (3X outside diameter)	Horizontal along line/track
5	Small ISO	70 ft.	9.2 inches (7X outside diameter)	Horizontal along line/track

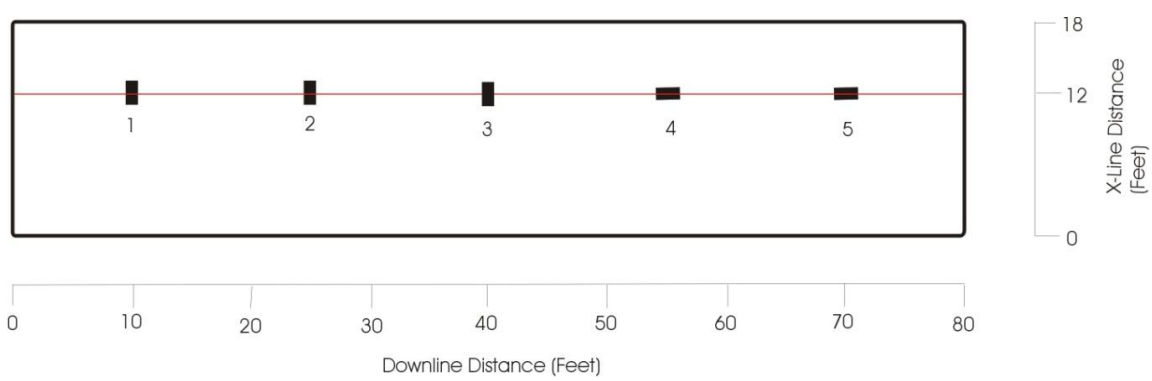


Figure 3-7: Schematic, Plan View of Northeast IVS

3.3 IVS INSTALLATION

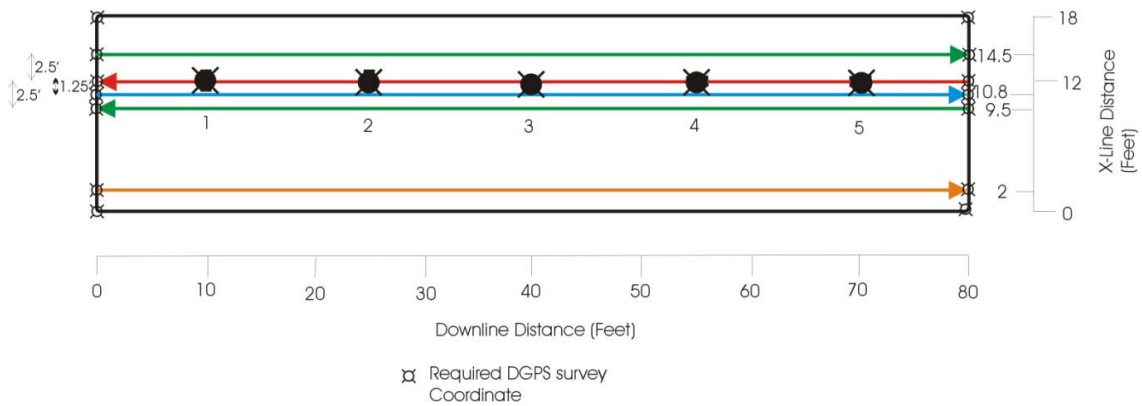
Section 3.2 shows that all three IVS areas will utilize the same ISOs and configuration (depths, orientations and offsets), because the most difficult to detect UXO found in these areas are small projectiles (e.g., 37 mm or 20 mm). Thus, the installation procedures for all three areas will be identical. The installation steps are as follows:

1. Select the general location of IVS within area(s) specified in Section 3.1 (Figures 3-3 through 3-5). General locations should simulate the terrain and vegetation typical of the AOC(s) and be easily accessible by the DGM crews.
2. Refine and select the IVS location. The IVS location(s) should be completely cleared of surface and buried metallic debris which would adversely affect the IVS (and noise strip) measurements. The IVS area will be 80 ft long by 18 ft wide as shown in Section 3.2. Prospective IVS areas will be located by conducting instrument aided surface sweeps (i.e., White DFX 300) of the general area in order to find “clear” areas. Note that the IVS area(s) can be oriented at any favorable azimuth.
3. Confirmation DGM surveys. Once a refined location devoid of buried metal is selected, the area will be surveyed with the DGM equipment (EM61 MK2) and the data analyzed. All DGM surveys will be conducted according to contractor SOPs approved by the Navy. Avoidance techniques will be utilized in the event that there are any DGM anomalies in the prospective IVS area, or the IVS area can be extended or relocated. Once the final IVS area is selected, a background (confirmation) DGM survey will be measured and the data will be processed and analyzed to ensure that there are no buried metal objects in the IVS area. Contractor quality control (QC) and Navy quality assurance (QA) will review and approve or reject the final IVS area. The final IVS area (80 ft by 18 ft) rectangle will be staked with non-metallic markers and surveyed with a survey grade DGPS. All of this DGM and survey data will be archived.
4. Test items (small ISOs) will be buried at locations as specified in Section 3.2 (i.e., Table 3-12 and Figure 3-8). The ISOs will be located on a straight line (IVS) that will be established with a survey tape and marked at each end with a non-metallic survey stake. Tundra (if present) and soil will be removed at the ISO locations to the appropriate depth(s) and the ISOs will be emplaced using the survey tape for orientation (i.e., in-line, cross-line), and a tape measure for depth. Depths will be measured with a tape measure from the top of the mineral (soil) interface to the center of the ISO. The height of any tundra overburden is then measured and recorded at each IVS seed item location. The full distance from the tundra surface and the mineral soil surface to the center of the ISO is measured with a tape measure and recorded. Each IVS seed item will be evaluated to the published NRL ISO response tables for the adjusted depth. If tundra thickness requires that the IVS seed item is buried below measurable responses on the DGM instrument, the seed item depth will be adjusted to a shallower depth to provide the necessary daily validation response. Coil height will be maintained at 15 (+/- 1) inches above the walking surface and checked daily. Due to tundra compaction from the weight of the DGM instrument and operators, the daily IVS results will be compared to a running average for each IVS seed item to accommodate change over time due to compaction. Prior to burial, the ISOs will be photographed (in-place) using the survey tape for orientation reference, and the ISO position (x, y and depth to center) will be measured with a survey grade DGPS. Variations between the proposed (i.e., Table 3-12 or adjusted depth) and measured depth should not exceed +/- 1 inch. A survey grade DGPS (5 cm accuracy) will be used to document all ISO locations and measurement lines in the IVS area. DGPS survey procedures will be guided by the contractor SOPs approved by the Navy.
5. Establish the supplemental measurement transects/lines and the noise strip. Supplemental DGM measurement transects/lines will be established parallel to the IVS line. These supplemental lines (reference Figure 3-8), will be located at 1.2 and 2.5 ft offset from the IVS line. A noise test strip will be established parallel and offset 10 ft from the IVS line as shown

on Figure 3-8. These lines can be established by survey tape and marked with non-metallic survey markers on each end. The end points (survey markers) will be measured with DGPS.

After the IVS(s) has been installed, a post installation DGM survey will be conducted to validate the installation. The post installation DGM survey will be conducted on the lines/transects shown on Figure 3-8, using SOPs for DGM surveys approved by the Navy. The DGM surveys can be conducted on the IVS, supplemental and noise strip transects in any order or direction. However, the paths shown on Figure 3-8 are recommended so that any instrument latencies can be quantified. Non-metallic survey tapes or ropes will be placed on the IVS, supplemental and noise strip transects (between survey hubs/markers) so that the DGM crew can maintain accurate real-time positioning along the transects. Post-installation DGM measurements over the IVS, supplemental and noise strip will be repeated five times.

The DGM data from the post installation survey will be processed according to the SOPs approved by the Navy. This processing is expected to consist of primarily adjustments for instrument latency/lag. Compensation for instrument drift or bias will likely be performed manually by the data processor.



NOTE: (red = IVS, green = supplemental lines offset by 2.5 ft, blue = supplemental line offset by 1.25 ft, orange = noise line)

Figure 3-8: Supplemental DGM Survey Lines/Transects and Noise Line/Transect in IVS

The DGM data will be analyzed to derive the following parameters/results:

- Expected latency/lag for the DGM instrument utilized during the survey.
- Range of values (millivolt) for the four channels of the EM61 MK2 over each ISO. Establish the baseline value expected for each channel for each ISO and compare to model results.
- Comparison of DGM anomaly locations versus known (surveyed) locations.
- Evaluation of the background noise at the site (noise strip).
- Evaluation of the supplemental transects (effect of transect position and ISO amplitude).
- Evaluation of tundra thickness on data interpretation and anomaly picks.

The contractor will prepare an IVS installation report that discusses the installation, post-installation DGM surveys and DGM data analysis. This report will contain (at a minimum) the following information/discussions:

- Installation: narrative of installation logistics, IVS area map and coordinates, pre-installation DGM data and discussion, photographs and coordinates of installed ISOs and transects.
- Post-Installation DGM survey: DGM data for all repeats on all transects, example maps/profiles of data, discussion of logistics (i.e., time required to run, terrain factors, etc.).

- DGM data analysis: discussion and quantified results for latency/lag, EM61 MK2 response over ISOs and comparison to model results, anomaly location versus known location of ISOs, background noise, and effect of transect position on ISO amplitude.

The IVS installation report will be delivered to the Navy and must be approved by the Navy prior to production DGM crew's use of the IVS.

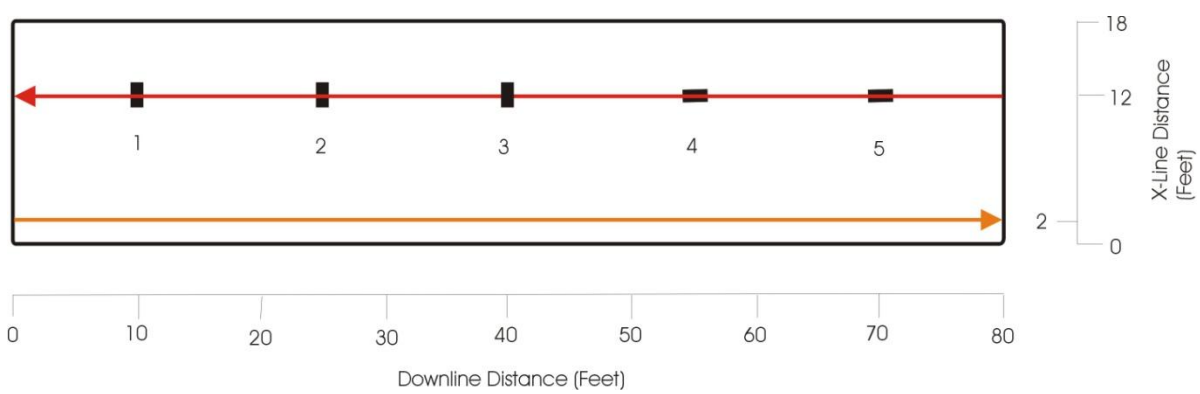
4.0 IVS OPERATION AND VERIFICATION

Contractor DGM crews will utilize the IVS area as a daily test of their DGM systems. The IVS (and noise strip) is designed to test the EM61 MK2 and assumes that production crews utilize this same DGM equipment as well as the same survey configuration (i.e., positioning or DGPS, transport method, etc.) as was used by the IVS installation crew.

4.1 DAILY IVS TESTING PROCEDURES

Each contractor DGM crew/system will run the appropriate (to the AOC under investigation) IVS area at the beginning and end of each production DGM day or if repairs are made to the equipment. The contractor DGM crews will assemble, test and warm up the DGM system according to their SOPs prior to the initial testing in the IVS area, and at other times as required by their SOPs. It is anticipated (but not required) that the contractor DGM crews will proceed directly from the IVS to the survey area, without system disassembly, and begin production surveying. If the system is disassembled between the IVS and the field work location, the disassembly step will be documented in field notes. Likewise, at the end of the day, it is anticipated that the DGM crews will proceed directly from the production survey area to the IVS.

The contractor DGM crews will run the IVS and noise strip as shown on Figure 4-1 at the beginning and end of each survey day.



NOTE: (red = IVS, orange = noise line)

Figure 4-1: Example Daily IVS and Noise Strip DGM Measurements

The contractor will run one pass over the ISOs (IVS) and one pass over the noise strip. These passes can be run in either direction at the discretion of the contractor. The contractor will also run the IVS and noise strip if any significant component of the DGM system is changed, repaired or modified during the survey day. Significant components are: any part of the geophysical sensor/electronics (i.e., coils, electronics console, and cables), changes to DGPS antenna and/or antenna mount, and changes to DGPS electronics. Note that changes to DGM system transport method (or DGPS mounting location) will require approval from the Navy. These changes will require re-run of the IVS, noise strip and the supplemental IVS transects (Figure 3-8), and re-evaluation of the DGM system as per Section 3.

4.2 DAILY IVS PASS/FAIL CRITERIA

The IVS data must pass the criteria established in this plan for the daily production data to be accepted by the Navy. Note that the daily IVS certification is in addition to (and does not substitute for) other DGM

system tests specified in the contractor SOPs. The contractor also may choose to utilize the IVS more than twice daily to reduce the chance of unacceptable DGM data.

The IVS data will be evaluated on two pass/fail criteria:

- Downline positioning error. The difference between interpreted location of ISO (from DGM data) and known ISO location (from Installation surveying) will not exceed +/- 9.8 inches (25 cm).
- ISO target amplitude. Measured DGM amplitudes will not exceed +/- 20% of the running arithmetic mean.

If multiple contractor DGM crews are operating in the same AOC, and using the same IVS area, all DGM systems must meet both criteria (collectively) as set for that IVS.

For initial (startup) IVS surveys, the mean of the ISO target amplitudes will be the values determined from the installation. After that, the running average will be determined from the production DGM crew(s) test runs.

4.3 DAILY IVS DELIVERABLES AND REPORTING

It is the responsibility of the contractor QC to evaluate the pass/fail criteria for their DGM crews/systems. The Navy will also perform independent QA evaluation of the IVS data, and can issue a failure notice independent of the contractor. If the IVS data for any DGM crew/system fails either of the test criteria during a production day, contractor QC (or QA) will notify the Navy and any production DGM data impacted by the failure will not be accepted by the Navy. QA will perform a root cause analysis for the failure and recommend a corrective action.

