

**MUNITIONS AND  
EXPLOSIVES OF CONCERN  
SUPPORT WORK PLAN**

**FORMER  
COMMUNICATIONS SITE  
RI/FS**

**FORT WAINWRIGHT, ALASKA**

**FINAL  
SEPTEMBER 2007**

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**Environmental Remediation Services  
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### ATTACHMENTS

Attachment 1	DOE Memorandum for the Assistant Chief of Staff for Installation Management. Subject: Munitions Response Terminology
Attachment 2	MEC Discovery Form
Attachment 3	MMPEH Chain-of-Custody Form
Attachment 4	Senior UXO Supervisor Resume
Attachment 5	Activity Hazard Analysis
Attachment 6	Memorandum for Work Plan Approval. Subject: Approval for Explosives Siting Plan (ESP), Munitions and Explosives of Concern Work Plan, Former Communications Site RI/FS, Ft. Wainwright, AK, September 2007

## ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
CoC	chain-of-custody
CIH	certified industrial hygienist
dBA	decibel
DMM	discarded military munitions
DOBD	dispose of by detonation
DPW	Department of Public Works
EM	Engineering Manual
EOD	explosive ordnance disposal
EP	Engineering Pamphlet
ES	explosives siting
FCS	Former Communications Site
FS	feasibility study
HAZCOM	hazard communication
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
HTRW	hazardous toxic radioactive waste
Jacobs	Jacobs Engineering Group Inc.
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazards
MRA	Munitions Response Area
MSD	minimum safe distance
PCB	polychlorinated biphenyl
POC	point of contact
PPE	personal protective equipment
RI	remedial investigation
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TBD	to be determined
TSDA	transport to safe disposal area
USACE	U.S. Army Corps of Engineers

**ACRONYMS AND ABBREVIATIONS**  
(continued)

USAED	U.S. Army Engineer District, Alaska
UXO	unexploded ordnance

## 1.0 INTRODUCTION

This Work Plan describes the Munitions and Explosives of Concern (MEC) support to be provided during the Remedial Investigation/Feasibility Study (RI/FS) planned at the Former Communications Site (FCS), also known as “Taku Gardens”, at Fort Wainwright, Alaska. The work described herein will be performed under U.S. Army Engineer District, Alaska (USAED), Environmental Remediation Services Contract Number W911KB-06-D-0007, Task Order 07. Table 1-1 presents key personnel for this activity. Notification procedures and additional contact information is provide in the 2007 Communications Plan (USAED 2007a).

**Table 1-1  
Identification of Key Project Personnel**

Position	Name	Contact Info.
<b>Explosive Ordnance Disposal</b>		
Army EOD	Fort Richardson	Phone: (907) 384-7600 24 Hour Emergency: 907-384-7603
Air Force EOD	Eielson AFB	907-377-4207
<b>Army</b> USAED P.O. Box 6898 Elmendorf AFB, Alaska 99506-0898		Phone: (907) 753-2689 Fax: (907) 753-5626
USAED Project Manager	Bob Brock	Phone: (907) 753-5612
DPW Fort Wainwright POC	Joe Malen	Phone: (907) 361-4512
DPW Project Manager	Cristal Fosbrook	Phone: (907) 384-2713
DPW Technical Support	Therese Deardorff	Phone: (907) 384-2716
DPW Technical Support	Karen Dearborn	Phone: (907) 384-2694
<b>Jacobs</b> 4300 B Street, Suite 600 Anchorage, Alaska 99503		Phone: (907) 563-3322 Fax: (907) 563-3320
Senior UXO Supervisor	David Frandsen	Mobile: (865) 621-1632
Project Manager	Terry Heikkila, PE	Phone: (907) 751-3312 Mobile: (907) 227-3466
Safety and Health Manager	Jon McVay	Phone: (907) 751-3395 Mobile: (907) 230-5395

Position	Name	Contact Info.
Site Manager	Brian Roberts	Phone: (907) 751-3356 Mobile: (907) 351-9158

**Note:** For definitions, see the Acronyms and Abbreviations section.

The FCS is a 54-acre housing project known as Taku Gardens. As a defense site known or suspected to contain unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents, the FCS falls under the definition of a Munitions Response Area (MRA). (See Attachment 1, Memorandum for the Assistant Chief of Staff for Installation Management. Subject: Munitions Response Terminology.) The military munitions and munitions related items discovered in the FCS are suspected to be from past Defense Reutilization and Marketing Organization activities.

The USAED is managing Fort Wainwright property re-use and is overseeing a RI/FS at the FCS. Due to the possibility of encountering UXO during the RI/FS, MEC support will be provided during all intrusive hazardous toxic radioactive waste (HTRW)-related activities in accordance with this Work Plan. This MEC Work Plan was developed in accordance with guidance listed in:

- USACE Engineer Pamphlet (EP) 75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities* (USACE 2004a).
- USACE Engineering Regulation [ER] 1110-1-8153 *Engineering and Design – Ordnance and Explosive Response* (USACE 1999), with Errata Sheet No. 1 dated 1/31/2006, defines requirements for providing UXO support to construction projects.
- USACE EP 385-1-95a *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations* (USACE 2004b) with Errata Sheets No. 1 and 2.

## 1.1 OBJECTIVES AND SCOPE

The objective of this Work Plan is to provide processes and procedures to locate, avoid, identify, and remove and/or report MEC, material potentially presenting an explosive hazards (MPPEH), and DMM within the site.

There will be no explosive disposal operations performed by contractors. Explosives operations related to explosives management, storage, transport, and disposal of MEC to include disposition of UXO, DMM, and MPPEH are not scope of this Work Plan. The U.S. Army Explosive Ordnance Disposal (EOD) team at Ft. Richardson or the U.S. Air Force EOD team at Eielson Air Force Base will provide support activities required to safely dispose of UXO, and/or perform venting and demilitarization if necessary.

Based on the quantity and configuration (inert/unfuzed/unfired) of items encountered at Taku Gardens to date, the U.S. Army Garrison Alaska has determined that UXO standby support as described in the USACE EP 75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities* is appropriate for the RI/FS activity because the level of risk of encountering MEC is determined to be “moderate to high” on the east side of the FCS.

## **1.2 SITE DESCRIPTION AND BACKGROUND**

Fort Wainwright is located in the interior of Alaska, just east of the city limits of Fairbanks, Alaska. The fort's area encompasses over 900,000 acres. Operations include maintenance of aircraft and vehicles, landfill activities, and power generation. Fort Wainwright includes a main post area of 4,473 acres, 8,825 acres of ranges, and over 898,000 acres of military maneuver areas. Approximately 15,000 people live and work at Fort Wainwright.

Construction of a 54-acre housing project known as Taku Gardens began in 2005 to provide housing for several thousand new personnel and their families. The construction crews noticed stained soil in June 2005 during excavation of a building foundation. Analytical testing confirmed the presence of chemical contamination, including polychlorinated biphenyls (PCBs). The Alaska Department of Environmental Conservation and the U.S. Environmental Protection Agency were notified, and construction was temporarily stopped so that the extent of PCB contamination could be determined. Petroleum contamination was also discovered in another area of the construction site.

Historic record and aerial photograph reviews revealed that contamination might be present in other areas of the site. In 2006, munitions-related items, buried drums, and large quantities of scrap metal were discovered. Several partially demilitarized explosive devices were also found, prompting an immediate halt to all unauthorized excavation. In addition to PCBs and petroleum, currently identified contaminants include chlorinated compounds, dioxin/furans, and heavy metals. No chemical agents have been found to date, and there is no evidence to suggest that chemical weapons might have been disposed of in this area (in July 2006, 2 bombs were unearthed that may have contained chemical warfare material, and were treated as such until it was determined that 1 was empty and 1 contained water). In other areas petroleum, drums of unknown contents, and scrap metal have been located. Continued research confirmed that the site was used for military salvage and reclamation.

