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WORK PLAN REVISION 1 MUNITIONS RESPONSE FOR DISCARDED MILITARY
MUNITIONS AT BUILDING 365 AND HANGAR 860 MUNITIONS RESPONSE AREAS NAS
CECIL FIELD FL
03/03/2011
AGVIQ/CH2M HILL



WORK PLAN REVISION

REVISION NO: 01

CONTRACT: N62470-08-D-1006 TO NO: JM07

PROJECT NAME: Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas PROJECT NUMBER: 378823

DOCUMENT NAME: Work Plan, Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas WORK PLAN DATE: June 2010

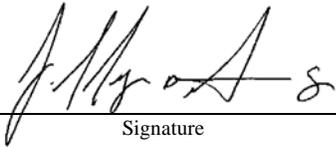
REVISION PREPARED BY: Jeffery Marks DATE OF REVISION: March 3, 2011

Modifications/Revisions:

Item No.	Description of Modifications/Revisions
Purpose	<p>The purpose of this Document Revision is to revise the Work Plan, Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas (MRA) at the former Naval Air Station Cecil Field, Jacksonville, Florida based on site conditions encountered during the munitions response (MR) field work completed July 6, 2010 to August 26, 2010. On August 26, 2010, a 2.75-inch rocket warhead was discovered at an excavation depth of 2 inches below ground surface within the Hanger 860 MRA. The discovery of this item required the Explosives Safety Submission (ESS) to be amended to reflect a change in the Munition with the Greatest Fragmentation Distance (MGFD) for the Hanger 860 MRA from the M56A4 20-mm High Explosive (HE) Round to the M151 and Mk64 2.75-inch Rocket.</p> <p>The technical approach specified in the Work Plan, Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas will be adhered to during the remainder of the MR scope of work. This Revision provides supplemental details, as included in Amendment No. 02 of the Explosives Safety Submission.</p>
001	<p>Replace the Explosives Safety Submission, Amendment No. 01, Execution of a Selected Response for Discarded Military Munitions, Hanger 860 Munitions Response Area (dated February 2010) found in Appendix C of the Work Plan with the attached Explosives Safety Submission, Amendment No. 02, Execution of a Selected Response for Discarded Military Munitions, Hanger 860 Munitions Response Area (dated November 2010).</p>

Reasons for the Modifications/Revisions:

Item No.	Description of Modifications/Revisions
001	<p>The ESS was revised to incorporate the change in the MGFD for the Hanger 860 MRA from the M56A4 20-mm HE Round to the M151 and Mk64 2.75-inch Rocket. Per NOSSAINST 8020.15B, amendments are required when a change to an approved ESS increases safety risks, identifies requirements for additional or increased explosives safety controls, or changes an explosive safety quantity-distance (ESQD) arc.</p>

Jeffery Marks TO Project Manager	 Signature	3/3/2011 Date
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Michael Halil Deputy Program Manager	 Signature	3/3/2011 Date
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Client's Responsible Authority	Signature	Date
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**Explosives Safety Submission for the Execution of a Selected
Response for Discarded Military Munitions Hangar 860 Munitions
Response Area (Amendment No. 02)**