Contractor QC will provide the following deliverables to the Navy:

- A written document certifying that the IVS data have been approved by contractor QC and that the data pass the IVS criteria (for each crew, for each test). The Navy will not accept any production DGM data without this accompanying QC document.
- Digital DGM data for each DGM crew/system for each IVS and noise strip test.
- A statistical analysis of the noise strip for each DGM crew/system for each test.
- A spreadsheet showing downline positioning of ISOs from the DGM interpretation compared to the known positions, and cumulative plots of the variance with time (also showing failure criteria limits). Figure 4-2 shows an example plot for an arbitrary ISO. These spreadsheets and plots will be provided for each DGM crew/system separately.
- A spreadsheet showing ISO target amplitudes from the DGM interpretation and cumulative plots showing the values and failure criteria limits. Figure 4-3 shows an example plot for an arbitrary ISO. These spreadsheets and plots will be provided for each DGM crew/system separately, as well as consolidated for all crews using the same IVS.

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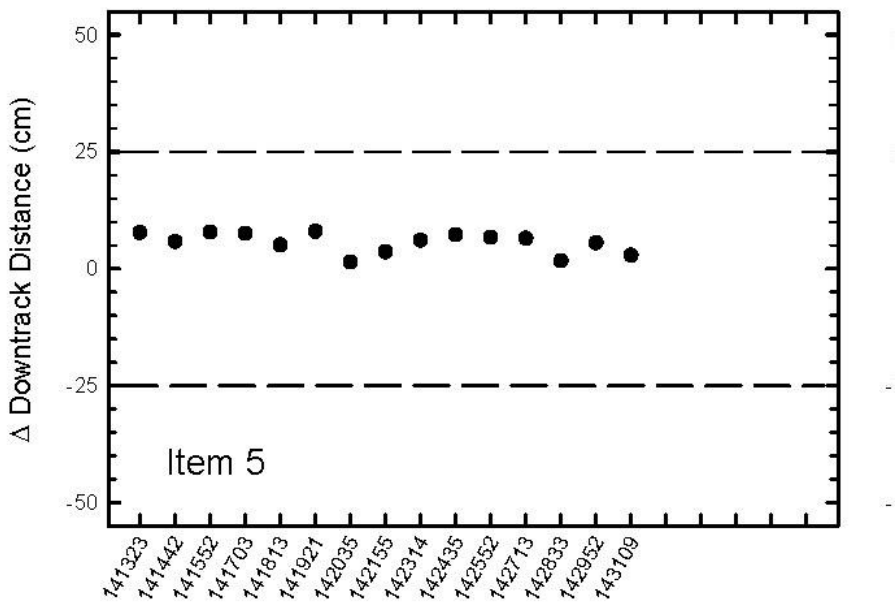

Figure 4-2: Example Deliverable: Cumulative Plot of Differences between Interpreted (DGM) and Known (Surveyed) ISO Positions in Downline Direction Showing Failure Criteria Limits (ESTCP, 2009)

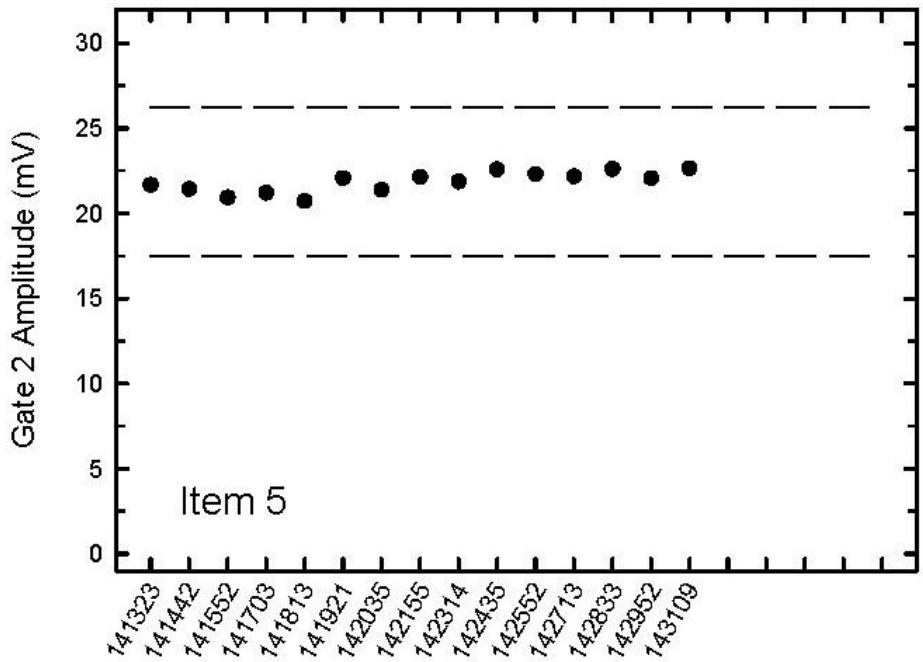

Figure 4-3: Example Deliverable: Cumulative Plot of ISO Amplitudes Showing Failure Criteria Limits (ESTCP, 2009)

5.0 BLIND SEED INSTALLATION

The blind seed program is a critical component of the GSV. Blind seeds allow for continuous monitoring of the quality of the production DGM data, target selection and intrusive activities. In addition, the amplitudes of the seeds should be consistent with both historical measurements and IVS predictions.

This section discusses the general features of the blind seed program to be conducted by contractor QC. Navy QA will also implement an independent blind seed program. Specific information on the Navy QA blind seed locations will be provided in the Navy QA Surveillance Plan (QASP). The QASP will have restricted distribution. Blind seeds will be comprised of the small ISOs (Table 3-1) as these small items are inexpensive, readily available, easily transportable, and do not pose a potential hazard if not recovered.

5.1 BLIND SEED LOCATIONS

Blind seeds will be utilized in all RAAs listed in Table 1-1. Figure 1-1, Figure 3-2, Figure 3-3, and Figure 3-4 show the locations of the RAAs and associated AOCs. Blind seeds will be installed semi-randomly at a frequency of one seed per full grid. BSIs in partial grids are aggregated to 1 BSI per full grid of partial grids. The seeds will be installed in horizontal orientations at depths of 3, 5, and 7 times the small ISO's outside diameter (4, 6.6 and 9.2 inches) below the mineral soil surface to correlate with IVS ISO depths and provide a standardized comparison. The horizontally placed ISOs will be placed with either a NS or EW orientation. The height of any tundra overburden is measured and recorded at each seed item location. The full distance from walking surface to ISO center is measured and recorded. If tundra thickness requires that the seed item is buried below measurable responses on the DGM instrument, the seed item depth will be adjusted to a shallower depth to provide the necessary daily validation response.

5.2 SEED ITEM EMPLACEMENT

The following general procedures are proposed for seed emplacement:

- An area 3 ft around each seed emplacement will be scanned with a handheld metal detector prior to emplacement to ensure the area is free from other surface or subsurface anomalies.
- Holes will be excavated with a shovel. At some locations the tundra will be peeled back prior to excavation of the hole.
- The seed item will be placed in the respective hole and the depth measured using a rigid measuring tape. Where possible, depth measurements will be recorded to the end(s) and/or centroid of each seed from both the top of the mineralized soil as well as the top of the tundra root mat to the seed item center. A NS or EW azimuth of the item will be obtained by compass.

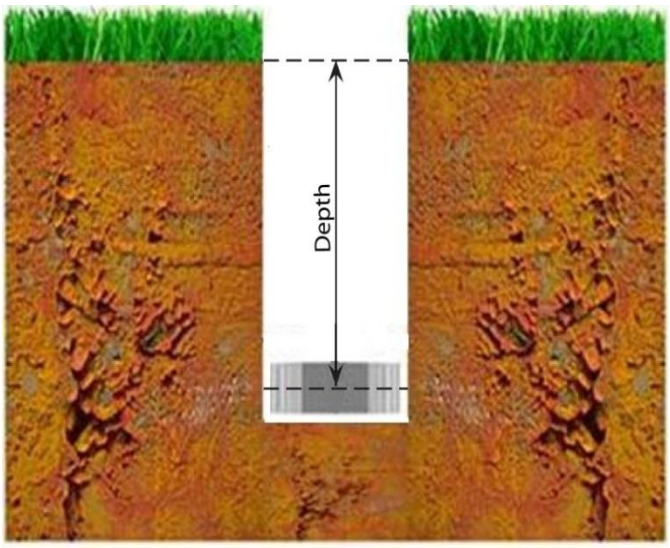

Figure 5-1: BSI Burial Illustration

- USA's civil survey team will survey the x, y, and z coordinates of the center of each seed item to within +/- 5 cm (x and y) (Figure 5-1).

The seed item type, coordinates, depth, and orientation (azimuth and dip) will be stored in the project database and secured (password protected) so that only QC and Navy QA personnel have access to the information.

6.0 EVALUATION OF BLIND SEED DETECTION

Contractor QC will evaluate the performance of the blind seed program using the following criteria:

- Detection and selection of the seed in the DGM data and target lists. The blind seeds must be selected in the contractor target lists and recovered in the field. Failure to detect, select, or recover a blind seed as a target will result in a Non-Conformance Report that will include a root cause analysis and a recommended corrective action that may result in DGM grid failure. Contractor QC will provide documentation of this failure and report it to Navy QA. An independent root cause analysis will be performed by Navy QA.
- Evaluation of DGM target position versus known position. Contractor QC will compare the contractor target pick to the surveyed location of the seed. Target picks for the seed should lie within the critical radius (Rcrit) of 2.5 ft of the known (surveyed) location of the seed. Target picks that lie outside of the critical radius (Rcrit) of 2.5 ft of the known location will result in a Non-Conformance Report that will include a root cause analysis and a recommended corrective action that may result in DGM grid failure. Contractor QC will provide documentation of this failure and report it to Navy QA. An independent root cause analysis will be performed by Navy QA.
- Evaluation of DGM target amplitude versus IVS predicted results. Contractor QC will compare the DGM target amplitude reported for each blind seed with the IVS response parameters determined at the GSV for the corresponding ISO depth. All blind seed amplitudes should be equal to or greater than -25% of the lowest IVS response (derived from the ½ line spacing line) for that seed item. Any deviations below this threshold will be investigated and reported to Navy QA. Justified deviations will be described and documented in the QC grid approval form. Unexplained, gross deviations will result in a Non-Conformance Report that will include a root cause analysis and a recommended corrective action that may result in DGM grid failure and require a root cause analysis by Navy QA.

7.0 REFERENCES

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FINAL

APPENDIX H. BLIND SEED COORDINATES

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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1.0 BLIND SEED COORDINATES

This appendix contains a list of coordinates of Blind Seed Item (BSI) installed in the RAAs clearance footprint to facilitate the Quality Controls associated with the NTCRA at OU B-2, Adak Island, Alaska. The seed item type, coordinates, depth, and orientation (azimuth and dip) will be stored in the project database and secured (password protected) so that only QC and Navy QA representative have access to the information.

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FINAL

APPENDIX I. MAPS

Non-Time Critical Removal Action

For the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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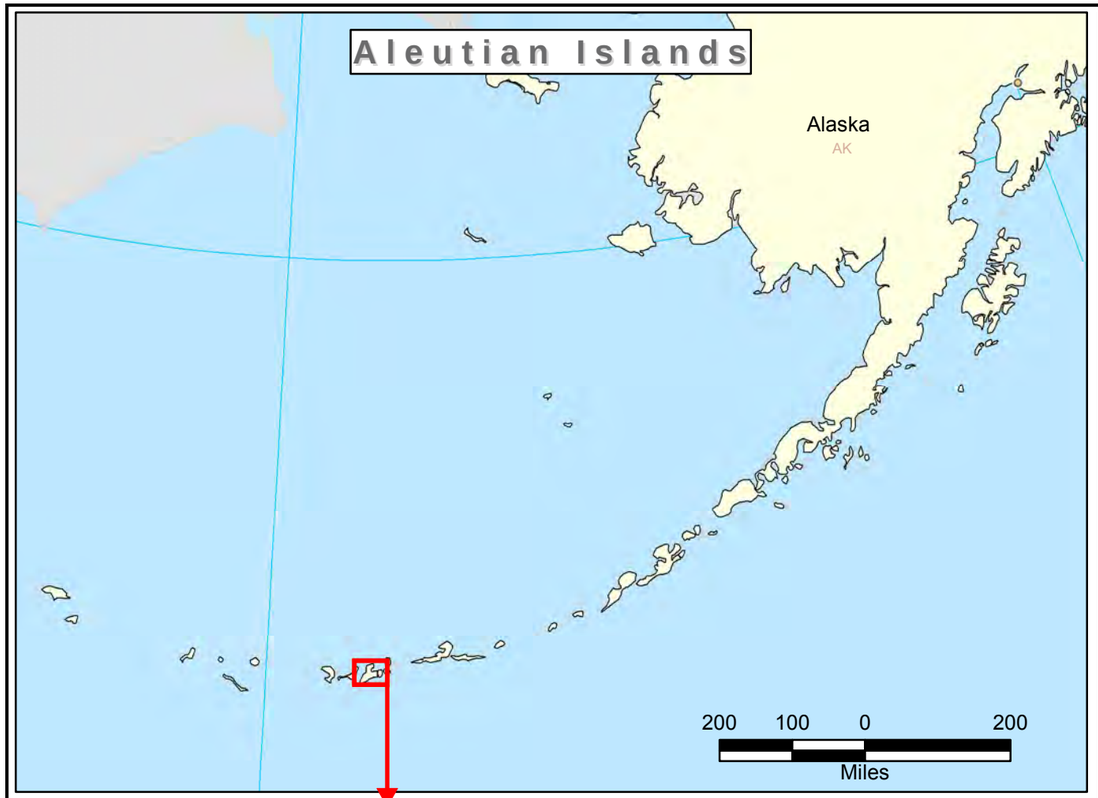