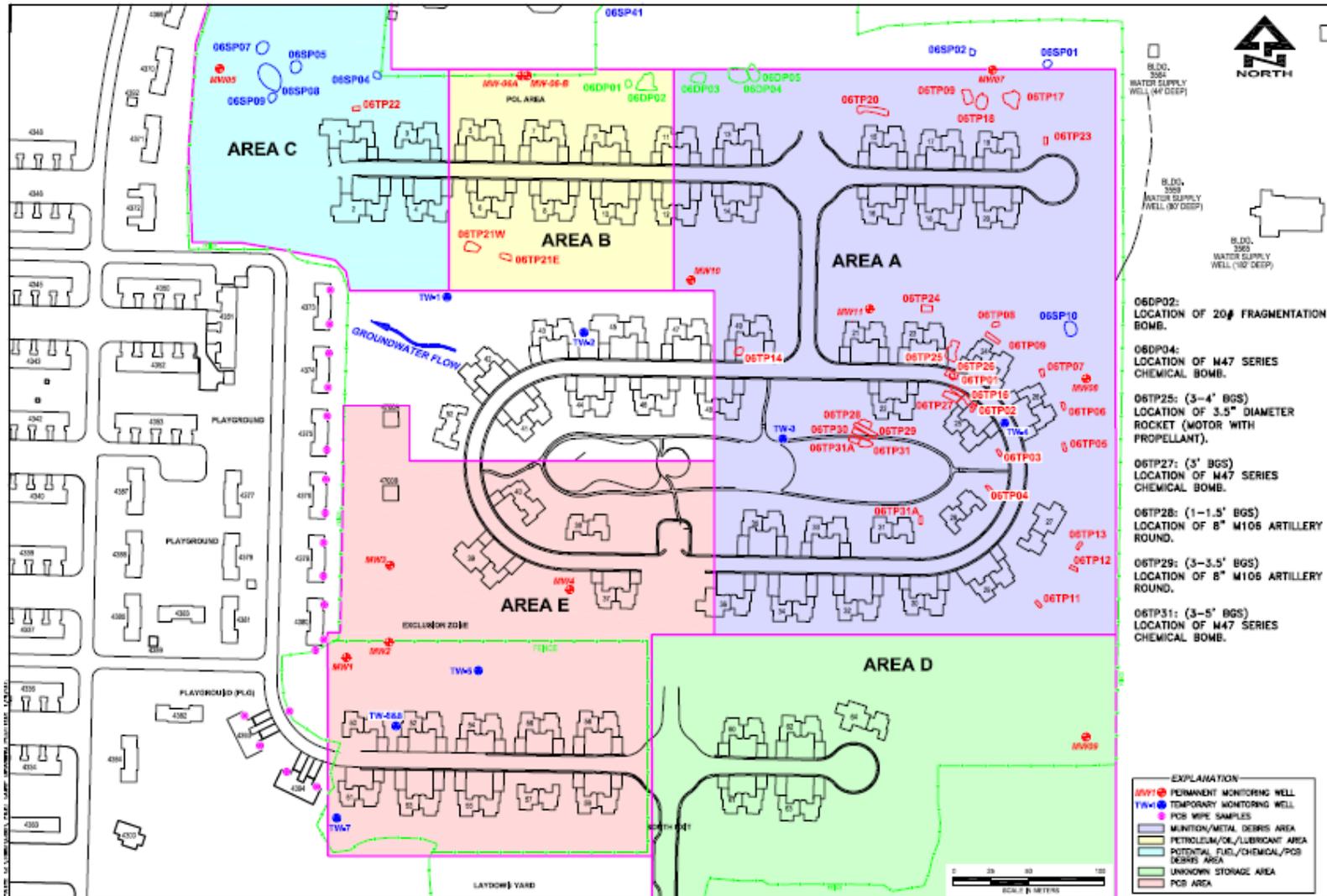
### **1.3 MUNITIONS AND EXPLOSIVES OF CONCERN HAZARD ASSESSMENT**

The FCS was divided into 5 separate areas of concern using historic records and aerial photographs, construction field notes and observations, 2004 geophysical survey data, and available field screening and analytical data. Project site boundaries and areas of concern are provided in Figure 1-1. Conceptual site models then were developed for each area utilizing these same data, all of which are provided in the Preliminary Source Evaluation (PSE) (USAED 2007b). A summary of information related to the potential MEC hazard of the areas of concern is provided below.

#### **1.1.3 Area A (East Area)**

Area A, located on the east side of the FCS, is considered a Munitions Response Site (MRS) because military munitions and related items have previously been discovered. These findings are documented in the PSE I Report (USAED 2007b) and the PSE II Report (USAED 2007c), and summarized in Table 1-2. A historic records and aerial photograph review revealed no evidence that ordnance were stored or disposed of onsite (USAED 2007a). To date, no UXO has been discovered in Area A. With the exception of one explosive burster and one unfired rocket motor with propellant, all MEC items discovered to date have been non-shock sensitive, inert, unarmed, or empty; suggesting that only training rounds, munitions

**Figure 1-1  
Former Communication Site Boundaries and Areas of Concern**



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**Table 1-2  
Previously Discovered MEC**

<b>Description</b>	<b>Quantity</b>	<b>Disposition</b>
Old Style Bomb Fins (Box Type)	1	Scrap
37-mm Recoilless Rifle Grenade Casing (Inert)	2	Scrap
3.5-Inch Rocket Training Warhead	1	Scrap
3.5-Inch Training Rocket Fired	1	Scrap
T-85 3.5-Inch Rocket	1	TSDA, DOBD
75-mm Recoilless Rifle Casing, Fired	1	TSDA, DOBD
8-Inch Artillery Projectile Unarmed	3	TSDA, DOBD
8-Inch Artillery Projectile Inert Filled Unarmed	3	TSDA, DOBD
8-Inch Artillery Projectile Inert Filled	5	TSDA, DOBD
20-Pound Fragmentation Bomb	1	TSDA, DOBD
M47A1 Bomb with Burster	2	TSDA, DOBD

**Note:** For definitions, see the Acronyms and Abbreviations section.

debris and MMPEH, are present. Therefore, it has been determined that there is a moderate to high probability of encountering MEC in the area delineated in Figure 1-2 as “moderate to high probability MEC area”, which includes the eastern portion of the former slough. Figure 1-2 was developed from 100 percent geophysical coverage survey data. In this area, UXO-qualified personnel will conduct a subsurface removal of the known investigation footprint and remove all discovered MEC.

### **2.1.3 Areas B, C, D, and E (West Area)**

To date, no MEC or munitions debris has been discovered within the West Area of the FCS. A historic records and aerial photograph review revealed no evidence that ordnance were stored or disposed of onsite (USAED 2007a). Additionally, the geophysical survey and subsequent MEC delineation performed by the U.S. Army Cold Regions Research and Engineering Lab indicates that there is a low probability of discovering MEC in the west area of the FCS. Therefore, anomaly avoidance will be practiced in this area.

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**Figure 1-2  
Former Communication Site MEC Areas**



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## **2.0 TECHNICAL APPROACH**

The following sections describe responsibilities and the technical approach to providing MEC support to RI/FS field personnel. A UXO team is comprised of one UXO Technician III and one UXO Technician II. At least one UXO team will be onsite during all HTRW fieldwork. One of the UXO Technician III's, Dave Frandsen, is also the Senior UXO Supervisor (SUXOS), who has final say in all UXO-related field matters unless Army or Air Force EOD personnel are onsite.

### **2.1 GENERAL SITE OPERATING PROCEDURES**

All MEC operational activities at the site will be performed under the supervision and direction of qualified UXO Technicians. Throughout HTRW activities, project personnel will strictly adhere to the following general practices:

- MEC activities will only be conducted during daylight hours
- The Jacobs Engineering Group Inc. (Jacobs) Site Manager will strictly control access into operating areas and will limit access to only those personnel necessary to accomplish the specific operations
- All intrusive activities, such as sampling and monitoring well drilling, will be supported by UXO Personnel via anomaly avoidance, down hole monitoring, and MEC disposal if required
- MEC items will only be handled by qualified UXO Technicians and only if they are identified as MPPEH or munitions debris.
- All personnel must attend a daily safety briefing prior to entering the operating area
- Site visitors must receive a safety briefing prior to entering the operating area and must be escorted at all times by the UXO qualified person

Safety violations and/or unsafe acts will be immediately reported to the SUXOS. Failure to comply with safety rules/regulations and/or failure to report violations may result in immediate eviction from the site.

### **2.2 MUNITIONS AND EXPLOSIVES OF CONCERN STANDBY SUPPORT**

UXO team members have the following responsibilities in support of intrusive site work.

### **1.2.2 Safety Briefing**

The UXO team will meet with onsite management and construction personnel and conduct a daily work safety briefing, which will include:

- Probable site hazards and site-specific safety considerations
- MEC standby support procedures
- Responsibilities and lines of authority for any MEC response
- Review of the Explosives Siting Plan and current MEC exclusion zone for non-essential personnel
- Emergency response procedures

### **2.2.2 Pre-Construction Support**

The UXO team will physically inspect each investigation area with the Site Manager and discuss visual observations and potential areas of concern prior to the beginning of any work in that area. In the event that surface MEC is discovered, the UXO team will place flagging adjacent to the discovery for subsequent visual reference, select a course around the item, and lead any onsite personnel out of the area. The UXO team will assess the condition of the MEC to determine if a disposal action is required.

### **3.2.2 RI/FS MEC Support**

The UXO team will monitor all investigation/removal activities in Area A. One member of the team will be positioned to the rear and upwind of the excavation equipment for continuous visual observation of activities. If the contractor unearths or otherwise encounters suspected MEC, all excavation activities will immediately stop and all non-UXO personnel will vacate the area to a distance determined to be safe by the UXO team. The UXO team will assess the condition of the military munition to determine if a disposal action is required. Once MEC has been encountered in an excavation, no further excavation will be allowed in that area until the UXO team has evaluated the MEC and determined a path forward. Excavation will not continue at that location until the area is deemed safe by the UXO team. If deemed safe, excavation will continue until the depth of debris as indicated by the geophysical survey has been achieved and no further debris is visible. The final step in clearing a location will be for

a UXO technician to perform a Schonstedt sweep of the bottom of the hole. If not further metal anomalies are detected, the hole will be turned over to the RI contractor for investigation.

#### **4.2.2 Munitions, Explosives of Concern Disposition**

The UXO team is generally not tasked to perform MEC disposition activities during standby support. If MEC requiring disposal is encountered, the SUXOS will notify the Jacobs Site Manager and Fort Richardson EOD. If the SUXOS determines the MEC can be moved safely, it will be moved to a safe and secure ammunition supply point in coordination with EOD and the Department of Public Works (DPW). MEC will be kept in this secured area until EOD takes possession of it.

If the UXO team determines that the MEC cannot be moved safely, the area around the MEC item will be secured using temporary construction fence and warning signs, and the SUXOS will determine a safe distance from the MEC at which work can continue. Finding fuzed and armed MEC will be cause for stopping work and reevaluating the MEC safety procedures in this work plan because fuzed and armed MEC must be considered to be shock sensitive.