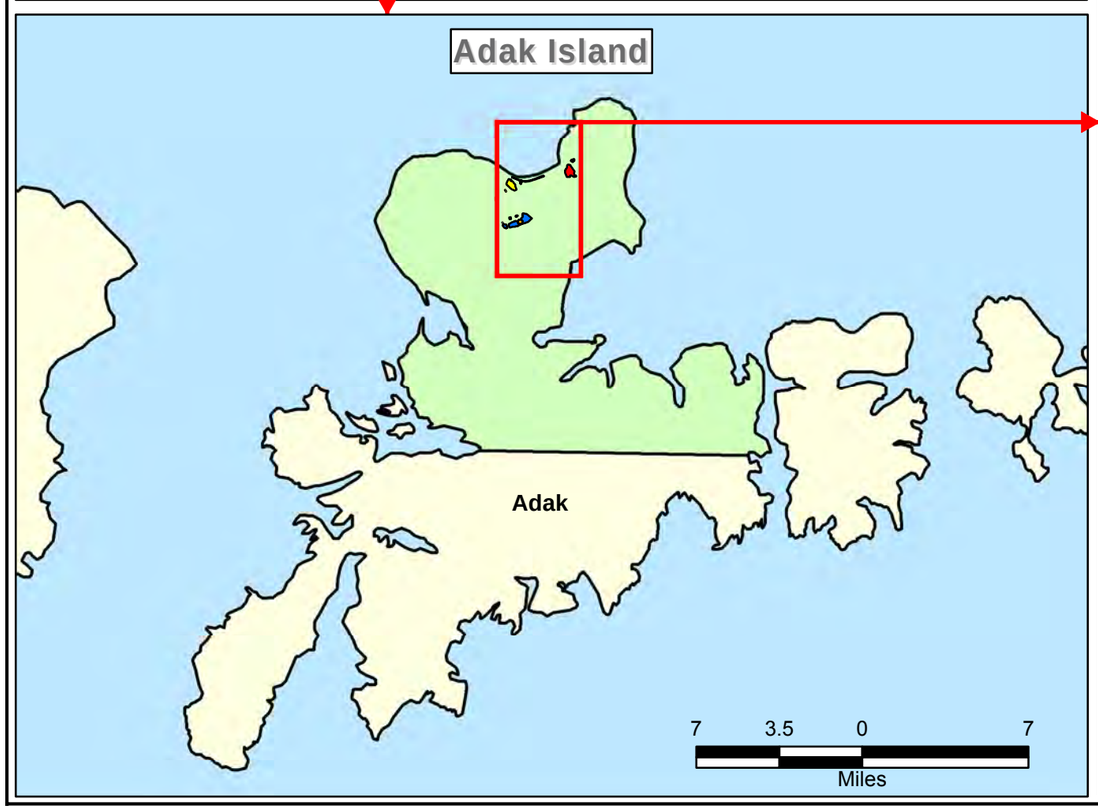

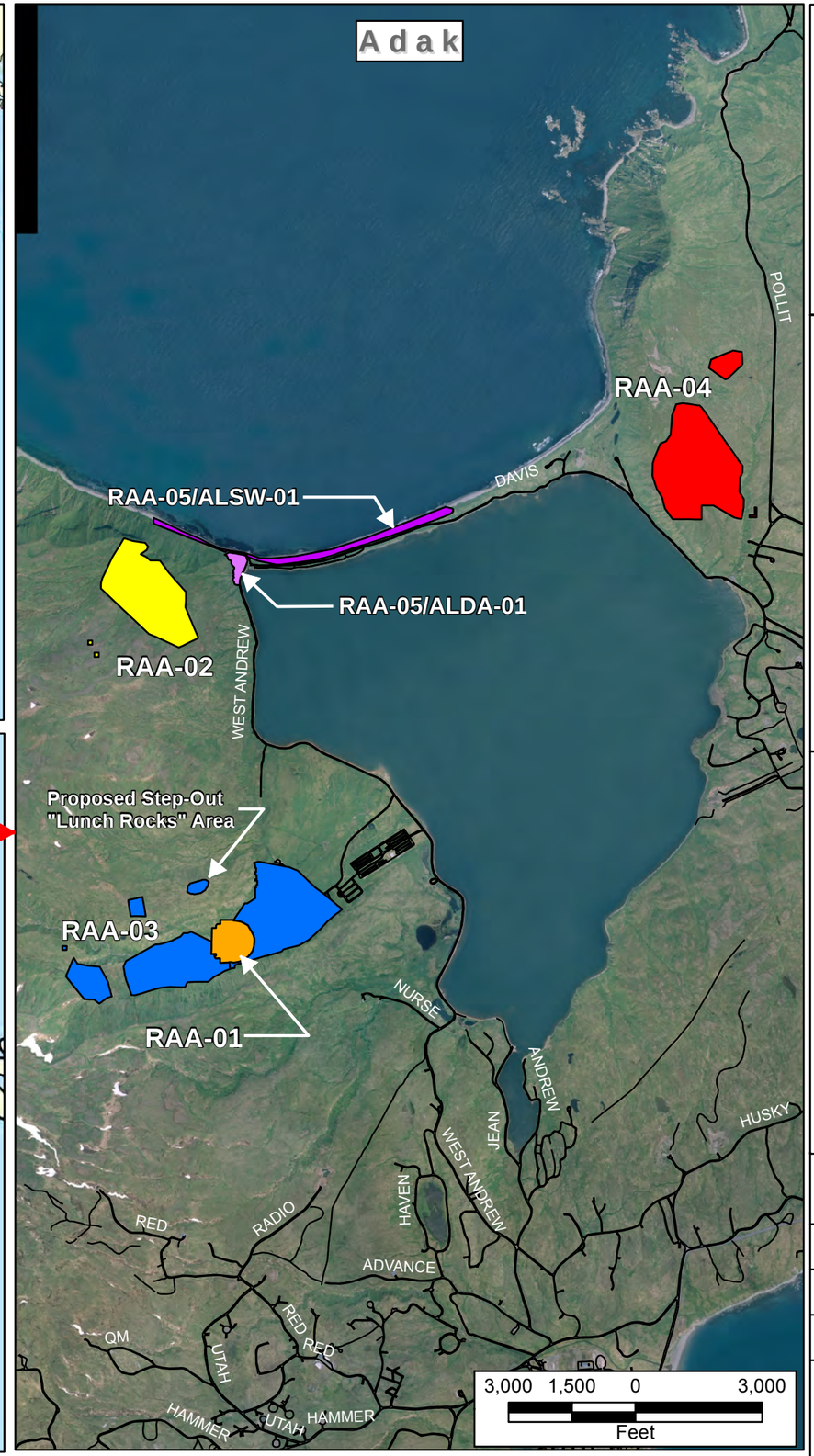

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Scale Varies

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-1

Adak Naval Air Station Regional Location Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- RAA-01 (19.30 ac.)
- RAA-02 (73.70 ac.)
- RAA-03 (149.66 ac.)
- RAA-04 (103.97 ac.)
- RAA-05/ALSW-01 (21.38 ac.)
- RAA-05/ALDA-01 (4.70 ac.)
- Roads
- Adak Naval Air Station

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Drawn By: CLH	Scale: Varies	Rev:
Checked By:	Date Drawn: 2/1/2013	
Submitted By:	Revision Date:	

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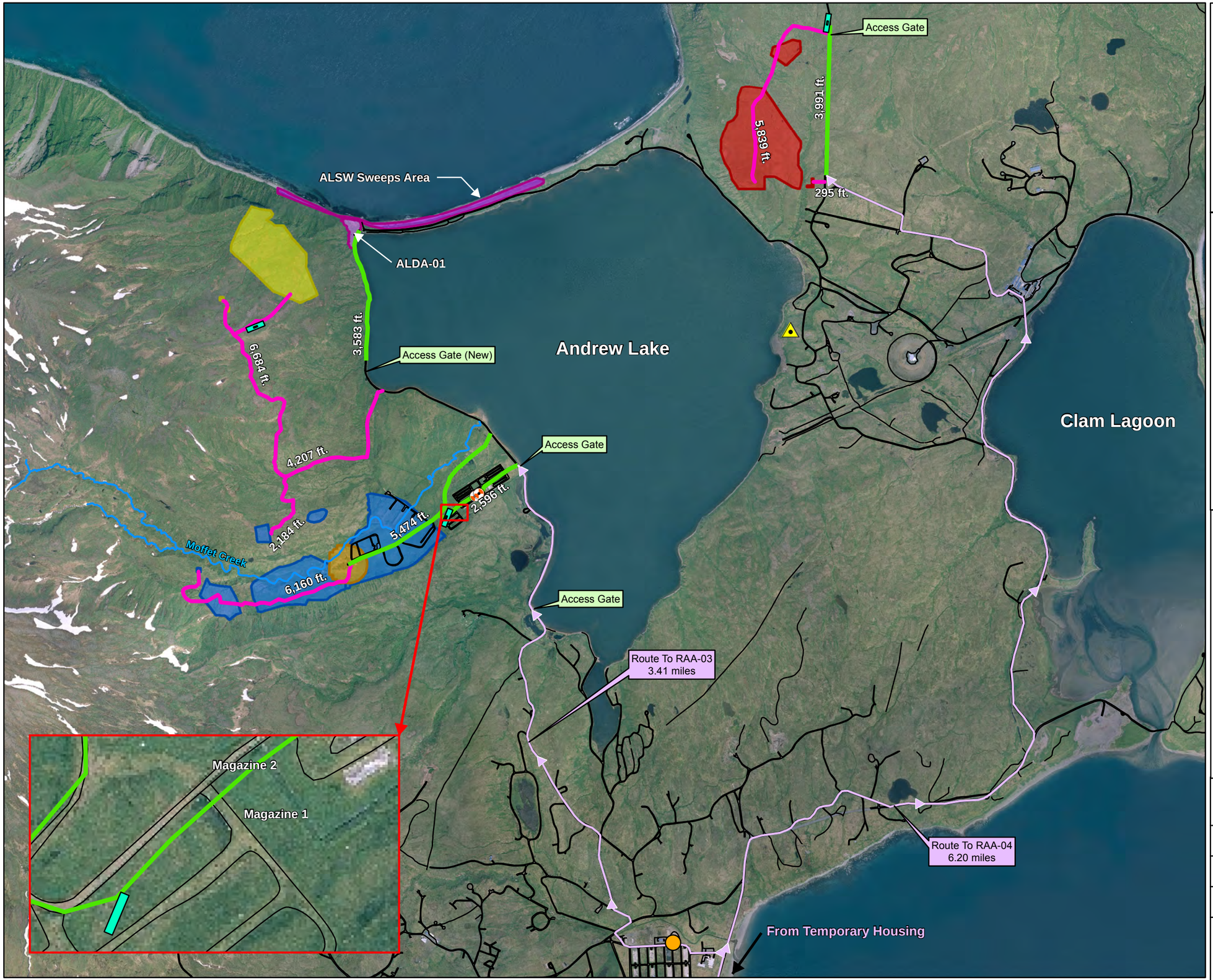

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2,500 1,250 0 2,500

Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-2

Adak Naval Air Station RAA Activities Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- Proposed Access Paths
- Road/Drainage Improvement
- Existing Road
- Route to Sites
- ATF Portable Magazine
- IVS Location
- Base Station (1st Option)
- City Dump and Burn Area

RAA Boundaries

- RAA-01 (19.30 ac.)
- RAA-02 (73.70 ac.)
- RAA-03 (149.66 ac.)
- RAA-04 (103.97 ac.)
- RAA-05/ALSW-01 (21.38 ac.)
- RAA-05/ALDA-01 (4.70 ac.)

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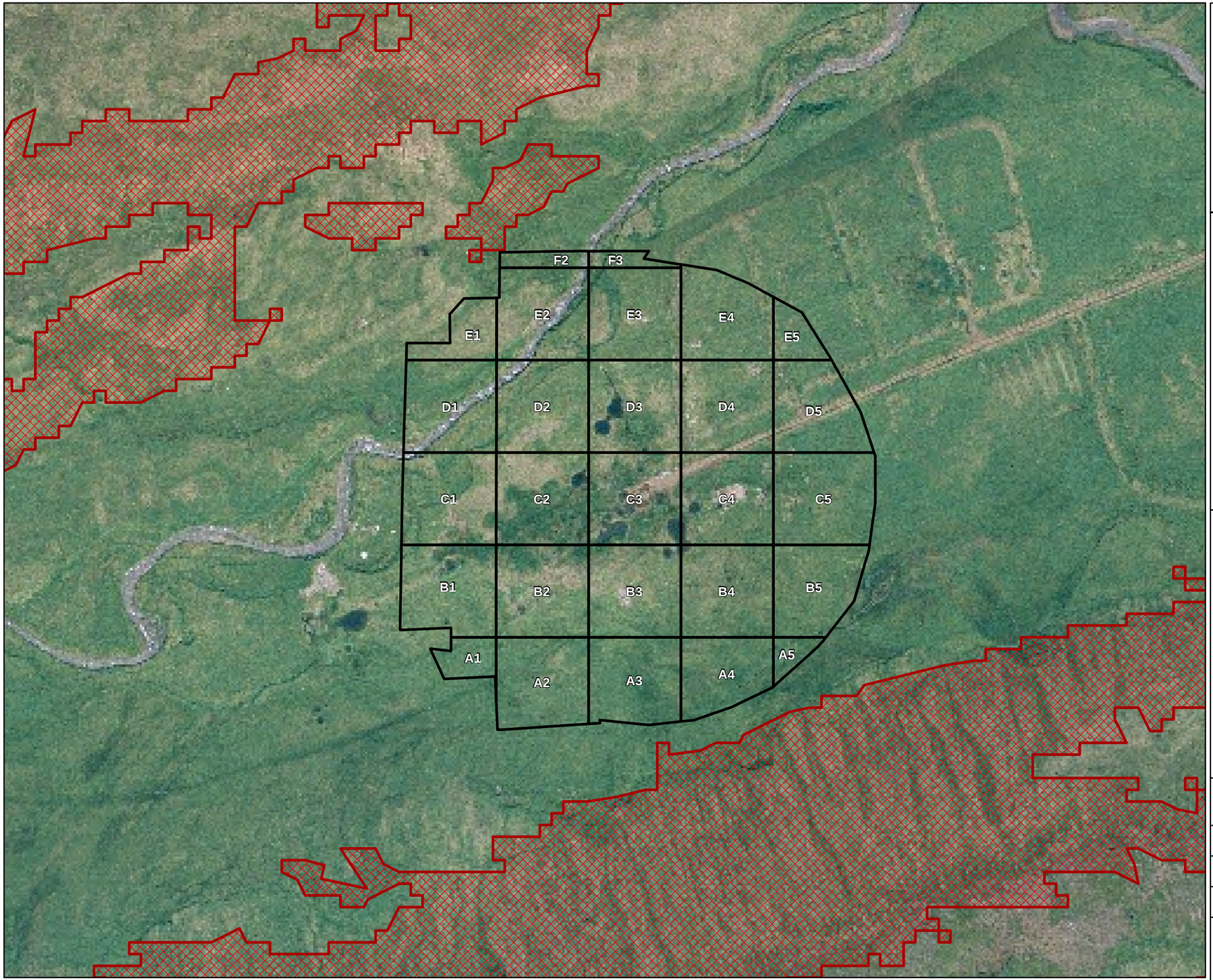

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Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-3

Adak Naval Air Station RAA-01 Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

200' x 200' Grids

Inaccessable Area - Slope > 30°

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Drawn By: CLH	Scale: 1 inch = 200 feet	Rev:
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Submitted By:	Revision Date:	

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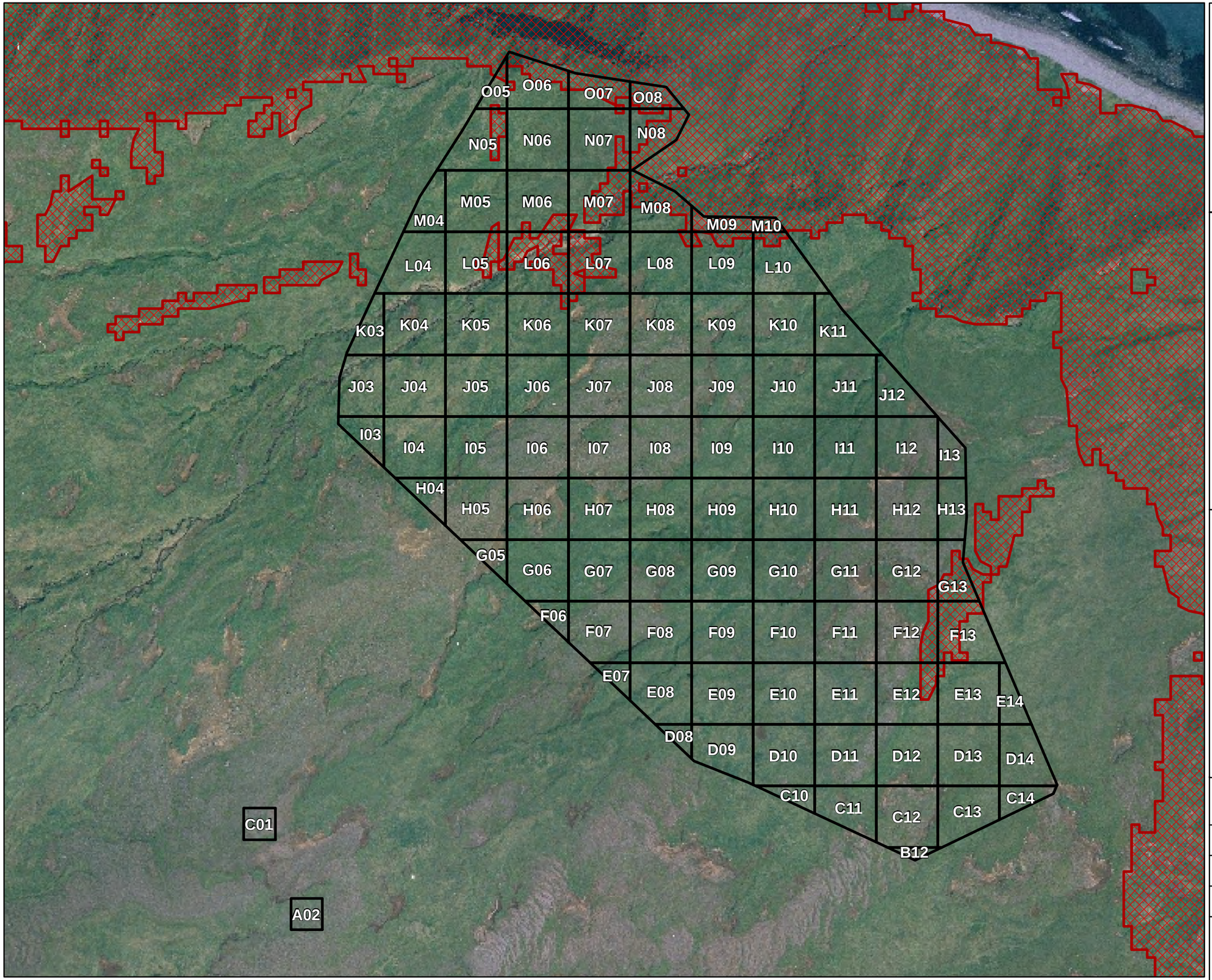

N

300 150 0 300

Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-4

Adak Naval Air Station RAA-02 Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

200' x 200' Grids

Inaccessable Area - Slope > 30°

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Checked By:	Date Drawn: 1/24/2013	
Submitted By:	Revision Date:	

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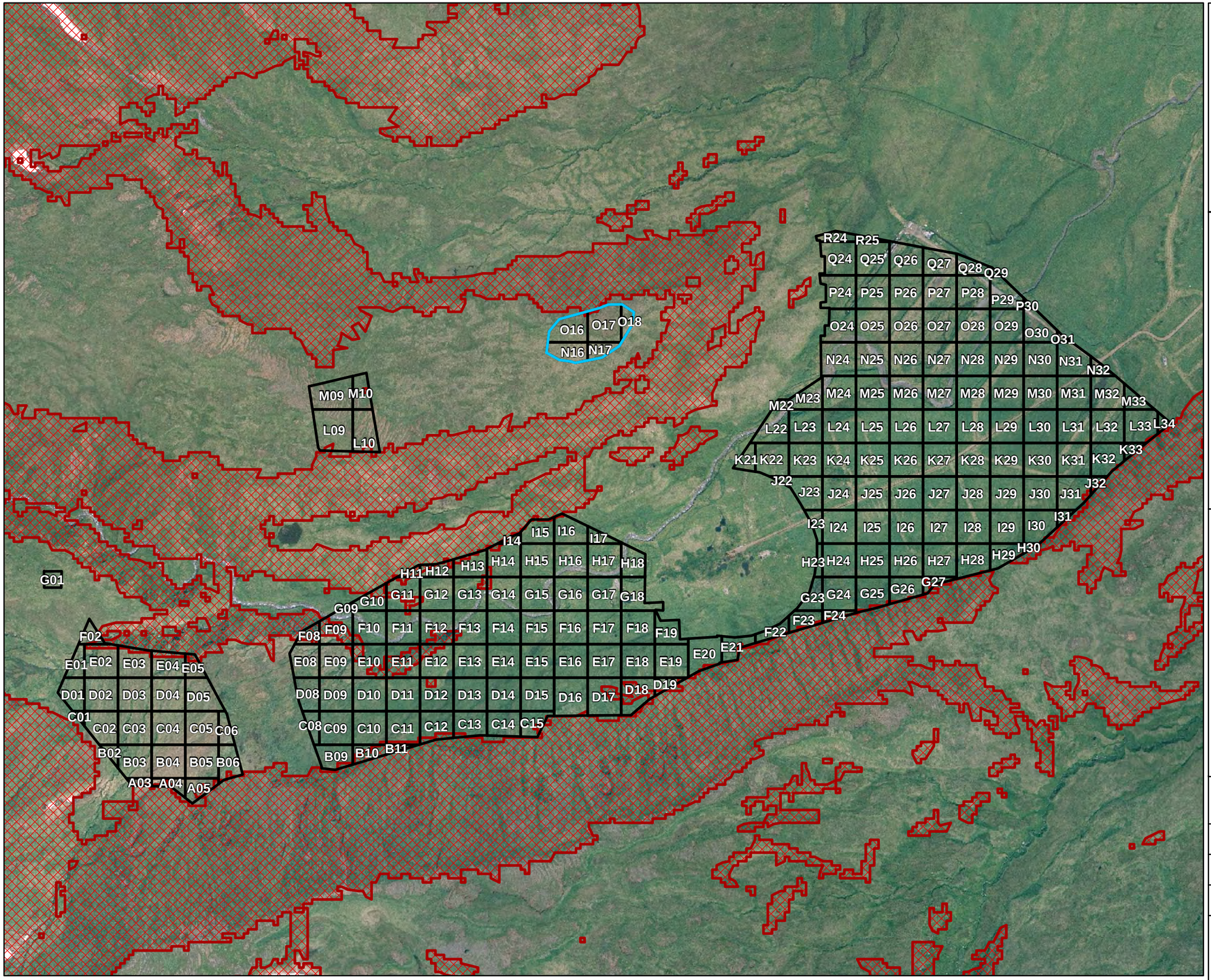

N

550 275 0 550

Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-5

Adak Naval Air Station RAA-03 Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- 200' x 200' Grids
- Proposed Step-Out "Lunch Rocks" Area
- Inaccessable Area - Slope > 30°

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Drawn By: CLH	Scale: 1 inch = 550 feet	Rev:
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Submitted By:	Revision Date:	

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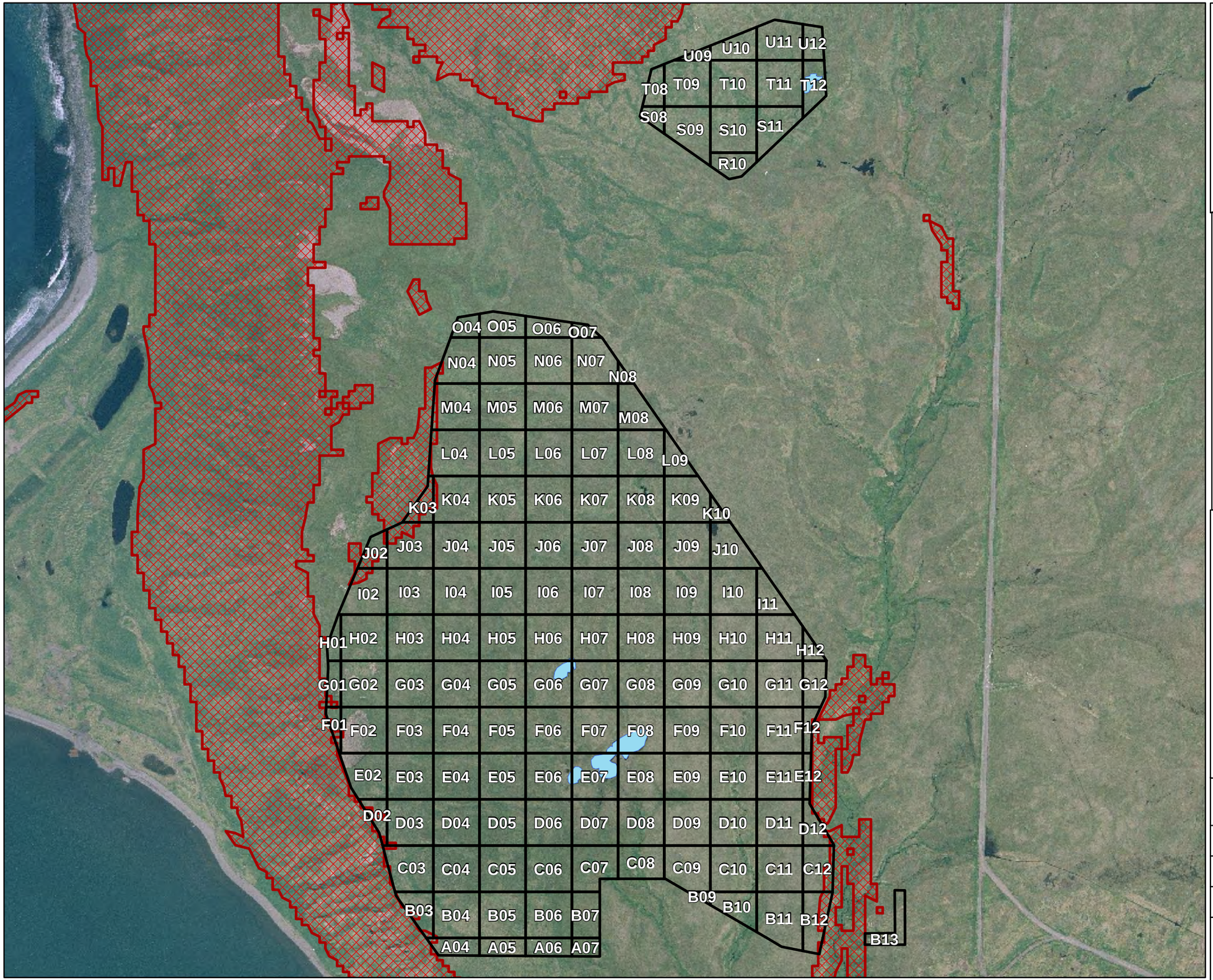

N

400 200 0 400

Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-6

Adak Naval Air Station RAA-04 Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- 200' x 200' Grids
- Inaccessable Area - Slope > 30°
- Inaccessable Area - Water Body

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Drawn By: CLH	Scale: 1 inch = 400 feet	Rev:
Checked By:	Date Drawn: 1/24/2013	
Submitted By:	Revision Date:	

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N

575 287.5 0 575

Feet

Data is projected to the UTM Coordinate System:
NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-7

Adak Naval Air Station
RAA-05/ALSW-01
Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- RAA-05/ALSW-01 Boundary
- Inaccessable Area - Slope > 30°

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Drawn By: CLH	Scale: 1 inch = 575 feet	Rev:
Checked By:	Date Drawn: 1/28/2013	
Submitted By:	Revision Date:	