#### **5.2.2 Munitions Debris**

Munitions debris found during the excavation will be inspected by a UXO team to verify the item is not fused and therefore acceptable to move. Munitions debris will be segregated in a closed container once it has been determined to be free of explosive hazards. Items requiring demilitarization will be segregated, placed in a secured area and processed in a timely manner and placed in a secured area. All munitions acceptable to move will be staged in a magazine within the Fort Wainwright as soon as possible until turned over to active duty military EOD personnel for final disposition. Items requiring demilitarization will be demilitarized by active duty EOD personnel in accordance with the U.S. Department of Defense 4160.21-M-1, Defense Demilitarization Manual. All ordnance and explosives items will be investigated to ensure that there are no explosives remaining in the items and that only inert filled or empty items are moved.

### **6.2.2 Turn-in of Recovered Inert Munitions Debris**

All properly demilitarized inert ordnance and munitions debris will be turned in to a local Solid Waste Facility. The SUXOS will complete and sign a DD Form 1348-1 in accordance with Engineering Manual (EM) 1110-1-4009 *Engineering and Design – Military Munitions Response Action* (USACE 2007), and the UXO Technician III will sign as the verifier. A certificate will be prepared with the following statement:

“This certifies and verifies that the material listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material.”

This document will serve as the custody document and will be signed by the receiver at the solid waste facility.

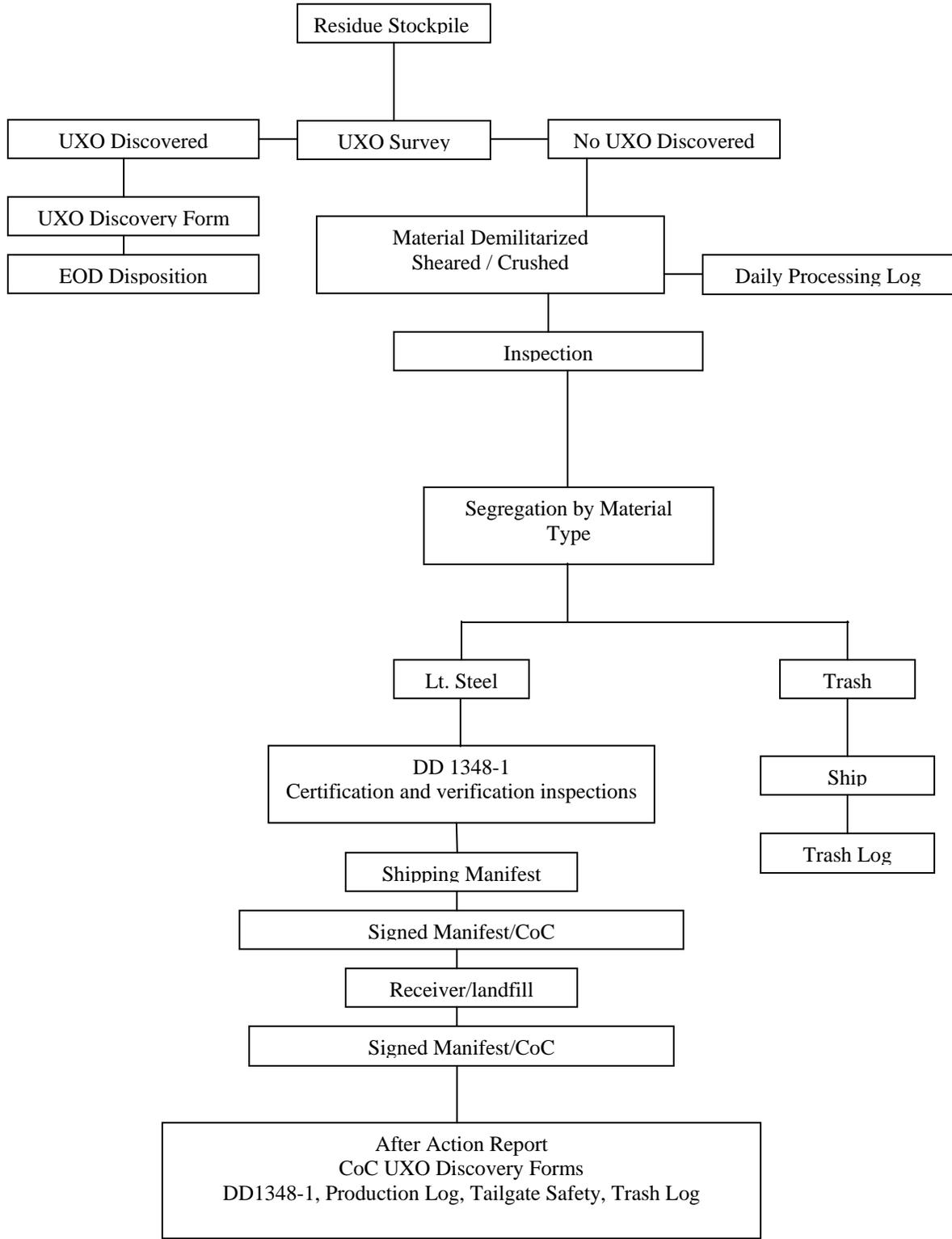
### **7.2.2 MPPEH Certification and Verification**

The MPPEH certification and verification process is depicted in Figure 2-1, which presents a graphic representation of the standard operating procedure for maintaining chain-of-custody (CoC) on the demilitarized materials. The procedures in EM 1110-1-4009 will be followed regarding MPPEH processes and procedures. Munitions debris and MPPEH CoC documents will be maintained for a period of three years.

### **8.2.2 Anomaly Avoidance for Subsurface Sampling**

In the west area, where there is a low probability of discovering MEC, anomaly avoidance will be practiced. Geophysical survey data and site design drawings will be used to identify potential sampling locations. The UXO team will perform a surface sweep prior to sampling to reduce the likelihood that metal debris or MEC will be encountered in the investigation area. If metal debris is encountered during investigation activities, a new sample location will be identified.

**Figure 2-1  
MPPEH Process**



### **2.3 MUNITION WITH AN UNKNOWN FILLER**

If an item is discovered that cannot be positively identified and is a munition with an unknown filler, all site activities will stop and the following procedure will be followed:

1. The discoverer will immediately withdraw upwind, and notify the SUXOS of the possible hazard.
2. The SUXOS will immediately direct the work teams to stop work and exit the site in an upwind direction.
3. The SUXOS shall note the location of the munition with an unknown filler to help with its identification.
4. When the work team has been evacuated to a safe distance as determined by the SUXOS from the munition with an unknown filler, the SUXOS will immediately notify the Project Manager and Base DPW point of contact, who will initiate the emergency notification procedure as outlined in the Work Plan and the Site Safety and Health Plan (SSHP).
5. The SUXOS will ensure that all field personnel are accounted for and establish a safe perimeter around the munition with an unknown filler.
6. The SUXOS shall not abandon the site and shall secure the location until relieved by active duty EOD personnel, or U.S. Army Technical Escort Unit Personnel.

### 3.0 EXPLOSIVES SITING PLAN

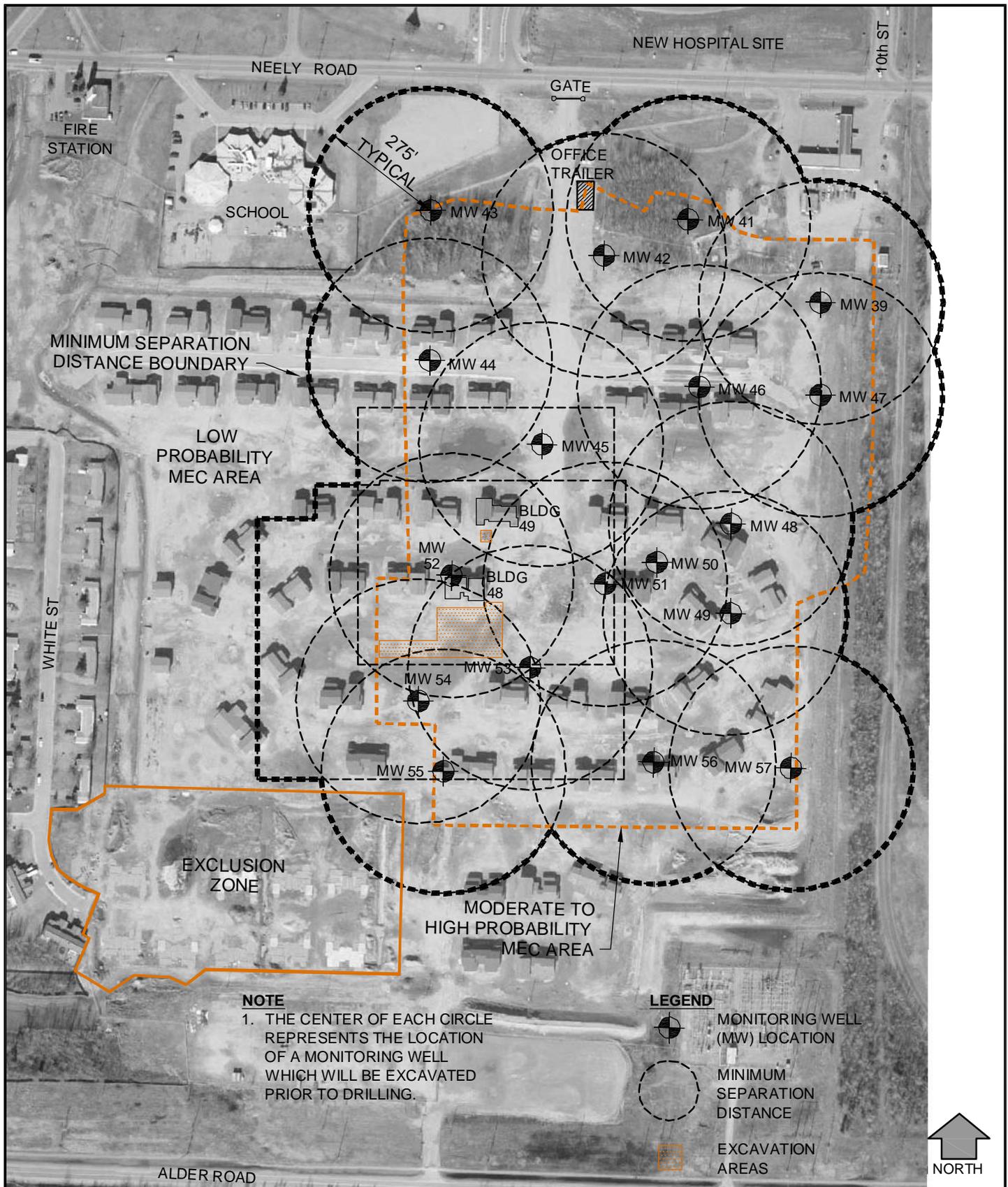
Explosive siting (ES) is a component of explosive safety for this MEC Work Plan, and is required for MEC support during construction activities within the medium to high MEC probability area (Area E). MEC explosives safety criteria for planning and siting of explosive operations are presented in Table 3-1. The ES proposed minimum safe distance (MSD) for intrusive operations and unintentional detonation was determined by evaluating previously discovered MEC representing the greatest risks, which were the M41 20 pound fragmentation bomb and 100 pound M47 series bomb. An MSD was determined for each item and the ES proposed hazard mitigation distance of 275 feet is selected as the MSD for non-essential personnel. The MSD for non-essential personnel for 2007 planned environmental activities within the FCS is provided in Figure 3-1.