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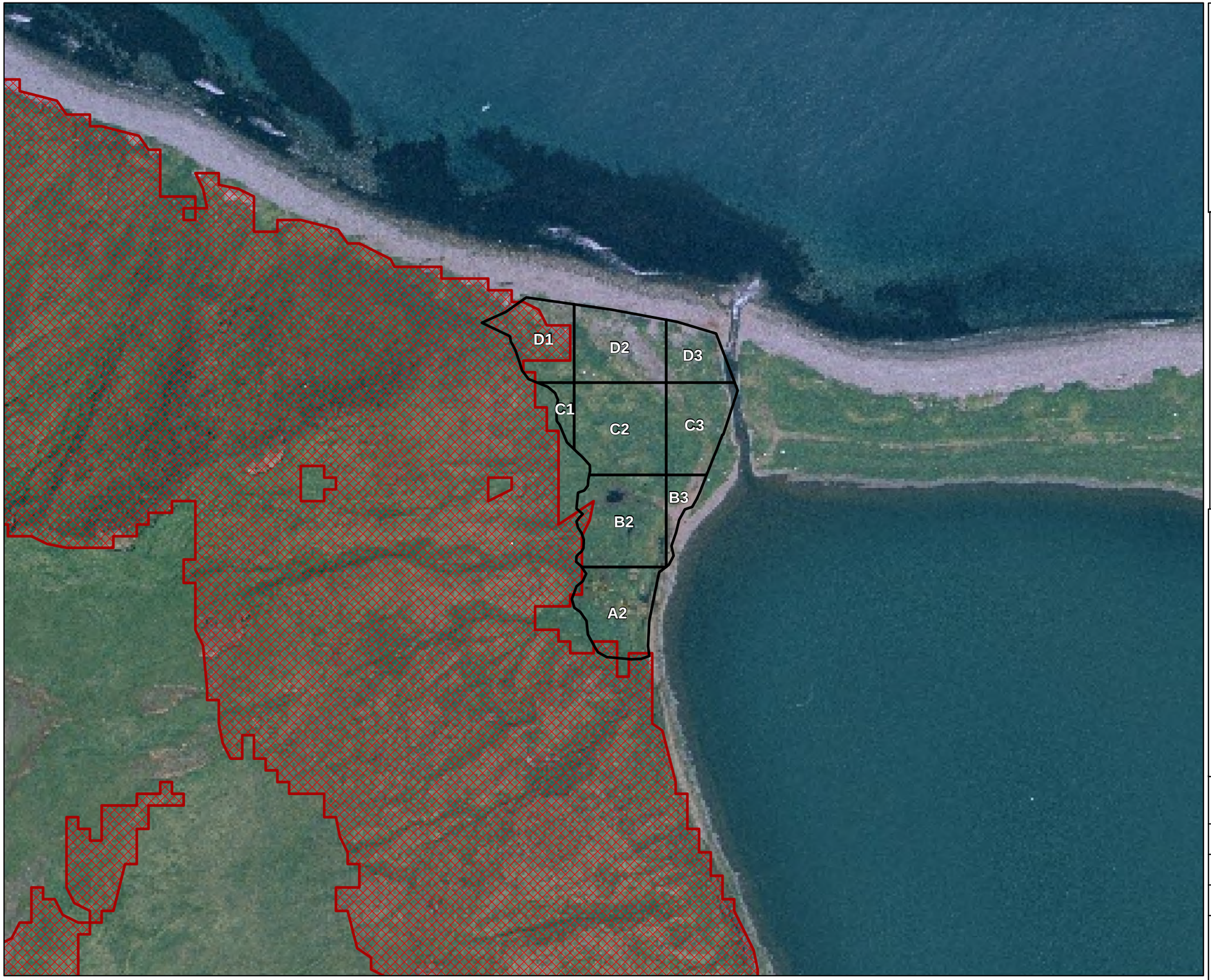

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200 100 0 200

Feet

Data is projected to the UTM Coordinate System: NAD 1983 StatePlane Alaska 10 FIPS 5010 Feet

Figure I-8

Adak Naval Air Station RAA-05/ALDA-01 Grid Map

RAA-01; RAA-02; RAA-03; RAA-04; RAA-05
Adak Island, Alaska
Contract No. N44255-12-C-3003

Legend

- 200' x 200' Grids
- Inaccessable Area - Slope > 30°

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Drawn By: CLH	Scale: 1 inch = 200 feet	Rev:
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Submitted By:	Revision Date:	

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FINAL

APPENDIX J. SCOPE MEETING NOTES

Non-Time Critical Removal Action

For the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

Prepared for:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL 34677

Prepared under:

Adak OU B-2, NTCRA Munitions Clearance
Contract No. N44255-12-C-3003

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Adak OUB-2 Technical Project Team Meeting
Comment Resolution Meeting on OUB 2 Feasibility Study
Anchorage Offices of the ADEC
October 25 - 26, 2011

DRAFT SUMMARY COMMENTS

In Attendance

Ray Kobeski	**Navy**
Christopher Cora	**EPA**
Guy Warren	**ADEC**
Lansana Coulibaly	**BRAC (via telecom)**
JoAnn Grady	**Grady and Associates**
Tom Hall	**Tech Law**
Karla Braesmle	**Tech law**
Marilyn Gauthier	**Ch2mhill**
Dana Downs-Heimes	**Ch2mhill**
George Spencer	**USA Environmental**
Les Clarke	**Batelle**
Mark Blohm	**Blohm Consulting LLC**
Eugene Mikell	**UXOPro**
Eric Zentner	**Boreal Communications**

INTRODUCTIONS AND EXPECTATIONS

The team began the day with a review of introductions and expectations for the day. Navy's Mr. Kobeski stated his major goal in the meeting was to provide the regulators the opportunity to have an "over the shoulder" review of the draft Feasibility Study (FS). He wants the regulators to have the chance to point out issues in the current version which they feel are incorrect and would like addressed. He would like the chance to discuss and hopefully correct any problem with the document.

The Environmental Protection Agency's (EPA) Chris Cora stated he was hopeful that the team could define the RAA boundaries as well as be able to agree as a team on the alternatives that are evaluated in the document. He would like to be able to move forward to the draft final stage on the combined RI/FS of the document. He felt the agencies can cooperate to get that accomplished.

The Department of Environmental Conservations (DEC) Guy Warren stated his objective was to make progress on the document. The stated the team has been struggling with the FS since 2001. His hope is to agree on the RAA boundaries and to make the determination of which alternatives to analyze in the FS. He acknowledged Mr. Kobeski's work to fill the document data gaps, and hoped during the meeting to address and clarify persisting issues with the document.

Ms. Grady reviewed the five guidelines for discussion and asked the team to be aware and protect each other's professional integrity.

The team reviewed the agenda, and agreed to have the wetland discussion take place on Thursday morning. Mr. Kobeski stated the Navy contractor is still in the process of verifying data, but feels the preliminary work gives a good idea of the horizontal extent of the wetland. He stated RAA 02 (C1-01) was the least affected by the wetlands, and Moffit valley being the most affected. DEC inquired how Navy felt the wetlands will affect the RAA boundaries. Navy stated it may affect implementability, the cost, worker safety and other aspects of work. Mr. Cora offered that the RAA boundary is set up by the contaminants of concern and suggested the team agree to that and then deal with the wetlands. Mr. Cora stated he does want the wetlands to get ahead of the team, and in that context, he feels if EPA approves the NTCRA to improve the drainage in the area, changes and impacts to wetlands might be temporary.

Navy shared recent preliminary maps on the wetlands, and stated the piece that is missing from the wetlands report that they feel is critical to understand is the consideration of impact and damage to the wetland itself. DEC stated they have never had to mitigate for wetlands due to anomaly investigations on Adak. Areas were investigated and the anomalies were prosecuted, but it did not affect the RAA boundaries. Mr. Warren felt the team would have to address the issue when they dig anomalies, but does not support cutting wetlands areas out of the RAA.

The team agreed to further their discussion on the wetland when the biologists can join the meeting later in the week.

THE ANOMALY DATABASE

Navy began discussion on the database and stated they had contacted Tetra Tech (TT) and ask them to provide the Navy with the 1999 to 2006 information gathered from work on the site. Navy is in receipt of the electronic data, but has also asked that TT locate the hard copy of the data. DEC offered that hard copies may not have been required in the field during that time.

The team undertook a lengthy discussion on the reasons for, and the confusion with, the multiple data bases which have been generated by the different contractors on the OU-B sites throughout the years. It is Navy's intention to combine and organize the databases to ensure the data which is used as the basis of the OUB 2 RIFS is complete and agreed upon.

Both EPA and DEC agreed that all information and data which make up the basis of the document should to be verified by Navy and agreed upon. Navy also stated that the administrative record needs to be complete and record a paper trail. It must record how data was collected and how it was used to generate decisions made at the site, and subsequently recorded in the document.

RECLASSIFICATION

Marilyn Gauthier addressed the issue of reclassification and reviewed for the team the myriad steps taken to update the document using the most recent MEC classifications. She highlighted that the addition of the 2008 non-MEC data that was pointed out as being missing from the Sept. 13, 2011 version of the FS did not change the RAA boundaries as they are currently drawn in the document. She

stated that when USA Environmental/Ch2MHill compared the RI, and cross checked the FS data to make sure all MEC items were accounted for, some items previously classified as UXO had been changed to MPPEH. EPA offered that Navy include a 'crosswalk" to transparently describe the reclassification and the work to create the uniform classification and database.

ACTION ITEM: Navy will include a copy of USAEnvironmental/CH2M Hill's database crosswalk as part of the MEC database appendix in the next version of the RI/FS.

Navy added their resolve to organize the data stating that any missed information could be tracked down and would be a single issue rather than an institutional flaw. Even though there is issue with the database, the team understood that potentially missing data is not likely to shift RAA boundaries.

Mr. Cora stated the thought that the project could lose track of data was of concern. Navy agreed and stated this as the reason they are organizing and cross referencing the data now. Mr. Hall of TechLaw sympathized with the difficulty Navy is undertaking with classifying historically collected data in 'painting a moving train', referring to the DOD munition language changing through the years. Kobeski said the Navy team will continue to work on the database until it is complete, and will provide a copy of the consolidated project database to Mr. Warren and Mr. Cora upon completion.

ACTION ITEM: Mr. Kobeski will provide a copy of the consolidated project database to Mr. Warren and Mr. Cora once it has been completed.

RAA BOUNDARY DETERMINATON PROCESS

The team undertook discussion on RAA boundaries and how they have been determined. CH2M Hill explained their process used to determine the boundaries. Ms. Gauthier stated in order for an area within an AOC to be included in an RAA it had to 1) contain DMM or UXO/MEC, and, 2) be accessible for investigation and removal.

EPA queried if this was a new criteria as they had not seen this definition used before. Mr. Cora questioned if it is adding a new definition to the access and/or 30 degree slope understanding. He was of the understanding that AOCs which contained areas of 30 degree slope would still be included in the RAA but would have ICs attached to them. He added there are many steep slopes on Adak which EPA is not concerned with, but there are other areas with slopes where EPA feels there is added risk.

Ms. Gauthier explained that in the past there were different areas within RAAs where only ICs, rather than active remediation would apply and in that case, the whole AOC would have been included in the RAA. In the FS, Navy defined the area by finds of MEC and areas that were accessible for removal, not just ICs.

EPA stated they have concerns as to whether ICs are applied to areas which are labeled inaccessible but that actually contain large sections that are accessible. Navy stated the RI Work Plan excluded working in areas of 30 degree or greater slopes as they were deemed unsafe for equipment use. EPA stated they recognize this, but do not want to exclude the areas from the RAAs as there may be confusion in the future regarding the understanding of why it had been excluded. EPA suggested these areas be included

in the RAA boundary to inform the public that these areas were impact areas and are not safe. The comment was noted. Ms. Grady encouraged Ms. Gauthier to return to her presentation regarding Navy's reasoning behind the RAA boundaries.

Ms. Gauthier continued and stated Navy looked at anomaly finds and drew polygons around areas where MEC was found and then merged adjacent polygons. She stated they started with large groupings of MEC and added 30 by 30 meter grids around MEC finds beyond the concentrated zones of MEC. The 30 by 30 meter grids were added to investigate if the find was an outlier or whether it was indicative of a larger area of MEC contamination. The RAA boundaries were also expanded to include what were thought to be target areas. In C1-01 she stated they did not have a good idea of where munitions were being shot from or where they were being shot to, which is why Navy included a large portion of the AOC west of the area where MEC was found. She stated they also looked at VSP analysis to verify if there was a reason to expand the RAA boundary.

DEC questioned the process by which Navy drew the boundary and could not follow how they ended up with the RAA boundary by following the aforementioned process. DEC suggested using VSP to censor out the no-finds. Mr. Warren further suggested if Navy screen out the no-finds and look at munitions related anomalies the analysis might be more helpful. He continued stating that one could then place a hundred foot buffer around MEC items and then look at the shape which he felt could provide a good methodology for selecting the RAA boundaries. He suggested that two methods be used to evaluate boundaries and the final RAA boundary should be based on the evaluation of both methods. He suggested Navy refine the analysis by selecting a threshold and then compare the shapes. He thought using this method would produce an RAA based on a better analysis His suggestion is that a process be uniformly used for all RAA's and be based on specific data and analysis procedures.

Navy acknowledged DECs suggestion but stated they would rather be over conservative than under conservative. Mr. Kobeski felt DECs approach would shrink the area slightly and stated he would rather stay with the larger boundary to be more conservative and ensure variables are captured.

DEC felt Navy would benefit from making decisions based on the analysis of the data instead of making arbitrary decisions on boundaries. EPA stated they were torn on the discussion and agreed with DECs position regarding looking at the data to make the analysis, but uncomfortable not knowing from which point the munition was fired. EPA was not opposed to Navy drawing the larger RAA based on the uncertainty of origin.

DEC offered two ways in which to proceed: put buffers around MEC and add a safety buffer; or use VSP analysis and remove non-munitions related items. EPA stated that it would be very important to articulate the reasoning for the definition of the boundaries in the document. Mr. Cora further clarified that EPA will need to see the objective rational for all of the areas being drawn in any way. Mr. Hall offered that the work plan will also need to include a good expansion process for MEC found on the border of an RAA.

Mr. Kobeski stated they wanted to be conservative and not miss putting an item or find on the boundary. His clarified his intent was not to draw a 'magic' line but to define and explain where they think the boundary should be.

DEC did not disagree with the outliers concept and agreed that there needs to be a 'fudge factor' for cost, but Mr. Warren stated he would still like to see the boundary based on the data and is hesitant to include large areas in the RAA with low densities of MD.

Mr. Cora agreed and felt Navy should define what they are using to define RAA boundaries and add the conservative factors. EPA would like to avoid Navy being accused of setting arbitrary boundaries.

AGREEMENT: After a lengthy discussion during both days of the meeting, the team agreed to use the following process to define RAA boundaries:

o Establish a buffer around MEC, merge the buffered areas, and based on patterns, determine preliminary RAA boundaries.

o Review munitions related anomaly density (mapped by VSP). Areas of high anomaly density without MEC present will be evaluated to determine if finds warrant additional investigation or clearance (and therefore need to be included in the RAA).

AGREEMENT: The Navy will add to the FS the narrative criteria for establishing each of the RAA boundaries. **(This agreement has changed slightly due to events. During the meeting it was agreed to place this narrative in the RI. The narrative will now be placed in the FS.)**

ALTERNATIVES TO BE CONSIDERED AND EVALUATED FOR IN THE RAA'S

The team continued their discussion on the alternatives to be considered and evaluated for in the RAA's. Ms. Gauthier stated that as OUB-2 is a MEC site, there are only so many technologies and process options available for remediation of MEC. She stated the alternatives listed were developed taking into account detection, removal, disposal, and institutional controls. These were the technology and process options from which the remedial alternatives were developed.

DEC stated when reading through the document it seemed the narration went through the technical evaluation and but never came to a conclusion. Instead it moved to a discussion on the alternatives, which were depth of clearance, but there seemed no relation between the technologies and the clearance depth. Mr. Warren stated he is struggling over how the alternatives are packaged and feels the additional alternatives placed in the document only confuse the reader. He asked if the alternatives/options could be simplified to no action, ICs only, and removal of MEC.
Mr. Warren continued his explanation to the group regarding the concept of clearance of all selected anomalies and presented his rationale for that alternative.

After a lengthy discussion regarding the packaging of the alternatives and a difference of opinion regarding a common definition of 'unrestricted land use', the team agreed to a discussion on alternatives without the discussion on land use. Ms. Grady suggested the team will need eventually to

agree on a common language and definition for both 'unrestricted land use', and an agreement on a team understanding of both the 'depth to detection" and/or 'clearance to 2 or 4 feet,' listed in the alternatives as both are tied to land use. The team did agree that for the sake of the EECA, the FS will continue to include all of the current alternatives, however, the concept of depth of detection and how it influences the depth to which anomalies will be prosecuted, will be added to the alternative descriptions (e.g., once a subsurface anomaly has been investigated and acquired, and no additional anomalies are detected to a depth of 2ft, the subsurface investigation will cease, otherwise the location of the residual anomaly will be recorded and the Navy will decide to either continue to intrusively investigate the anomaly or to manage uncertainty about the source or the anomaly with ICs). Navy understood this to be a compromise on their part. Mr. Kobeski stated he needs assurance the Navy is not put in a position to have to implement a ROD amendment to change the remedy. He further stated Navy has no intent of leaving any known area of MEC in place and this was why the 4 ft. limit was added since that is the depth to which OUB-01 was cleared for unrestricted use.

EPA stated they felt the discussion was more a matter of semantics. Mr. Cora stated he is looking for clearance to 2 ft. using the standards established on island, and prosecuting the remaining anomalies if they have not been found at that depth, this is a different scenario from depth to detection measured from different surfaces since we are trying to avoid the thousands of no-finds that would result from lowering the pick thresholds

Navy stated a QAPP would be presented to the team shortly, which Mr. Kobeski feels will need to be modified regarding the unrestricted access issue. Mr. Kobeski stated he has the authority to make the decisions regarding EPA and DECs suggestion regarding the depth to detection alternative, and that he is leaning towards an agreement, but will reserve the right to discuss it with his management.

RAA 01-OBOD-01

The OBOD-01 area was defined in the RI/WP as an area of a certain diameter where a variety of detonation activities occurred. This is the one area in OUB-2 that is regulated under RCRA and requires a closure plan. The area is surrounded by target impact areas. The area was investigated with 100 percent DGM, except in the water filled crater areas. Navy explained when they drew the RAA-01 boundary they included a portion of RR-02. The max depth of the pre 2008 investigation at this AOC was to 4 feet but they did not find any MEC deeper than 2 feet in the limited investigation. They stated they did find some metal debris at depths greater than 2 feet.

Ms. Gauthier presented map of various depths with all MEC items labeled. The anomaly narrative was taken from the database and included blasting caps, initiators, etc. She stated there appears to have been some overlap between the range-related and OBOD-related items, and the boundary was not distinct between the uses of this area.

DEC stated they thought that since the area was an OBOD site, stopping at 2ft seemed inappropriate. DEC articulated another concern regarding how the excavation of concentrated anomalies was factored in the cost. Navy stated there are a lot of variables that affect the cost estimate: how deep you go,

whether you dig by hand, water management, percentages etc., which all have to be factored to determine the cost of remedial action alternatives at r each RAA.

Both EPA and DEC requested further justification for its estimate on the cost associated with the mass excavations in the RAA 04 area. Navy agreed.

Navy discussed its rationale for terminating investigating at 2 ft. in the OBOD area. EPA and DEC asked that the documentation for justifying the termination be added to the narrative. Navy said they could clarify the justification for terminating its investigation at 2 feet in OBOD area.

AGREEMENT: The Navy will provide further justification for its estimate of the cost associated with mass excavations and other wetlands related work in the RAA-01 area.

Mr. Kobeski stated that the long term plan on this site is for it to revert to a wildlife area after work is complete. He stated the land use controls and wetlands status will be protective into the future. URS is currently working to determine the vertical limits of wetlands using existing information. By 'vertical limits', Navy is referring to the possible presence of a low permeability soil horizon which would limit vertical percolation of precipitation causing water to pond up on the surface and create wetlands. If they cannot determine this from boring logs and other previously gathered information, they will return in the spring and gather the data needed to complete their determination

ACTION ITEM: Ms. Gauthier will provide to the Navy the boring and well logs for sampling locations in the Moffett Valley to assist in the classification of soils for the wetlands evaluation.

Navy stated there are considerations they will need to take into account in this area, such as historical considerations regarding the road into the site. EPA questioned the need to preserve the road and felt that if SHPA heard the rational for removing an access route into the highest risk site on Adak, they may reconsider their interest in preserving the road. Navy stated they will await the completion of the historic and cultural study and report back on that determination.

RAA-03 (MI-01, MI-02, MI-03, RR-01)

Ms. Gauthier began her discussions on RAA 03 stating the key feature in the RAA is Moffit Creek which has very steep banks in the valley, a steep wall, and a high MEC density in the MI-01 area. Mr. Warren stated that after looking at the VSP analysis of the area, it seemed to DEC that the RAA boundaries were missing 'hot spots'. Ms. Gauthier stated the RAA boundary was not drawn on munitions debris but on MEC. DECs stated their concern is that the high density area might be an impact mortar area. Ms. Gauthier stated that oversight could be a function of the reclassification process as this was an area where location information was different and/or missing in the administrative database.

The team undertook a long and animated discussion regarding differences in the database information being used to make determinations on these sites. EPA asked that it be stated for the record that they had lost confidence in the Navy data. Navy stated that they had control of their database, but did not have access to ADECs database and was uncomfortable referring to their unofficial data base for clarification regarding data issues. Mr. Warren clarified that the GIS data that he used for his evaluations

was provided to ADEC on CD by the Navy's RI contractor. He clarified it was not ADEC's database, but rather a project database. Marilyn clarified that the data which DEC has may very well be in the administrative database, as that they were still working to align and verify the data.

The team continued its consultation related to the formation of the boundaries for RAA 03. Mr. Warren stated he felt the agreed upon analysis for designating the RAA boundaries must be applied uniformly on all sites. He reiterated his understanding of the process as removing no finds from the VSP analysis, and rerunning the analysis, comparing the differences and drawing the boundary based on the most valid decision point between those two methods.

EPA agreed and stated that the explanation of the high density finding in this area as being a kick out did not make sense. Mr. Cora suggested Navy place a boundary around the area and state that the team is uncertain about it due to limited investigation. Navy stated they felt they had enough information to feel confident about their determination and boundary.

DEC referred to their data base showing mortar tailfins and fuses had been found at the site, and they felt this information had not been taken into account when determining the boundary for this RAA. Navy stated again that they did not feel comfortable using anything but the administrative database to make determinations and the tailfins and fuses were recorded in the ADEC database. Mr. Kobeski continued stating his concern that any data being used for analysis must be verified by the Navy. He said the questions regarding the data base were only brought to his attention during the previous month, and he is taking steps to ensure that the contractor's database is now lined out with the official NIRIS database. Ms. Gauthier stated further that they may have the mortar tailfins and fuses in their database, but they may not have them listed in the same way as ADEC. They are still coordinating all of the data from the varied databases.

EPA stated the issue of database inconsistency is undermining EPA's confidence in the RI and Mr. Cora stated Navy must manage their data so that it is secure. Navy stated the database controlled by the ADEC was bringing into question the database controlled by the Navy. Mr. Kobeski stated that ADEC should prove their database is better than the Navy and also noted that there are two standards for the two databases. EPA suggested it would be prudent to uncover why the two data bases are different because EPA is concerned Navy is moving ahead and making decisions on data that is now in question.

Navy caucused at this point in the discussion. Upon returning to discuss the issue with the team, they stated the teams' confusion may be the limited amount of data that is available for this area. They agreed that there is some evidence that a particular type of munition exists at the site and is indicative of a possible target/impact area. As a result, in areas where queries identify MD, Navy will look and see if it is related to 81's, 60's or other ordinance the characteristic of which would suggest a target area.

EPA suggested the information on the tailfins and fuses be placed in the MEC 'crosswalk'. Mr. Spencer stated it would be placed in the table and in the narrative as well. Mr. Kobeski stated he will provide a copy of the consolidated project database to Mr. Warren and Mr. Cora once it has been completed.

ACTION ITEM Mr. Kobeski stated he will provide a copy of the consolidated project database to Mr. Warren and Mr. Cora once it has been completed.

RAA-03 CONTINUED

Discussions on RAA 03 continued. Ms. Gauthier brought forth maps showing the surface to 6 inches for RAA-03 and explained that all discrete items were labeled in the maps. The very high density MI-01 location showed many finds and a variety of UXO. She explained the dense clusters in most cases in the MI area were centered on finds from 1999 where a ribbon walk was performed through MI-01. The sampling design for the 2008 investigation was the 30 x 30 grid with 100 percent DGM to determine the density of MEC in the area. Mr. Kobeski stated the Navy focus for this portion of RR-03 is the upper two feet of mineral soil. EPA asked if Navy was suggesting that they would use the alternative of 2 ft. clearance followed by the prosecution of deeper finds?

Navy confirmed, and again stated the need to check with management, but after the in depth discussions taking place at this meeting, he felt the 2 ft. clearance, with unrestricted land use was the alternative to be used here, but stated he will still need to keep the 6" evaluation as it pertinent to the EECA.

Mr. Kobeski continued to explain the benefits of this approach as it captures 97 percent of MEC clearance and the most significant reduction of MEC exposure. DEC stated their understanding of the approach and agreed it could be used as an interim remedy for the site. EPA suggested that if there are unprosecuted anomalies for greater than 6 inches at the site, there should be a procedure to mark them. Navy stated it will do 100 percent DGM, everything will be picked and reviewed and if found deeper than 6 inches, it is considered unresolved will be added to the target list.

Inclusion of HG-01 in RAA 03

DEC began discussion on this site and explained why they felt the investigation conducted in 1999 at the site is not acceptable to DEC as a final clearance on the site. Mr. Warren explained the process that DEC uses to call a site complete established DQOs that are then implemented in the field and documented in the report on the site. There is then a review of the data to ensure that the DQOs have been met. He stated that it is DECs opinion that this process was not performed on the site. Mr. Warren stated that ADECs DGM coverage analysis for the site determined that approximately 20% of the site was not covered by DGM. He suggested that the anomaly density in the grids vs. the anomaly density in the original data contain discrepancies and suggested the area should be included in the surrounding RAA to glean approval from DEC.

After reviewing the maps, Navy inquired why DEC and EPA would ask for a 100% review of the area if only 20% of the area was missed? EPA stated there was a concern is that the site is a grenade range and the 1999 and 2008 data indicates that Navy did not pick all anomalies that were on the site. Mr. Cora further elaborated that it was his recollection that as a project team, it has not been decided what an adequate transect spacing for that range would be.

Navy stated this issue should have been covered in the RI phase, and Mr. Kobeski's understanding is that the team had determined the process was adequate and the team had agreed to it. He did not agree that Navy should return to the site during the FS portion of the process.

EPA stated the RI showed the site not complete and leaving it for further consultation and decision was agreed to by the former Navy project manager, the OUB team and Navy contractors. Navy understood the minutes gave approval to move the site forward in the draft phase of the document. Navy asked if there is a data gap at the site, and if the 20 percent that was missed at the site could be redone. Mr. Kobeski stated he felt the regulators were being inflexible in requesting the entire area be redone. He requested DECs analysis on the site for Navy review. EPA stated they did not have to provide the analysis, and stated the items found have an ESHA score of 4 or 5, and the area was not cleared. Mr. Cora stated Navy cannot ask EPA to walk away from work that was not performed adequately. He stated the Navy agreed to this three years ago and this is the fourth time the team has discussed this area. Mr. Cora stated he is of the understanding that if a Navy project manager changes, agreements such as this are not dismissed.

EPA further commented that Navy is required to follow EPA policy. Mr. Cora stated the objective is to have a better FS and have the RAA boundaries defined in a way that is reasonable. He stated DEC spent a lot of time describing how we could simplify this process. EPA stated they felt they were seeking to compromise during the meeting and were not inflexible.

An intense discussion ensued regarding the process at the table. EPA and DEC stated they had been asked to give their opinion on the document, and it was their understanding Navy would listen to their concerns but at each step they felt they were confronted with defense on Navy's part. EPA stated their confidence in the project had been undermined during the meeting as the data for the basis of decisions was in question. Mr. Kobeski stated when he took over the project his goal was to ensure that the quality of the data was verifiable. He felt that Navy had compromised also during their discussions and a team member agreed. DEC stated their objective for the meeting was to agree on RAA boundaries and alternatives. Mr. Warren acknowledged that the team had managed to come to some agreements, but felt Navy was not listening to their concerns. Ms. Grady asked that the team take a two hour break and after reconvening would consider the request by EPA and DEC to end the meeting.