**Table 3-1  
Exclusion Zone Explosive Siting Explosive Safety Quantity Distance Arcs for  
Construction Support**

<b>Activity/Setting</b>	<b>Radius in feet</b>
Explosives Storage Magazines	Government furnished
Established Demolition Areas	EOD drovided
Planned Demolition Areas	EOD determined
Footprint Areas Blow-in place	EOD determined
Intrusive Operations	275 feet
Unintentional Detonation	275 feet
Team Separation Distances	200 feet
Intentional Detonations	EOD determined
Interline Distance Class 1.1	66 feet
Inhabited Building Distance	(*) 140 feet
Public Transportation Routes	165 feet
Passenger Rail	102 feet

**Note:** (\*) Unbarricaded (no inhabited structures within 500 feet of any planned excavation site).

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**NOTE**

1. THE CENTER OF EACH CIRCLE REPRESENTS THE LOCATION OF A MONITORING WELL WHICH WILL BE EXCAVATED PRIOR TO DRILLING.

**LEGEND**

-  MONITORING WELL (MW) LOCATION
-  MINIMUM SEPARATION DISTANCE
-  EXCAVATION AREAS

DATE OF AERIAL PHOTOGRAPHY:  
APRIL 25, 2007



**EXPLOSIVES SITING PLAN  
MINIMUM SEPARATION DISTANCE**

FORT WAINRIGHT, ALASKA

PROJECT MANAGER: T. Heikilla	FILE NAME: Fig 3-1 Explosives Siting Plan.dwg	DATE: Sept. 06, 07
	LAYOUT TAB: Explosives Siting Plan	FIGURE NO.: 3-1
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### 3.1 REPORTED MUNITIONS AND EXPLOSIVES OF CONCERN

Table 3-2 contains the munitions and munitions related items previously discovered within MRS Area A.

**Table 3-2  
Previously Discovered Munitions and Munitions Related Items**

Type	Size/Weight	Nomenclature	Filer	Condition	Disposition
Bomb	100 pounds	100-pound bomb M47 Series (*)	Incendiary Smoke Gas Chemical Burster Black Powder Filled	Not-fuzed Filler None Burster filled	Recovered by EOD
Bomb	20 pounds	20-pound Fragmentation Bomb AN-M41	2.7 pounds TNT	Not-fuzed Filler None	Recovered by EOD
Rocket	3.5 inches	Rocket Practice 3.5-inch M409(**)	Igniter M20A1 Black Powder 0.2 grams (Motor) Propellant 2.5 pounds	Dummy Fuze M405A2 Warhead Inert Motor unfired	Recovered by EOD
Projectile	8 inches	M106	Wax	Inert	Recovered by EOD

**Notes:**

(\*) No specific Make and Model provided beyond series

(\*\*) data for M409 designations not locatable, may be also considered M29A2

### 3.2 MUNITIONS AND EXPLOSIVES OF CONCERN IDENTIFICATION AND ANALYSIS OF HAZARDS

Munitions and munitions-related items have been found at and near the site. To date, none of these items have been determined to present a threat to public or personnel. Site history confirms the MRA was never used as an impact, training, or proficiency range, and was not used for Research and Development testing. MEC is any munition that is capable of functioning and producing injury or death to personnel or damage to property. The MRS (Area A) does have a history as a disposal site for munitions and munitions related items.

However, the history is incomplete and historical sources do not define the term disposal. It may be considered that disposal refers to disposition and thus, may have been turned-in for salvage or treatment. Some evidence indicates that munitions items may have been decontaminated either prior to arrival or onsite.

### **3.3 MUNITIONS AND EXPLOSIVES OF CONCERN SAFETY**

Subsurface removal actions must be accomplished in strict accordance with the approved work plan and the SSHP. Prior to commencing subsurface removal activities, the UXO team will provide a general work and safety briefing to all onsite personnel. This briefing will address the following:

- Probable site hazards and site-specific safety considerations
- Responsibilities and lines of authority for any military munitions response to MEC
- Emergency response procedures

Utility clearance and/or excavation permits must be obtained prior to the commencement of any intrusive activities near underground utilities. The UXO team is responsible for verifying that all necessary excavation permits are onsite prior to commencing operations. CH2M Hill will take the lead role in contacting the appropriate agency(ies) or company(ies) to mark the location of all subsurface utilities in the construction area. All located utilities will be marked by paint, pin flags, or other appropriate means to visually delineate their approximate subsurface routing. The color will not conflict with the colors used in MEC activities. In the event that subsurface utilities are suspected in an excavation area, the UXO team must attempt to verify their location. The UXO team must be aware that not all utility lines will be detectable with geophysical equipment (i.e., not all utility lines are constructed of ferrous material).

Jacobs will utilize the specific safety practices identified in EP 385-1-95a (USACE 2004b) and EP 75-1-2, Chapter 6 (USACE 2004b). All personnel entering the general excavation area will have the appropriate personal protective equipment. In addition, each individual will be constantly aware of the possibility of unexploded ordnance within the worksite and should anyone suspect UXO, they will immediately notify one of the members of the UXO team. In

any case, no item of ordnance or ordnance scrap is to be moved without the permission of a UXO team member.

An Activity Hazard Analysis (AHA) for performing MEC standby support is provided as Attachment 5. This AHA will be reviewed and updated daily to ensure that the most recent safety observations and lessons learned are followed. Additional AHAs will be developed for additional work tasks as necessary.

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## **4.0 REPORT REQUIREMENTS**

At the conclusion of each field season's activity, a brief MEC Report will be prepared, which will contain the following:

- Figures showing the locations of MEC and munitions debris found designated by grid number, type, and quantity.
- A separate list/table that identifies all MEC, munitions debris, and other material recovered during the response action. The depth to the top of each MEC item recovered will be reported on the list as well.
- A photograph of each individual piece of MEC encountered will also be provided.

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## 5.0 REFERENCES

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- USACE. 1999 (May). *Engineering and Design – Ordnance and Explosive Response*. ER 1110-1-8153.
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- USAED. 2007c (February). *Preliminary Source Evaluation II, Former Communications Site, Fort Wainwright, Alaska, Draft*. Prepared by North Wind, Inc.

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**ATTACHMENT 1**

**DOE Memorandum for the Assistant Chief of Staff for Installation Management.  
Subject: Munitions Response Terminology**



DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY  
INSTALLATIONS AND ENVIRONMENT  
110 ARMY PENTAGON  
WASHINGTON, DC 20310-0110

APR 21 2005

MEMORANDUM FOR THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION  
MANAGEMENT

SUBJECT: Munitions Response Terminology

1. This memorandum replaces my October 28, 2003 memorandum, subject: Definitions Related to Munitions Response Terms, and requests your office ensure that the enclosed terms and their definitions (Enclosure 1) are used, when appropriate, in correspondence (e.g., policies, guidance) and briefings concerning the Army's implementations of its Military Munitions Response Program (MMRP), Sustainable Range Management Program (SRMP) and, as appropriate, in other munitions-related matters.
2. In the past three years, the Department of Defense (DoD) has developed policies and guidance to implement its MMRP and SRMP. It has also worked to close a policy gap related to the management of material that may pose explosives hazards to DoD personnel and/or the public. During this period, DoD has been actively engaged, through the Munitions Response Committee (MRC), with the U.S. Environmental Protection Agency, Federal Land Managers, states, and with American Indians and Alaska Natives, to address issues related to the cleanup of munitions response sites.
3. To provide clarity and consistency in these efforts and in internal and external discussions, DoD has been working to establish and use common terms and definitions. The consistent use of accurate, descriptive terms, the definitions of which are commonly understood, is important to our dialogue with environmental regulators and safety officials, stakeholders, and the public.
4. Many of the terms that DoD has adopted for use in addressing munitions-related issues are now codified in Federal statute. On December 14, 2004, the Department of Defense Explosives Safety Board approved revisions to DoD 6055.9-STD, Ammunition and Explosives Safety Standards, using the enclosed terms.
5. The U.S. Army Technical Center for Explosives Safety, in coordination with other agencies, developed the enclosed matrix (Enclosure 2) to help the communities (e.g., operational, explosives safety, logistical, and cleanup) involved in addressing munitions-related operations to better understand how some of the new terms apply to actions they conduct.

6. Use of this terminology does not imply any specific funding authority, nor does it alter the DERP Management Guidance's program eligibility criteria.
7. My staff point of contact is J. C. King at (703) 697-5564 or jc.king@us.army.mil.



Raymond J. Fatz

Deputy Assistant Secretary of the Army  
(Environment, Safety and Occupational Health)  
OASA(I&E)

Enclosures

cf:

G-3

G-4

DAIM-BD

SFIM-OP

SAGC

OTJAG-ELD

NGB

CEMP-R

USACE

AEC

## Enclosure 1: Military Munitions-Related Terms and Definitions

<u>Consolidated Definitions</u>
<b>Anomaly Avoidance.</b> Techniques employed on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.
<b>Chain of Custody.</b> The activities and procedures taken throughout the inspection, re-inspection and documentation process to maintain positive control of MPPEH to ensure the veracity of the process used to determine the status of material as to its explosive hazard. This includes all such activities from the time of collection through final disposition.
<b>Chemical Agent (CA).</b> A chemical compound (to include experimental compounds) that, through its chemical properties produces lethal or other damaging effects on human beings, is intended for use in military operations to kill, seriously injure, or incapacitate persons through its physiological effects. Excluded are research, development, testing and evaluation (RDTE) solutions; riot control agents; chemical defoliants and herbicides; smoke and other obscuration materials; flame and incendiary materials; and industrial chemicals.
<b>Chemical Agent (CA) Hazard.</b> A condition where danger exists because CA is present in a concentration high enough to present potential unacceptable effects (e.g., death, injury, damage) to people, operational capability, or the environment.
<b>Chemical Agent (CA) Safety.</b> A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of a mishap involving chemical warfare material (CWM) and CA in other than munitions configurations.
<b>Chemical Warfare Material (CWM).</b> Items generally configured as a munition containing a chemical compound that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other-than-munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide (AC), cyanogen chloride (CK), or carbonyl dichloride (called phosgene or CG)) configured as a military munition. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control devices; chemical defoliants and herbicides; industrial chemicals (e.g., AC, CK, or CG) not configured as a munition; smoke and other obscuration producing items; flame and incendiary producing items; or soil, water, debris or other media contaminated with low concentrations of chemical agents where no CA hazards exist.
<b>Chemical Warfare Material (CWM) Response.</b> Munitions responses and other responses to address the chemical safety; explosives safety, when applicable; human health; or environmental risks presented by CA-filled munitions and CA in other than munitions configurations. (See munitions response.)
<b>Construction Support.</b> Assistance provided by DoD EOD or UXO-qualified personnel and/or by personnel trained and qualified for operations involving CA, regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or CA hazards.
<b>Cultural Debris.</b> Debris found on operational ranges or munitions response sites, which may be removed to facilitate a range clearance or munitions response, that is not related to munitions or range operations. Such debris includes, but is not limited to: rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, and fence wire.
<b>Defense Sites.</b> Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))
<b>Discarded Military Munitions (DMM).</b> Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))
<b>Disposal.</b> End of life tasks or actions for residual materials resulting from demilitarization or disposition operations.
<b>Disposition.</b> The process of reusing, recycling, converting, redistributing, transferring, donating, selling, demilitarizing, treating, destroying, or fulfilling other life-cycle guidance, for DoD property.

## Enclosure 1: Military Munitions-Related Terms and Definitions

<p><b><u>Documentation of the Explosives Safety Status of Material.</u></b> Documentation attesting that material: (1) does not present an explosive hazard and is consequently safe for unrestricted transfer within or release from DoD control, or (2) is MPPEH, with the known or suspected explosive hazards stated, that is only transferable or releasable to a qualified receiver. This documentation must be signed by a technically qualified individual with direct knowledge of: (1) the results of both the material's 100 percent inspection and 100 percent re-inspection or of the approved process used and the appropriate level of re-inspection, and (2) the veracity of the chain-of-custody for the material. This signature is followed by the signature of another technically qualified individual who inspects the material on a sampling basis (sampling procedures are determined by DoD entity that is inspecting the material).</p>
<p><b><u>Environmental Regulators and Safety Officials.</u></b> Include, but may not be limited to environmental regulators, environmental coordinators or hazardous material coordinators, law enforcement officers, and safety personnel of the U.S. Environmental Protection Agency (USEPA), American Indians and Alaska Natives, other Federal Land Managers, and/or the States. When appropriate, public health officials of various agencies may also be involved.</p>
<p><b><u>Explosive Hazard.</u></b> A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capability, or the environment.</p>
<p><b><u>Explosive Ordnance Disposal (EOD).</u></b> The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration.</p>
<p><b><u>Explosive Ordnance Disposal (EOD) Personnel.</u></b> Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform Render Safe Procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices.</p>
<p><b><u>Explosive Ordnance Disposal (EOD) Unit.</u></b> A military organization constituted by proper authority; manned with EOD personnel; outfitted with equipment required to perform EOD functions; and assigned an EOD mission.</p>
<p><b><u>Explosives or Munitions Emergency Response.</u></b> All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency. An explosives or munitions emergency response may include in-place render-safe procedures, treatment or destruction of the explosives or munitions, and/or transporting those items to another location to be rendered safe, treated, or destroyed. Any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency. Explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at RCRA facilities. (Military Munitions Rule, 40 CFR 260.10)</p>
<p><b><u>Explosives Safety.</u></b> A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions.</p>
<p><b><u>Interim Holding Facility (IHF).</u></b> A temporary storage facility designed to hold recovered chemical warfare material (RCWM).</p>
<p><b><u>Land Use Controls (LUC).</u></b> LUC are physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property, to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.</p>
<p><b><u>Long-Term Management (LTMgt).</u></b> The period of site management (including maintenance, monitoring, record keeping, 5-year reviews, etc.) initiated after response (removal or remedial) objectives have been met (i.e., after Response Complete).</p>
<p><b><u>Material Potentially Presenting an Explosive Hazard (MPPEH).</u></b> Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.</p>

## Enclosure 1: Military Munitions-Related Terms and Definitions

**Military Munitions.** Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof.

The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)(A) through (C))

**Military Munitions Burial Site.** A site, regardless of location, where military munitions or CA, regardless of configuration, were intentionally buried, with the intent to abandon or discard. This term includes burial sites used to dispose of military munitions or CA, regardless of configuration, in a manner consistent with applicable environmental laws and regulations or the national practice at the time of burial. It does not include sites where munitions were intentionally covered with earth during authorized destruction by detonation, or where in-situ capping is implemented as an engineered remedy under an authorized response action.

**Minimum Separation Distance (MSD).** MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

**Munition with the Greatest Fragmentation Distance (MGFD).** The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

**Munitions and Explosives of Concern (MEC).** This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 U.S.C. 101(e)(5); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

**Munitions Constituents (MC).** Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(3)).

**Munitions Debris.** Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

**Munitions Response.** Response actions, including investigation, removal actions and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC), or to support a determination that no removal or remedial action is required.

**Munitions Response Area (MRA).** Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

**Munitions Response Site (MRS).** A discrete location within an MRA that is known to require a munitions response.

**Mutual Agreement.** A meeting of the minds on a specific subject, and a manifestation of intent of the parties to do or refrain from doing some specific act or acts. Inherent in any mutual agreement or collaborative process are the acknowledgement of each member's role in the process and their differing views of their authorities. The mutual agreement process will provide a means of resolving differences without denying the parties an opportunity to exercise their respective authorities should mutual agreement fail to be achieved.

**One Percent Lethality Distance.** A distance calculated from a given CA Maximum Credible Event (MCE) and meteorological conditions (temperature, wind speed, Pasquill stability factor) and established as the distance at which dosage from that MCE agent release would be 150 mg-min/m<sup>3</sup> for H and HD agents, 75 mg-min/m<sup>3</sup> for HT agent, 150 mg-min/m<sup>3</sup> for Lewisite, 10 mg-min/m<sup>3</sup> for GB agent, 4.3 mg-min/m<sup>3</sup> for VX vapor, and 0.1 mg-min/m<sup>3</sup> for inhalation and deposition of liquid VX.