Ms. Grady gathered the team together in the early afternoon and asked if the team could agree to move forward with the rest of the agenda. All RPMs agreed to continue the meeting. She asked Mr. Kobeski to reiterate the progress and agreements that had been made to date by the team. Mr. Kobeski stated the team had reached conclusions on how to move ahead on C-101, RAA-03 and how to proceed in the OBOD area. He added that after consultation with his team, Navy could also agree with US EP and ADEC to 100% DGM and investigation of selected anomalies at HG-01. (This is based on the 20% data gap across HG-01), and that HG-01 will be included in RAA-03.

AGREEMENT: The Navy agreed with US EP and ADEC to 100% DGM and investigation of selected anomalies at HG-01. (This is based on the 20% data gap across HG-01). HG-01 will be part of RAA-03.

RAA-04 (SA93-01)

Ms. Grady proposed that the afternoon discussions focus on SA-93 and ALDA-01, that the team discuss the SMP schedule and NTCRA activity. It was proposed that the team try and conclude their business by the end of the day, and move the wetlands report to a teleconference the following week. The team agreed and moved forward with discussion on SA 93-01

Mr. Kobeski asked Mr. Warren if he had performed an analysis on SA-93-01 and to discuss his conclusions with the team. Mr. Warren suggested continuing with the project methodology and center a 30 x 30 meter grid on outlier MEC and on MEC found in grids at the southeast corner of the RAA so there is a 15 M buffer in the accessible area. The team agreed. The RAA-04 boundary will be established using the same process as discussed for the other target/impact area RAAs. Expansion grids will be added along the edges of Grids 12 and 13 where MEC was found in 2008 (15 meters out from the edge). As a result of MEC being found between 2 and 4 feet bgs., Navy expects to dig up to 4 feet in this RAA.

AGREEMENT: The RAA-04 boundary will be established using the same process as discussed for the other target/impact area RAAs. Expansion grids will be added along the edges of Grids 12 and 13 where MEC was found in 2008 (15 meters out from the edge). As a result of MEC being found between 2 and 4 feet bgs., Navy expects to dig up to 4 feet in this RAA.

RAA 04- VERTICAL EXTENT

During discussions regarding vertical extent in the area, EPA asked if this would be addressed by the 2 ft. alternative with larger anomalies prosecuted to 4 ft. Navy stated it will be to at least 4 feet barring the differences on how the alternatives are worded. At this point Navy stated the team has agreed to disagree on the 2 feet 4 feet wording but will work it out at a later time.

During discussion on this site, it was suggested that during work performance on the NTCRA and remedial action sites, the munitions constituent (MC) ammonium picrate will be analyzed for, specifically in cases of breached M-62 series items or when multiple (10-20) M-62 series items are found.

ACTION ITEM: During work performance on the NTCRA and remedial action sites, the munitions constituent (MC) ammonium picrate will be analyzed for, specifically in cases of breached M-62 series items or when multiple (10-20) M-62 series items are found.

RAA 05 (ALSW-01, ALDA-01)

Ms. Gauthier began the discussion on the Andrew Lake Seawall and stated she wanted to be clear about how Navy was defining boundaries for the different parts of this RAA. Both ALDA- 01 and ALSW make up the RAA 05, and both have their own conceptual site model. She began her discussion on the ALDA-01 side of RAA-05. She stated as ALDA-01 was originally defined, it was a debris disposal area. In the 1990s a 100 percent DGM was performed and trenches were dug in the area. Debris was found to 4 feet; MPPEH and MEC were found in the subsurface. Additionally, the surface of ALDA-01 contains a variety of items that appear to have been washed up and tossed onto the surface from wave action. ALDA-01 consists of both the former disposal area and the wash up area, so there is overlap in the conceptual site

models that drive remedial decisions for the ACOC. She stated the seawall beach sweep alternative will have to be incorporated in the overlap area since it is known that MEC ends up on the water side of the AOC.

Mr. Warren suggested the team review the historic aerial photos provided by Navy. He stated on pg. 19 a pertinent photo from 1943 might lend insight into the area. The first thing Mr. Warren noticed was that the spillway is not present in the photo and the seawall appears to be completely intact. The pattern of disturbance suggests the site could have been used as a beach dump. He further surmised that the idea of a dump offshore of the seawall may not be accurate. Mr. Kobeski stated he wanted to make certain the photo was sent to Batelle for consideration in the UXO mobility study. Mr. Kobeski said the Navy will review the offshore modeling and historical aerial photographs to possibly revise the conceptual site models for ALDA-01 and ALSW-01.

ACTION ITEM: The Navy will review offshore modeling and historical aerial photographs to possibly revise the conceptual site models for ALDA-01 and ALSW-01.

Mr. Kobeski added that some of the information from the older reports and drawings call the water body Andrew Lagoon which was then changed to Andrew Lake. He wondered if they added the seawall when they built their gunnery emplacements.

Ms. Gauthier discussed the proposed alternative for this site. She stated it is known that debris is mixed with rocks to at least 4 feet in the ALDA-01 area. There were no investigation trenches dug through the northern part of the AOC, and attempts in 2008 to dig target anomalies along the beach and the seawall at ALSW-01 were not successful In terms of vertical distribution there is indication of MEC intermingling with the debris to at least 4 feet in the ALDA-01 disposal area. . There is limited access to the subsurface since it is difficult to dig along the seawall itself. She stated there is geophysical evidence that shows debris is present at depth in the seawall. She also stated they are actively trying to locate coordinates for MEC found along the seawall during the annual beach sweeps. She stated some MEC coordinates and information are provided in the NIRIS database, such as the 2002 and 2004 data on the beach sweeps, but they are looking for additional information from the previous and subsequent beach sweeps. Mr. Warren asked if they had provided coordinates and MEC descriptions for items found on the seawall during the 2008, 2009 and later EOD beach sweeps. If so, could Navy provide that information to DEC.

Mr. Kobeski stated the CSMs for this site may change should more lines of evidence be uncovered. He stated he was hoping the Mobility Study might assist. He stated there will be a meeting next week of the upper management of the EPA, DEC and Navy to discuss the off shore portions of the RAA

ACTION ITEM: The Navy will provide the coordinates and MEC descriptions for items found on the seawall during the 2008, 2009, and later EOD beach sweeps, if available. These data will be used to map where MEC has been found on the seawall and assist in establishing the terrestrial boundaries of RAA-05.

RAA 05 ALTERNATIVES

Mr. Warren suggested in his comments to the Navy that inconsistencies in Appendix C of the document for this site detract from the credibility of the argument. He stated that further explanation is needed to explain why the active offshore alternatives, dredging, raking, divers, etc., are not preferable to doing the onshore work. Ms. Gauthier confirmed that DEC is asking them to address the risk as it washes up rather than go after the source. She understood DEC was requesting the need to make a strong case for what is protective, and also that it address the pathway of concern.

EPA stated their concern that the Baring Sea NOT becomes a money dump. Mr. Cora asked Navy to present a logical argument for why none of the alternatives are practicable, i.e., it is not practical to mobilize multiple dredges if you can demonstrate financially that you do not need to do that to reduce the risk. He continued stating the idea of not characterizing the source undermines the argument of how long it will take. He feels the document needs a rational showing that what is being proposed makes the most sense, while discounting other things that do not make sense. He stated that EPA shares the idea that it is not a good use of federal funds to clear a suspected offshore dump that no one is sure exists.

Navy stated they were listening, but Mr. Kobeski stated the decision was out of his hands. He stated he was told by management that this would be one of their agenda items and it will be handled at that level because it was handled there before. He stated he felt the best option was the alternative analysis, and the cost will go up depending on how alternatives were executed, and also because of the remoteness of the site. He stated that Navy did solicit real costs for dredging.

Mr. Kobeski stated that Navy needs to study the UXO mobility report, look at the historic photos, and then see what the managers have to say on the subject. The Navy will then review offshore modeling and historical aerial photographs to possibly revise the conceptual site models for ALDA-01 and ALSW-01. The team agreed.

AGREEMENT: Navy will review offshore modeling and historical aerial photographs to possibly revise the conceptual site models for ALDA-01 and ALSW-01.

AGREEMENT: An upper level management meeting will be held next week to discuss the resolution of the offshore (marine) portion of ALSW-01.

Ms. Gauthier continued stated they are fine looking at offshore technology and process options, but carrying through the alternatives analysis with a big unknown will use up a lot of resources. Dealing with the 'what if' and how to estimate that is a concern. She stated they would like the FS to be focused on the MEC exposure risks associated with the site. In regard to moving forward, the offshore will be discussed at the management level. She is also looking forward to seeing what the analysis and the modeling will show so that terrestrial alternatives for RAA-05 can be pinned down.

Ms. Gauthier proceeded to discuss the alternatives for the disposal portion of the seawall. She discussed Alternative 5A which consists of annual seawall sweeps, clearance of MEC at ALDA-01 to a depth of 6 inches, and access restrictions. She stated the 6" is the maximum depth able to be addressed without heavy machinery. She said Navy looked at clearance to 2 feet which would get to the debris layer and the depth at which MEC was found. She stated in the past those alternatives were evaluated. She said

the deeper digging option in ALDA-01 (Alternative 5B) will require heavy equipment in most areas, although isolated anomalies could be dug by hand by highly motivated EOD techs. DEC mentioned that understanding did not come across to them in the mechanical example in the document. Ms. Gauthier noted the comment.

Ms. Gauthier continued and pointed out that, in the FS, all the alternatives for RAA-05 involve the Navy retaining the property. They all have specific ICs associated with them. Mr. Kobeski added the complicating factor is if F&W will accept the transfer, or it they will accept it and want Navy to maintain it for them. He stated it is his understanding that when the land is transferred back to F&W, it is then tagged with containing MEC. It does not go into the deed itself until it is transferred back to the government. EPA stated this is where their concern lies. Mr. Cora stated EPA can 'live with' the land use being designated as a wildlife refuse since it falls into the existing control system. If it is unrestricted and can move to residential, EPA feels they will need some sort of measure.

Mr. Warren said the confusion may lie in the Navy stating, in Homer in 2009, that the land would not necessarily go back to the F&W. Mr. Kobeski stated that was an incorrect statement. Mr. Cora continued stating the Wildlife Refuge/Subsistence Recreation designation of unrestricted land use regularly gets confused with unrestricted residential designation, but the unrestricted designation meant unrestricted for wildlife, Subsistence/Recreation as determined be ESHA intrusion depths. He stated if Navy begins to change the future anticipated land use, both DEC and EPA will have concerns. He stated it may help to clearly state that the unrestricted to 4 foot designation means unrestricted for the future anticipated land use as a wild life refuge.

Mr. Kobeski stated that OUB-1 is 'unrestricted'. Mr. Cora stated there is nuance in that designation which can be better understood if the land transfer is reviewed. He stated there are land use designations in the transfer and the land is unrestricted for that land use. He feels the unrestricted residential designation is a problem that causes confusion.

EPA added that there is a significant difference between the anticipated land use being unrestricted for wildlife refuge and unrestricted for residential use, which is why EPA is being more diligent about defining "unrestricted land use".

The team agreed to conclude their discussions on the FS document. Mr. Warren completed the discussion on the FS with a last suggestion, requesting that Navy review and revise Appendices C for technical accuracy and consistency with the remainder of the document. ADEC requested that Appendix C include a brief description of how MEC detonation/disposal have traditionally been conducted on Adak. Navy concurred.

ACTION ITEM: The Navy will review and revise Appendices C for technical accuracy and consistency with the remainder of the document. ADEC requested that Appendix C include a brief description of how MEC detonation/disposal have traditionally been conducted on Adak.

SMP SCHEDULE

Mr. Kobeski discussed the SMP schedule with the RPMs and stated he is in need of amending the schedule. He explained that combining the RI and the FS will not produce the draft final until January of 2013. He stated he knew the accelerated schedule including the NTCRA was a 'hard sell', but it allows the project to move forward in an expeditious way. He will send the draft schedule to the RPMs for their review and hopefully their approval this next week.

FUTURE MEETINGS

The team discussed dates for scheduling future meetings. The team will meet via teleconference on November 3rd for a wetlands update, and discuss at that time the need for another meeting on the NTRCA update to be held either November 10 and/or 17th. The team also agreed to meet for an in-person meeting in Seattle November 29 to discuss the NTCRA work plan.

AGREEMENT: The team will meet via teleconference on November 3rd for a wetlands update and on November 10 and/or 17th for an update on the NTCRA plan.

AGREEMENT: The team agreed to meet for an in-person meeting on November 29th in Seattle to discuss the NTCRA Work Plan.

The meeting adjourned at 4:30

OUB Team Teleconference
November 10, 2011

In attendance:

Ray Kobeski	**NAVFAC NW**
Chris Cora	**EPA Region 10**
Guy Warren	**ADEC**
JoAnn Grady	**Grady and Associates**
Les Clarke	**Batelle**
Mark Blohm	**Blohm Consulting LLC**
Tom Hall	**Tech Law**
Karla Braesmle	**Tech Law**
Eric Zentner	**Boreal Communications**

REVIEW OF MEETING OBJECTIVE, AND FUTURE MEETING SCHEDULES AND OBJECTIVES

Ray welcomed the team and stated the objective of the teleconference was to receive input from the regulatory agencies on the draft NTCRA work plan, and also to review the process by which the Navy incorporated information received from the regulators at the Oct 25-26 meeting into the horizontal extent of the RAA boundaries. He also reviewed the schedule for upcoming meetings and inquired regarding the possibility of having the Nov 17th meeting focus on response to comments on the FS along with ADEC comments on the work plan. He stated his goal is to incorporate as many comments as possible and have the FS in a draft final stage when it is delivered to the regulators on the 28th of November. Guy stated he will not be prepared to have a discussion on the NTCRA work plan until the 18th. Chris acknowledged the accelerated review on the document is posing a problem as EPA does not have the resources to dedicate to the review. The team agreed next week's meetings will focus on discussion of the last of the ADEC, EPA comments on the FS, and any remaining comments on the work plan.

RAA BOUNDARY PROCESS AND INPUT INTO THE NTCRA WORK PLAN

Ray suggested the discussion begin on the horizontal extent of the RAA boundaries and how Navy is proposing the information received during the last meeting flow into the FS document. Les provided a review of the analysis they performed for determining the boundaries of the RAA. Ray said there was not a formal presentation on the process, and asked the regulators to contact him if they needed any information or clarification on where their input has been placed in the report. EPA felt the need to state their management wants the site to move towards a Record of Decision.