## Enclosure 1: Military Munitions-Related Terms and Definitions

<p><b>On-call Construction Support.</b> Construction support provided, on an as needed basis, where the probability of encountering UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, has been determined to be low. This support can respond from off-site when called, or be on-site and available to provide required construction support.</p>
<p><b>On-site Construction Support.</b> Dedicated construction support, where the probability of encountering UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, has been determined to be moderate to high.</p>
<p><b>On-the-Surface.</b> A situation in which UXO, DMM or CA, regardless of configuration, are: (A) entirely or partially exposed above the ground surface (i.e., the top of the soil layer); or (B) entirely or partially exposed above the surface of a water body (e.g., because of tidal activity).</p>
<p><b>Open Burn (OB).</b> An open-air combustion process by which excess, unserviceable, or obsolete munitions are destroyed to eliminate their inherent explosive hazards.</p>
<p><b>Open Detonation (OD).</b> An open-air process used for the treatment of excess, unserviceable or obsolete munitions whereby an explosive donor charge initiates the munitions being treated.</p>
<p><b>Operational Range.</b> A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101(e)(3)(A) and (B)). Also includes “military range,” “active range,” and “inactive range” as those terms are defined in 40 CFR §266.201.</p>
<p><b>Primary Explosives.</b> Primary explosives are highly sensitive compounds that are typically used in detonators and primers. A reaction is easily triggered by heat, spark, impact or friction. Examples of primary explosives are lead azide and mercury fulminate.</p>
<p><b>Public Access Exclusion Distance (PAED).</b> The PAED is defined as longest distance of the hazardous fragment distance, inhabited building distance (IBD) for overpressure, or the One Percent Lethality Distance. For siting purposes, the PAED is analogous to the IBD for explosives; therefore, personnel not directly associated with the chemical operations are not to be allowed within the PAED.</p>
<p><b>Qualified Receiver.</b> Entities that have personnel who are, or individuals who are, trained and experienced in the identification and safe handling of used and unused military munitions, and any known or potential explosive hazards that may be associated with the MPPEH they receive; and are licensed and permitted or otherwise qualified to receive, manage, and process MPPEH.</p>
<p><b>Range.</b> A designated land or water area that is set aside, managed, and used for range activities of the Department of Defense. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 U.S.C. 101(e)(1)(A) and (B))</p>
<p><b>Range activities.</b> Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 U.S.C. 101(e)(2)(A) and (B))</p>
<p><b>Range Clearance.</b> The destruction, or removal and proper disposition of used military munitions (e.g., unexploded ordnance (UXO) and munitions debris) and other range-related debris (e.g., target debris, military munitions packaging and crating material) to maintain or enhance operational range safety or prevent the accumulation of such material from impairing or preventing operational range use. “Range clearance” does not include removal, treatment, or remediation of chemical residues or munitions constituents from environmental media, nor actions to address discarded military munitions (e.g., burial pits) on operational ranges.</p>
<p><b>Range-Related Debris.</b> Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., target debris, military munitions packaging and crating material).</p>
<p><b>Recovered Chemical Warfare Material (RCWM).</b> CWM used for its intended purpose or previously disposed of as waste, which has been discovered during a CWM response or by chance (e.g., accidental discovery by a member of the public), that DoD has either secured in place or placed under DoD control, normally in a DDESB-approved storage location or interim holding facility, pending final disposition.</p>

## Enclosure 1: Military Munitions-Related Terms and Definitions

<p><b><u>Render Safe Procedures (RSP).</u></b> The portion of EOD procedures that involves the application of special disposal methods or tools to interrupt the functioning or otherwise defeat the firing train of UXO from triggering an unacceptable detonation.</p>
<p><b><u>Secondary Explosives.</u></b> Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX or cyclonite), HMX, and tetryl.</p>
<p><b><u>Small Arms Ammunition.</u></b> Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.</p>
<p><b><u>Team Separation Distance (TSD).</u></b> The distance that munitions response teams must be separated from each other during munitions response activities involving intrusive operations.</p>
<p><b><u>Technical Escort Unit (TEU).</u></b> A DoD organization manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort and remediation of chemical, biological and industrial devices or hazardous material.</p>
<p><b><u>Technology-aided Surface Removal.</u></b> A removal of UXO, DMM or CWM on the surface (i.e., the top of the soil layer) only, in which the detection process is primarily performed visually, but is augmented by technology aids (e.g., hand-held magnetometers or metal detectors) because vegetation, the weathering of UXO, DMM or CWM, or other factors make visual detection difficult.</p>
<p><b><u>Time Critical Removal Action (TCRA).</u></b> Removal actions where, based on the site evaluation, a determination is made that a removal is appropriate, and that less than 6 months exists before on-site removal activity must begin. (40 CFR 300.5)</p>
<p><b><u>Unexploded Ordnance (UXO).</u></b> Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C))</p>
<p><b><u>UXO Technicians.</u></b> Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.</p>
<p><b><u>UXO-Qualified Personnel.</u></b> Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.</p>
<p><b><u>Venting.</u></b> Exposing any internal cavities of MPPEH, to include training or practice munitions (e.g., concrete bombs), using DDES- or DoD Component-approved procedures, to confirm that an explosive hazard is not present.</p>

**Military Munitions-Related Terms (1)**  
**How do they apply to specific types of material?**

Type of Material (These are only examples.)	What is it <b>BEFORE</b> it is inspected for explosives hazards? (2)		What is it <b>AFTER</b> it is inspected for explosive hazards?					
	What is it <b>BEFORE</b> it is inspected? (16)		If it presents an explosive hazards?			If it does not present an explosive hazards?		
	MPPEH	Other	MEC			MC (5)	Munitions Debris	Other
			UXO	DMM (3)	MC (4)			
Used military munition, on a range, fired	X		X				X	
Unused military munition, on a range, apparently discarded	X			X			X	
Used military munition, in a burial pit, on an operational range or on former ranges	X		X (6)				X	
Unused military munition, in a burial pit on an operational range or on former ranges	X			X (6)			X	
Explosives in the soil	X				X (7)	X		
Refrigerator, nails, soft drink cans, old fence wire, etc.		(8)	NA	NA	NA			(8)
Used cartridge cases, from a range, with live unused munitions possibly mixed in	X			X			(9)	
Target from a range (other than small arms range)	X		(10)	(10)	(10)			(11)
Remnants of munitions from an operational range or former range	X		X (12)	X (12)	X (12)		X (13)	
Kicked out military munition from a former open burn or open detonation ground	X			X (14)			X	
Residual MC in a melt kettle of a former (closed) explosive cast loading building	X		(15)	(15)	X (15)	X		X (16)
Residual MC in a floor drain pipe from an explosives-laden wash water drain of a former (closed) explosives cast loading facility.	X		(15)	(15)	X (15)			X (16)
Residual MC in cracks in floor slab (and in soil underneath floor cracks) in a former explosives manufacturing building	X		(15)	(15)	X (15)	X		X (16)
Small arms bullets or lead particulates in the soil from small arms use at a former small arms range used only for firing small arms ammunition		X (17)	Not Applicable (17)			X		

Note: The examples in this table are not all inclusive. The numbers in the table refer to footnotes that are found on the next page. It is important to read the footnotes, as they provide additional information of importance to understanding.

Environ 2

**Endnotes:**

- (1) DoD has been working to standardize terms related to military munitions.
- (2) Before material that is considered MPPEH can be either transferred within or released from DoD, its explosives safety status must be determined (see definition--Documentation of the Explosives Safety Status of Material). The type material involved determines the type of inspection (e.g., visual examination, chemical analysis, X-ray) required. Personnel qualified to determine the status of the particular material being examined must perform required inspections. For example, EOD and UXO-qualified personnel may inspect UXO and DMM during a munitions response or during range clearance activities. A QASAS or certified Wage Grade ammunition operator may inspect steamed-out projectiles at a depot's steam-out operation. A laboratory technician may perform a chemical analysis of soil to determine the percent explosives in the soil.
- (3) Munitions generally considered as DMM include: buried munitions; un-recovered kick outs from open detonations; munitions left behind or discarded accidentally during munitions-related activities; munitions intentionally disposed of without authorization during munitions-related activities. Munitions removed from storage for the purpose of disposal that are awaiting disposal are not DMM.
- (4) This is MC that is both (a) an explosive; and (b) present in sufficient concentrations to present explosive hazards.
- (5) This is MC that is either (a) not an explosive (e.g., lead, beryllium, and cadmium); or (b) an explosive not present in sufficient concentrations to present explosive hazards.
- (6) Although military munitions in a burial pit will normally be DMM, some may be UXO. For explosives safety reasons, munitions in a burial pit should be approached as UXO until assessed by technically qualified personnel (e.g., EOD personnel, UXO-qualified personnel) and determined that they are not UXO or that they do not present explosive hazards similar to UXO.
- (7) Explosive soil is typically found in sumps and settling lagoons for explosives-laden wastewater, and in and around drainage ditches and pipes that carry the wastewater to such sumps and lagoons.
- (8) These items are cultural debris.
- (9) After determination of their explosives safety status, used cartridge cases documented as safe would, after any demilitarization required to remove their military characteristics, be available for release from DoD. In addition to these DoD requirements, other regulatory criteria may apply.
- (10) A target is a type of range-related debris. Although a target is not MEC, it may contain UXO, DMM, or MC. Prior to its release from DoD control, its explosives safety status must be documented.

- (11) A target's explosives safety status must be documented and any demilitarization required to remove its military characteristics must be performed prior to its release from DoD control.
- (12) UXO, DMM, or MC may be found on operational ranges and on former ranges (previously referred to as closed, transferring or transferred ranges). An inspection of the material will determine into which category this material falls. For example, if a projectile breaks apart on impact, one could find (a) a sheared-off fuze, which would be UXO or (b) explosive filler, which would be MC, that broke away from the projectile's open body. If during an open detonation of an unserviceable munition that is conducted on an operational range, the donor charge detonates, but the munition being destroyed breaks up, but does not detonate, the remnants of the munition would be DMM or, if explosive residue (e.g., clumps of TNT), MC.
- (13) After determination of its explosives safety status, scrap metal from used munitions on a range that is documented as safe would, after any demilitarization required to remove its military characteristics, be available for release from DoD control. In addition to these DoD requirements, other regulatory criteria may apply.
- (14) Prudent safety practice is to consider kick outs, which have experienced an unknown environment, to be equally dangerous and managed like UXO until technically qualified personnel assess and determine that they are not UXO or do not present explosive hazards similar to UXO.
- (15) Of itself, such material (e.g., metal kettle, drainpipes, floor slabs) do not present an explosive hazard and would not be classified as UXO, DMM or MC. However, residual MC (e.g., TNT, RDX, HMX) could remain in such material in high enough concentrations to present an explosive hazard.
- (16) After determination of its explosives safety status, such material (e.g., metal kettle, drainpipes, floor slabs) when documented as safe would be available for release from DoD control. In addition to this DoD requirement, other regulatory criteria may apply.
- (17) At operational ranges or former ranges used exclusively for live fire of small arms ammunition, some unfired small arms ammunition may be found. Although this ammunition is considered DMM and would be MPPEH, it is not considered to present a significant explosive hazard.

**ATTACHMENT 2**  
**MEC Discovery Form**

# MEC Discovery Form



## UXO/OE Discovery Form

Date: \_\_\_\_\_ Name: \_\_\_\_\_  
 Contract: \_\_\_\_\_ Contract Number: \_\_\_\_\_  
 Location: \_\_\_\_\_ Site Manager: \_\_\_\_\_

MEC Discovery Data						
Item #	Item	Inspected By	Date	Disposition	SUXOS	UXOSO
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

UXOSO Print Name

SUXOS Print Name

UXOSO Signature

Date

SUXOS Signature

Date

**ATTACHMENT 3**

**MMPEH Chain of Custody Form**

MPPEH Chain of Custody Document



<b>GENERAL</b>	<b>NON-HAZARDOUS MPPEH/RANGE RESIDUE CHAIN OF CUSTODY AND CERTIFICATE OF DESTRUCTION</b>			Load No.		
	1. Generators Name and Mailing Address			1a. Generators Phone No.		
	2. Generators Project Location			2a. Project Phone No.		
	3. Transporter #1 Name and Mailing Address			3a. Transporter #1 Phone No.		
4. Transporter #2 Name and Mailing Address			4a. Transporter #2 Phone No.			
<b>GENERATOR/CONTRACTOR</b>	5. Receiver Name and Mailing Address (If Different from Transporter)			5a. Phone No.		
	6. Security Seal Numbers Box#	7. Gross Weight	8. Tare Weight	9. Net Weight	10. Weight Ticket #	
	11. Description	12. Material	13. Quantity	14. Units (Wt. Volume)		
	<b>INERT CERTIFICATION</b> "I CERTIFY THAT EACH ITEM OR ITEMS CONTAINED HAS BEEN PERSONALLY INSPECTED BY ME AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, CONTAIN NO ITEMS OF A DANGEROUS OR HAZARDOUS NATURE AS DEFINED BY FEDERAL, STATE, AND/OR LOCAL REGULATIONS."					
	15. Inspector 1/Project UXO/QA					
Printed/Typed Name		Signature		Month/Day/Year		
16. Inspector 2/ Project Rad/Safety						
Printed/Typed Name		Signature		Month/Day/Year		
<b>TRANSPORTER</b>	17. Transporter 1 Acknowledgement of Receipt of Material (Receiving Signature Verifies that Seals were intact)					
	Printed/Typed Name		Signature		Month/Day/Year	
	18. Transporter 2 Acknowledgement of Receipt of Material (Receiving Signature Verifies that Seals were intact)					
	Printed/Typed Name		Signature		Month/Day/Year	
<b>QUALIFIED RECYCLER</b>	19. Qualified Recycler Acknowledgement of Receipt of Material (Receiving Signature Verifies that Seals were intact)					
	Printed/Typed Name		Signature		Month/Day/Year	
	DEMILITERIZATION/DESTRUCTION CERTIFICATION "I CERTIFY THAT EACH ITEM OR ITEMS LISTED HEREON WERE DEMILITERIZED/DESTROYED ABOVE AND BEYOND THE STANDARDS DIRECTED BY DoD 4160-21-M-1 (SO AS TO NO LONGER RESEMBLE A.E.D.A -ORDINANCE)"					
	20.					
	Printed/Typed Name		Signature		Month/Date/Year	
21. Remarks/Comments			Mail Completed form to: Bering Sea Eccotech, Inc (Contracts File) 4300 "B" Street, Suite 402, Anchorage, Alaska 99503			

**ATTACHMENT 4**

**Senior UXO Supervisor Resume**

**Name:** DAVID J. FRANDBSEN

**Title:** Senior UXO Supervisor

**Education:** B.A., 1986, Kensington University, Glendale, California  
1972, Naval Explosive Ordnance Disposal School, Indian Head, Maryland

**Special Training:** Explosive Ordnance Disposal Master Technician, 1978 (CEHNC#070)  
OSHA 40-Hour Health and Safety Training (HAZWOPER)  
OSHA Supervisor Training  
OSHA Refresher Training  
OSHA Confined Space Training  
OSHA 10-Hour Construction Safety  
First Aid and CPR Training  
Construction Quality Management for Contractors

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Mr. Frandsen has over 30 years of experience in planning and managing operations for government and commercial clients at locations nationwide and worldwide. With over 15 years each of military and commercial experience, he is knowledgeable in federal, state, and local laws regarding safety and quality. He has supervised multiple project teams performing all phases of response activities and has extensive experience destroying all types of ordnance safely. He has managed Munitions Response Programs with a combined total value of over \$50 million, the most recent being a \$20 million contract with the U.S. Army Corps of Engineers, Huntsville Center for CONUS and OCONUS MEC projects.

As a Jacobs's employee he served as Safety and Quality oversight during the cleanup of a 40mm Rifle Grenade range at the former Castle Air Force Base, California. He also served as Site Manager and Quality Manager at Beale Air Force Base for the successful and incident free Cleaning and Inspection of eight, fifty-thousand gallon underground fuel storage tanks. The project was completed on time and within budget.

Prior to joining Jacobs, Mr. Frandsen served as Senior Project Manager with EODT, Inc., an environmental engineering company specializing in MEC remediation and recovered chemical warfare materiel (RCWM) projects for commercial and federal clients. He performed overall project management, including conducting site visits, formulating a work plan, assigning personnel, and coordinating the work effort through project completion and acceptance of the final report. In addition he helped prepare competitive requests for proposals and submitted fixed-price bids for task orders to the U.S. Army Corps of Engineers, Huntsville Center. During this assignment for the Huntsville Center he managed UXO projects at the following sites:

- Former Camp Claiborne, Alexandria, Louisiana – As the Project Manager in support of CERCLA EE/CA investigation of HTRW and OE concerns, he developed and

implemented the UXO safety program. While onsite, he analyzed UXO risks, supervised exclusion zone operations, and conducted daily safety inspections.

- Ouli Site, Former Waikoloa Maneuver Area, Waimea, Hawaii – As the Project Manager for the time-critical removal action, he located and removed UXO and OE scrap from the 300-acre residential site. To complete site activities, he developed the site-specific UXO safety program, enforced personnel limits, and conducted safety inspections. In addition, he coordinated with stakeholders, implemented site security, and disposed of range residue.
- Former Benicia Arsenal, Benicia, California – As the Project Manager for a \$2.5 million Formerly Used Defense Sites (FUDS) project, he was responsible for clearing WWI- and WWII-era UXO.
- Hohenfels, Germany – As the Project Manager for a \$2.5 million range clearance project, he was responsible for clearing WWII-era and current UXO.
- Fort Hood, Texas, Digital Multi-Purpose Range Complex – UXO Clearance and support During Construction Activities for the Digital Multipurpose Range Complex (DMPRC) Personally requested by the USACE to serve as on-site Project Manager/SUXOS for this \$2.2M project critical to the war in Iraq that was put over one-year behind schedule by a separate contractor. The project involved using magnetometers and digital geophysical instruments to detect and remove surface and subsurface UXO from an active impact range. Specific lanes and areas were surveyed for clearance and all daily activities were coordinated with a separate on-site construction contractor. Removal activities and construction support for earth moving machinery were conducted concurrently. All field activities were documented daily on CAD, spreadsheets, daily reports, and meetings. Weekly meetings were attended and verbal and written progress reports were provided to the Base Commander and the USACE. After four-months onsite Mr. Frandsen had successfully brought the project 2-weeks ahead of schedule, which resulted in completing the project a head of schedule.
- As the Project Manager for a \$1.9 million range clearance and construction support project, he was responsible for clearing WWII-era and current UXO.
- Joliet, Illinois – As the Project Manager for a \$750,000 project, he was responsible for clearing WWI- and WWII-era UXO.
- Fort McClellan, Alabama – As the Project Manager for a \$2 million FUDS project, he was responsible for clearing WWI- and WWII-era UXO.

Prior to this, Mr. Frandsen served as a Project Manager for HFA, Inc. in Waldorf, Maryland where he was responsible for overall management of \$20 million in projects. He prepared reports and provided cost accounting for all projects, which included all types of UXO. Upon receipt of a task order he conducted the initial site visit, formulated the work and safety plans, assigned personnel, and coordinated the work effort through project completion and approval of the final report. All projects were completed on time and under budget. Additionally, he prepared proposals for contract award and submitted fixed-price and time and material bids to

the U.S. Army Engineering and Support Center, Huntsville. He also served as the assistant Health and Safety Officer and Quality Manager during the absence of these fulltime positions.

Mr. Frandsen's representative project assignments at HFA, Inc. include the following.

- Fort Devens, Massachusetts – As the Senior UXO Supervisor and Project Manager, he oversaw UXO sampling actions on property being accessed to the Federal Bureau of Prisons under the Base Realignment and Closure (BRAC) program. He planned and supervised multi-team UXO sampling and removal operations using the U.S. Army Engineering and Support Center Huntsville's site characterization computer program. He coordinated all intrusive operations with military police, military dependents, and contractors. In addition, he organized and provided sampling data to the U.S. Army Corps of Engineers Huntsville and New England Districts. He provided sampling results to the U.S. Army Corps of Engineers St. Louis District and coordinated efforts to verify the results of the initial archives search report. He planned and supervised UXO removal activities in areas that earlier were determined through sampling to be contaminated with UXO, resulting in a \$4 million BRAC project at Fort Devens. He provided daily project coordination with active duty military, military dependents, and local contractors for safety and relocation during multi-team UXO clearance operations. He performed cost accounting, records maintenance, and daily and weekly reporting to the U.S. Army Corps of Engineers Huntsville and New England Districts. This was the first successful BRAC project involving UXO removal activities that involved UXO sampling (32 separate areas) and continued through the UXO clearance and documentation phase. The project's overall organization and success was used as a model for other BRAC projects for several years.
- Fort Ord, California – As the UXO Supervisor, he managed the sampling and clearance of property contaminated with all types of U.S. ordnances. As the Site Safety Officer and the Senior UXO Supervisor, he supported multi-team UXO clearance operations while clearing the 40-acre Laguna Seca area.
- Tooele Army Depot, Tooele, Utah – As the UXO Safety Officer and UXO Supervisor, he supported UXO clearance of property contaminated with fuzes and projectiles. During this assignment he established site-specific health and safety policies and enforced federal and state laws regarding UXO operations.
- Former Camp Croft, South Carolina – As the UXO Supervisor, he managed UXO clearance operations on property contaminated with U.S. mortars and projectiles.