Les proceeded to ask the regulators for their input on the NTCRA WP. Guy said he had only started his review but could suggest that Worksheet 10 make a better attempt at focusing on the data quality objectives (DQO). EPA concurred and felt less history and more on the DQOs would be appropriate. Les noted the difference in the suggested change and the guidance he received from Navy's internal review. EPA said the worksheet is supposed to focus on problem of definitions and a synopsis of secondary data and site reports. He suggested the project objective should be listed up front, but as it is now, the reader does not know the objective until the end. EPA's suggestion was noted.

Guy stated a DEC concern is the lack of discussion regarding preparing the areas for improving drainage conditions or dealing with road issues. Navy stated they addressed this issue in the work plan but it was in worksheets 14 and 17 instead of 10. Ray stated Navy would move the discussion to worksheet 10 if the team felt it would be more appropriate.

ACTION ITEM: Navy will move the above mentioned discussion to worksheet 10.

Guy further stated he would like to see an expanded discussion on the reasons behind the work, specifically why Navy is proceeding without an EECA or an action memo. He again reiterated that he is still in review of the document and will submit more formal comments by the 18th. He will not be in a position to discuss it further until then.

The team discussed how the lack of an extension on delivery of the FS might affect the NTCRA schedule. Budget constraints associated with varying options were discussed by the team.

EPA stated their concern that the approach Navy is presenting might add damage to the environment, erosion etc. as it would result in a double mobilization that is contrary to their concerns about wildlife. He stated that while EPA does not have to approve how Navy does the removal actions, he would rather see a complete removal per the final remedy at specific RAAs or prepare the site for addressing the remedial actions which the team thinks are appropriate, such as the drainage controls etc. Chris does not agree that Navy's approach will make the area safer for people since Navy has said it is already safe under its educational awareness program. He feels this is an inherent conflict as there is already a fundamental remedy for the whole site, which is the educational awareness program. EPA is presuming that the program is working and that people are going to be aware of UXO. If Navy feels it is not safe, they should not allow access.

Ray stated the Navy feels there should be a removal action, and that the safety component should be addressed. He stated he is trying to address the safety issue with the funds available in the next few years. Chris stated EPA would rather see Navy completing RAAs to the anticipated remedial action. He referenced the issue regarding clearance anomalies to the depth of detection based on the threshold to be protective of future land use.

ACTION ITEM: Ray will send Chris a list of the land use controls that the Navy intends to implement on Adak.

The team discussed budget concerns regarding removal and remedial options. Chris said EPA is most comfortable having the removal action be consistent with the FS. He emphasized again EPA is not saying Navy should not do this, and he appreciates the opportunity to give input. Navy stated they hope the language in the FS to address this issue is sufficient, and again requested the regulators let him know if there are any 'show stoppers' in the language, and if it will meet everyone's needs.

The team agreed to proceed to address EPAs general and specific comments on the NTCRA Work Plan. Chris presented the following initial comments on the draft.

- For Worksheet 10, lines 11-12**:** Problem Statement is insufficient. The Problem is there is MEC which poses an unacceptable hazard to current trespassers and future users at OU B-2. There is also no mention on the previously discussed need to improve road access and drainage of the area.
- Include the Worksheet number in the header for every
- Worksheet 10, lines 14-22. The RAA's are a subset of the OU B-2 AOCs/RAAs. The QAPP should indicate why ALSW is not included, and why SA-93-02 is included in the QAPP, (EPA recognizes it was added post the 9/2011 Draft FS submittal) but will need to make sure documents are consistent.
- Should include a list of MEC items previously found and their depths/media to satisfy WS 10 "classes of contaminants and affected media"
- Worksheet 10, table 10-1: The Table has specified clearance depths which are not protective of known land use activities, per the Adak ESHA. Conducting clearance to depths which are not protective of potential activities will result in the need for future remedial action for those RAAs. This is what EPA was referring to in the previous discussion…a second mobilization with associated costs and impacts to the land (erosion). EPA believes the EECA would be more consistent with future remedial actions if it completed clearance operations at individual RAA's and/or prepared the area for future remedial actions according to a Record of Decision.
- Worksheet 10 pgs. 25-28: EPA feels the Background/Previous Site Investigation narrative is excessive. See OU B-2 RI MEC QAPP WS # 10 for reference.
- Worksheet 10, line 44: Again referring to our previous discussions, the RAO's state the objective is to reduce to a level that can be managed through land use controls. There are no existing land use controls on Adak besides "educational awareness". The text should be clear that these are not traditional "land use controls" which prohibit activities on the land.
- Generally, EPA feels worksheet 10 only addresses two steps of the DQO process and feels it is inconsistent with the UFP Guidance cited.
- Regarding worksheet 11: EPA says Step 2 in the UFP QAPP is to 'Identify the Decision'. The MEC QAPP states it is to identify the goal. On line 42**:** The QAPP needs to define "inaccessible" according to project definitions, same thing with Worksheet 11. EPA said they have many issues with Step 4. There is an opportunity to reduce the RAA boundaries and the establishment of a buffer zone beyond the MEC polygons. EPA feels there are a lot of things that need to be defined in Step 4.
- Worksheet 11, Page 29, Line 45: There are issues when talking about MDEH and MPP, EPA feels there is a contradiction.
- Page 30, Line 22: The polygons that you have…how do you know it is MEC, why would you investigate it?
- Worksheet 11, Step 3, Line 16: removal activities are not remedial.
- Worksheet 11, line 42: QAPP needs to define: "inaccessible according to project definition".
- Worksheet 17, Line 39: RAA 2 & 5 have a 2.5' clearance depth, Table 10-1 says 2'. EPA is wondering if this belongs in Step 4. EPA suggests this section be taken out and say the

boundaries are RAA-1 2 3 4 5 etc., and then list the tables and the GPS coordinates and leave out how RAA boundaries were developed.

- Worksheet 11, step 4, 1: It appears the approach is to have the contractor redefine the RAA's and run VSP to re-map the RAA's. EPA would like clarification on this.
- Worksheet 11, Step 4, 2: What is the intent of "lateral investigation? Will it continue until the MEC item is identified and removed? Previously it says the lateral boundary is 2.5'. Also, how do we know it is a MEC item and not MD or cultural debris, and what is the RAA threshold.
- Worksheet 11, Step 4, line 16: These are Removal Activities, not Remedial.
- Worksheet 11, Step 4: UFP QAPP—EPA believes WS 10 usually defines the "boundaries of the study" (WS 10 of OU B-2 RI work plan also)
- Worksheet 17, line 39: Question regarding "resolved anomaly".

The team returned briefly to discuss a clarification on an action item from the Oct 25-26 meeting on the sampling of analytes. An in-depth discussion was undertaken regarding which analytes to test for and how to test for them. The team suggested, and Navy agreed, to revise the FS to require the analysis of all analytes using the application of EPA Method 8330B.

ACTION ITEM: Navy will revise the FS language to require the analysis of all analytes during the application of EPA

The meeting adjourned at 4:30 Alaska Time

Adak Manager's Meeting, December 7th, 2011
Project Team Agreements

RAA-01 (OB/OD-1)

The project team agreed to defer to the ROD any decisions on the depth of clearance in the RAA-01 (OB/OD) area. While leaving a description of the site in the work plan, the project team agreed to remove reference to the proposed NTCRA removal action activities at this site.

RAA-02 (C1-01)

For the purposes of the NTCRA, the Project Team agreed to a 2 feet clearance in RAA-02. The team will determine the pick threshold for that area based on the size and depth of the MEC items previously found in the RAA. Any targets of interest (TOI) that are not resolved within the 2 foot interval will either be further excavated or addressed by ICs which prohibit intrusive activities in the area that may exceed its clearance depth.

RAA-03 (MI-01, MI-02, MI-03, HG-01, RR-01)

For purposes of the NTCRA, the Project Team agreed to establish the clearance criteria in this RAA to include a depth of clearance to 2 feet for the eastern and western portions of RAA-03. The team will determine the pick threshold for that area based on the size and depth of the MEC items previously found in the RAA. Any TOI that are not resolved within the 2 foot interval will either be further excavated or addressed by ICs which prohibit intrusive activities in the area that may exceed its clearance depth.

RAA-04 (SA93-01, SA93-03)

For purposes of the NTCRA, the Project Team agreed to establish the clearance criteria for this RAA to include a depth of clearance to 4 feet in the RAA-04 area. The team will determine the pick threshold for that area based on the size of the MEC items previously found in the RAA. Any anomalies that are not resolved within the 4 foot interval will either be further excavated or addressed by ICs which prohibit intrusive activities in the area that may exceed its clearance depth.

RAA-05 (ALDA-01, ALSW-01)

The project team agreed to defer to the ROD any decisions on the depth of clearance in the RAA-05 (ALDA-01) area. While leaving a description of the site in the Work Plan, the project team agreed to remove reference to the proposed NTCRA removal action activities at this site. The project team agreed to perform monthly beach sweeps along Andrew Lake Seawall while its UXO contractors are operating on- island.

FINAL

APPENDIX K. PROJECT SCREENING VALUES

Non-Time Critical Removal Action

for the

Operable Unit B-2 Various Remedial Action Areas
Former Adak Naval Air Facility
Adak, Alaska

February 2013

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DESCRIPTION OF THE SCREENING VALUE SELECTION TABLES FOR OU B-2

A screening value selection table has been created for soil at Operable Unit (OU) B-2 that may be sampled during the Non-Time Critical Removal Action (NTCRA). The table presents the information considered in the sequential process used to identify and recommend the constituent concentrations to be used as the action limits for the NTCRA. If soil containing potential MC is identified during MEC removal activities, a soil sample will be collected for laboratory analysis. Any MC constituents detected in soil will be compared to the screening values identified for that constituent to determine if soil should be excavated for off-site disposal.

Constituent Identification

Each screening value selection table starts at the left with the listing of the munitions constituents (MCs) to be sampled in that medium (i.e., the analytes), their identifying shorthand abbreviation and Chemical Abstract Service (CAS) number, and the range of measured concentrations from any prior sampling in these areas of OU B-2 for that constituent. The next portion of each screening value selection table presents published screening values that were historically associated with OU B-2 with respect to the remediation goals of the protection of human health and the protection of the environment. For each remediation goal, the listing includes (for purposes of comparison) any criteria that were used previously for the project (e.g., in the PSE-2 Report) for that constituent in that medium, and any current potentially applicable criteria relative to these remediation goals.

Candidate Screening Values

For surface soil, the set of prior screening values for human health protection included only one EPA Region 10 Risk-Based Screening Concentration (RBSC). The current criteria listed for human health protection are the ADEC Method 2 Soil Cleanup Levels (ADEC, 2008) for residential soil listed separately for each potential exposure route (direct contact, inhalation, and via migration from soil to groundwater) and the EPA Region 6 Medium-Specific Screening Values for Residential and Industrial Soil. These EPA Region 6 screening values for soil relate to potential direct contact exposure to the soil and consider the combined exposure from incidental ingestion, dermal absorption, and the inhalation of soil particulates. The listed values reflect an individual constituent projected cancer risk from these exposure pathways of $1x10^{-6}$ or a non-cancer hazard index of 0.1 (whichever is lower). The residential soil values were conservatively chosen for consideration relative to the selection of screening values for the surface soil in OU B-2. The set of prior screening values for ecological protection included a set of risk-based screening concentrations that were adopted previously for Adak. The current criteria listed for ecological protection are the most protective values taken from the noted literature along with an identification of the sensitive species to which the indicated screening value relates.

Identification of the Most Stringent Candidate Screening Values by Remediation Goal

The soil screening value selection table then lists the most stringent (i.e., the lowest) candidate screening value identified for each constituent in that environmental medium for each of the following remediation goals: Protection of Human Health (in consideration of direct contact exposure); Protection of the Environment; and Protection of Human Health (in consideration of potential migration of soil contaminants to groundwater and subsequent drinking water exposure). These selections were made from the current candidate screening values listed in the preceding columns of that table.

Practical Sample Quantitation Limits

The soil screening value selection table then lists the level at which each constituent can be analytically measured in that environmental medium on a consistent basis; the practical sample quantitation limit (PQL). The values will be inserted once the analytical laboratory is selected. These values are listed so that a screening value would not be specified for a constituent that could not be reliably and defensibly quantified.

Recommended Screening Values

The soil screening value selection table then ends with a recommendation of a screening value for each constituent in consideration of the remediation goals appropriate to OU B-2 (i.e., protection of human health in consideration of direct contact exposure and protection of the environment). The most stringent screening value for either of these two goals was identified and compared to the PQL for that constituent. If the most stringent risk-based screening value was larger than the PQL, that value was recommended as the screening value. If the most stringent risk-based screening value was smaller than the PQL, then the PQL was recommended as the screening value.

Table K-1: Reference Limits and Evaluation Table

Analyte	EPA Region 6 or 10 RSL for Residential Soil Nov 2012 (mg/kg)	EPA Region 6 or 10 RSL for Industrial Soil Nov 2012 (mg/kg)	18 AAC 75 Over 40 in Direct Contact April 2012 (mg/kg)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3800	49000	3700
Hexahydro-1,3,5-Trinitro-1,3,5-trazine (RDX)	5.6	24	59
1,3,5-Trinitrobenzene (1,3,5-TNB)	2200	27000	2300
1,3-Dinitrobenzene (1,3-DNB)	6.1	62	5.8
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	240	2500	330
Nitrobenzene (NB)	4.8	24	41
2,4,6-Trinitrotoluene (2,4,6-TNT)	19	79	36
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	150	1900	16
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	150	2000	16
2,4-Dinitrotoluene (2,4-DNT)	1.6	5.5	7.2
2,6-Dinitrotoluene (2,6-DNT)	61	620	7.3
2-Nitrotoluene (2-NT)	2.9	13	21
3-Nitrotoluene (3-NT)	6.1	62	1200
4-Nitrotoluene (4-NT)	30	110	290
Nitroglycerin (NG)	6.1	62	240
Pentaerythritol tetranitrate (PETN)	120	430	None established
3,5-Dinitroaniline (3,5-DNA)	None established	None established	None established