Prior to this, Mr. Frandsen served as an EOD Team Member and Team Leader for EOD World Services in Kuwait. He managed UXO teams and foreign nationals during the clearance of four bombed and burned ammunition supply points. He was responsible for clearing all types of U.S. and foreign ordnance and mines and supervising multi-team range clearance operations. Under his watch, there were no explosive accidents or incidents.

Prior to this, Mr. Frandsen served in the U.S. Navy, retiring after 20 years at the rank of Senior Petty Officer. During his military career, his representative UXO project assignments included the following.

- Point Mugu, California – As the Detachment Senior Chief, Operations Chief, Safety Officer, and Senior Diving Supervisor, his responsibilities included scheduling and assigning personnel for all detachment operations. He also scheduled and managed multi-team evolutions during missile and mine recovery operations and supported all U.S. Navy mines and missiles, including the Phalanx Gun system. Furthermore, he provided EOD services to the U.S. Secret Service and local law enforcement agencies.
- Fort Story, Virginia – As the Underwater Ordnance Division Senior Chief and Senior Instructor, he developed the formal curriculum for torpedo and mine identification, recovery, intelligence data, and disposal, organized the practical training, assigned instructors, and performed project scheduling. He completed a special assignment as the Senior Enlisted Advisor to the U.S. State Department-sponsored EOD training team in Beirut, Lebanon in which he managed the hands-on practical EOD training to graduates of a four-week, accelerated EOD course. This training involved scheduling and supervising UXO clearance operations in downtown Beirut and throughout Lebanon. Mr. Frandsen also personally organized and managed the UXO cleanup of a burned ammunition supply point in downtown Beirut. He coordinated clearance operations with Israel EOD units and multinational forces. He gathered and provided ordnance intelligence to U.S. agencies and the Naval EOD school and facility. No accidents or injuries occurred during his supervision or participation.
- Keflavik, Iceland – As the detachment's leading Chief Petty Officer and Unit Operations Chief, he managed the budget and assigned project personnel. He interfaced with the Icelandic police and NATO representatives during all phases of recovering USSR ordnance and information gathering devices. He managed a yearlong hazardous chemical cleanup and disposal project for commercial chemicals recovered from the base supply department. He managed the base wide removal, testing, and disposal of PCB-contaminated electrical transformer oil. During dignitary visits to Iceland he managed EOD support to the Icelandic government, NATO, and the U.S. State Department.
- Charleston Naval Weapons Station, South Carolina – As an EOD Team Member, he performed maintenance and inventory of EOD tools and equipment, ordered materials, and maintained the detachment's supply records and budget. He also was the Demolition Range Safety Petty Officer and Diving Supervisor during diving operations. He supported nuclear weapons maintenance and transportation to the Polaris Missile Facility.
- U.S. Army EOD Unit, Fort Bragg, North Carolina – As an EOD Team Member, he performed range clearance operations on a 40-mm rifle grenade range, a projectile impact range, and a mortar impact range. Supervised multi-team range sweeps, inspected retrograde ordnance, and disposed of retrograde ordnance.
- Fort Story, Virginia – As an EOD Technician and Team Member, he participated in numerous range clearances at various locations. Assigned to the U.S.S. Independence CV62, EOD team to support to all munitions carried by the aircraft carrier and aircraft.

- Suez Canal – While on special assignment, he trained Egyptian Special Forces in EOD and diving procedures and techniques during both surface and underwater ordnance clearance operations. He helped locate and dispose of all types of U.S. and foreign ordnance in and adjacent to the canal without accident.
- U.S. Secret Service – While on special assignment, he provided EOD support to U.S. and foreign presidents and heads of state.

## **Employment History**

Jacobs Engineering Group Inc.	2004 – Present
EODT, Inc. Senior Project Manager Project Manager	1999 – 2004
HFA, Inc. Senior UXO Supervisor UXO Supervisor/Specialist EOD World Services	1993 – 1999
EOD Team Leader/Team Member	1992 – 1993
State of Iowa First Judicial District District Court Clerk	1987 – 1992
Vitro Corporation Technical Writer/Editor	1985 – 1986
United States Navy EOD Senior Chief Petty Officer Detachment Senior Chief Operations Chief Safety Officer Senior Diving Supervisor Underwater Ordnance Division Senior Chief/Senior Instructor EOD Technician/Team Member Aviation Ordnanceman	1965 – 1985

**ATTACHMENT 5**

**Activity Hazard Analysis**

## CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

**Task: MEC/UXO Anomaly Avoidance and Construction Support During Excavating Activities with Mechanical Equipment**  
**MEC/UXO Analyzed by: Terry Briggs, CIH** **Reviewed by: Dave Frandsen, SUXOS**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>MEC/UXO Avoidance and Identification, Marking the location of MEC/UXO or potential MEC/UXO, Identifying MEC/UXO and stopping work activities, Using a magnetometer and general hand tools.</p>	<ul style="list-style-type: none"> <li>MEC/UXO; MEC at the site has been evaluated and determined to most likely be not shock sensitive.</li> <li>Ergonomic issues with using a magnetometer, slips, trips and falls, temperature extremes, explosions/fires and power tool safety issues.</li> <li>Mechanical equipment and excavating activities.</li> <li>High-pressure hydraulic lines and hot hydraulic fluid.</li> </ul>	<ul style="list-style-type: none"> <li>MEC safety support, in accordance with this Work Plan, will be onsite during all work activities.</li> <li>Level D PPE required to include, hearing protection ear plugs if &gt; 85dBA and double protection ear muffs if &gt; 105dBA. Hard hats to be worn around operating equipment, Leather gloves with disposable dust respirators optional to employees if dust is present. Eye protective glasses with side shield of dust goggles. Any additional upgrade of PPE is to be approved by a CIH. Steeled toe boots should not be worn when performing magnetometer surveys unless a foot hazard exists. Heat/cold stress awareness, monitoring and ample fluids should be available.</li> </ul>
EQUIPMENT TO BE USED	INSPECTIONS REQUIRED	TRAINING REQUIRED
<p>Hand tools, Schonstedt Model GA-52Cx, and flagging tape.</p>	<p>A response check of the magnetometers will be performed at the start and finish of each work day. Any other inspections or tests based on site conditions and work plan requirements will be conducted.</p>	<p>Trained UXO Technician III and UXO Technician II (the UXO team) will be onsite during all work activities. As a minimum HAZCOM, 40-hour HAZWOPER, 8-hour refresher are required, and MEC Safety Training. Site personnel are to attend all daily safety briefings and initial site specific training. Standard hand signals used between spotter and operators of mechanical equipment.</p>

<b>Certification of Activity Hazard Analysis</b>			
<p>The signature below certifies that the above mentioned persons have assessed and reviewed this task to ascertain the potential hazards associated with its conduct, and to determine the control techniques and PPE which will be required to safeguard site personnel from the identified hazards.</p>			
Signature of Analyst:	Date:	Signature of Reviewer:	Date:

**ATTACHMENT 6**

**Memorandum for Work Plan Approval. Subject: Approval for Explosives Siting Plan (ESP), Munitions and Explosives of Concern Work Plan, Former Communications Site RI/FS, Ft. Wainwright, AK, September 2007**



REPLY TO  
ATTENTION OF:

CEHNC-OE-CX

DEPARTMENT OF THE ARMY  
HUNTSVILLE CENTER, CORPS OF ENGINEERS  
P.O. BOX 1600  
HUNTSVILLE, ALABAMA 35807-4301

SEP 07 2007

MEMORANDUM FOR Commander, US Army Engineer District, Alaska, (CEPOA-PM-C/Mr. Robert Brock), PO Box 6898, Elmendorf AFB, AK 99506-0898

SUBJECT: Approval for Explosive Siting Plan (ESP), Munitions and Explosives of Concern Work Plan, Former Communications Site RI/FS, Ft. Wainwright, AK, September 2007

1. References:

- a. Department of Defense 6055.9-STD, Ammunition and Explosives Safety Standards.
- b. Department of the Army Pamphlet 385-64, Ammunition and Explosive Safety Standards.
- c. Engineer Regulation 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern Operations, March 2007.
- d. Munitions and Explosives of Concern Work Plan, Former Communications Site RI/FS, Ft. Wainwright, AK, September 2007.

2. The ESP, at Chapter 3 of the Work Plan, is approved for use.

3. This office has reviewed this ESP and this memorandum constitutes Direct Reporting Unit (DRU) approval in accordance with reference 1c.

4. Any changes to the provisions of the ESP will require subsequent reviews and approvals by the Military Munitions Center of Expertise in accordance with reference 1c.

5. If you have any questions, please call Mr. Hank Hubbard, at (256) 895-1586.

Encl

*for William Seitz*  
CAROL A. YOUKEY, P.E., PLS  
Chief, Military Munitions Center  
Of Expertise

CF:

Commander, US Army Corps of Engineers, (CESO-SWD/Ms. Blanca Roberts) 441 G Street,  
NW, Washington, DC 20314-1000