Amendment No. 02

Explosives Safety Submission

**Execution of a Selected Response for
Discarded Military Munitions
Hangar 860 Munitions Response Area**

**Former Naval Air Station Cecil Field
Jacksonville, Florida**

**Contract No. N62467-01-D-0331
Contract Task Order No. 0029**

Prepared for



**U.S. Navy Facilities Engineering Command,
Southeast**

Prepared by



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November 2010

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Acronyms and Abbreviations

ARARs	Applicable or Relevant and Appropriate Requirements
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BEM	Buried Explosion Module
BIP	blown-in-place
bgs	below ground surface
BRAC PMO SE	Base Realignment and Closure, Program Management Office, Southeast
C/D	Class/Division
CAI	cartridge actuated initiator
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M HILL	CH2M HILL Constructors, Inc.
CFR	Code of Federal Regulations
CMC	closed metal container
DDESB	Department of Defense Explosives Safety Board
DGPS	Differential Global Positioning System
DMM	Discarded Military Munitions
DoD	Department of Defense
DODI	Department of Defense Instruction
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
ECA	Equipment Check Area
EO	Executive Order
EOD	Explosive Ordnance Disposal
EODB	EOD Bulletin
ESQD	Explosives Safety Quantity-Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FAA	Federal Aviation Administration
FANG	Florida Air National Guard
FE\AD	Facilities Engineering & Acquisition Division
FLARNG	Florida Army Reserve National Guard
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HD	Hazard Division
HE	High Explosive
HERO	Hazards of Electromagnetic Radiation to Ordnance
HFD	Hazardous Fragment Distance
IBD	Inhabited Building Distance
IAW	in accordance with
ICA	Instrument Certification Area
JAA	Jacksonville Airport Authority

lb	pounds
MD	munitions debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
MCE	Maximum Credible Event
MDAS	Material Documented as Safe
MFD-H	Maximum Fragmentation Distance- Horizontal
MFD-V	Maximum Fragmentation Distance- Vertical
MGFD	Munition with the Greatest Fragmentation Distance
mm	millimeter(s)
MMRP-CX	Military Munitions Response Program Center of Expertise
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
NAS	Naval Air Station
NAVFAC SE	U.S. Naval Facilities Engineering Command, Southeast
NAVSEA	Naval Sea Systems Command
NAVSEAINST	Naval Sea Systems Command Instruction
NEW	Net Explosives Weight
NOSSA	Naval Ordnance Safety and Security Activity
NOSSAINST	Naval Ordnance Safety and Security Activity Instruction
OP	Operational Procedures
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
ORM	Operational Risk Management
OSHA	Occupational Safety and Health Act
PES	Potential Explosion Site
QA	Quality Assurance
QC	Quality Control
RLS	Registered Land Survey
RPM	Remedial Project Manager
RTK	Real Time Kinematic
RTS	Robotic Total Station
SUXOS	Senior UXO Supervisor
TNT	Trinitrotoluene
TP	Technical Paper
TRRA	Time-Critical Removal Action
TtNUS	Tetra Tech NUS, Inc.
USACE	U.S. Army Corps of Engineers
USAE	USA Environmental, Inc.
USAESCH	U.S. Army Engineering Support Center, Huntsville
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1.0 Background

1.1 Project Manager

The responsible U.S. Naval Facilities Engineering Command, Southeast (NAVFAC SE)/ Base Realignment and Closure, Program Management Office, Southeast (BRAC PMO SE) Project Manager for this project is:

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1.2 Munitions Response Site (MRS) Identifier and Description

The 74-acre Hangar 860 Munitions Response Area (H860-MRA) contains both the 20-acre Hangar 860 MRS -1 (H860-MRS-1) and 54-acre Hangar 860 MRS-2 (H860-MRS-2). H860-MRS-2 is located west of Hangar 860. Hangar 860 is located on Aerospace Way and north of Runway 9L-27R on the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. Figures 1-2 and 1-3 show the MRS location within NAS Cecil Field and Jacksonville, Florida.

H860-MRS-2 is comprised of an initial 12-acre region and a potential 42-acre expansion. If Munitions or Explosive of Concern (MEC) is recovered on a periphery grid of the initial 12-acre region, the "Selected Response" will continue into a 42-acre expansion region. "Selected Response" will be performed until no MEC is recovered within one row of periphery grids in the 42-acre expansion region.

Hangar 860 MRA and Building 365 MRA are located within the compounds of the former NAS Cecil Field (see Figure 1-3). The purpose of this Explosive Safety Submission (ESS) Amendment is to update and clarify the Hangar 860 MRA ESS.

The initial 20-acre H860-MRS-1 was released back to Jacksonville Airport Authority (JAA) from the Navy in a letter dated January 31, 2007 (BRAC PMO SE, 2007).

1.3 Regional Map

A Regional Map of former NAS Cecil Field (Figure 1-1) shows the State of Florida and the location of the former NAS Cecil Field. Expansion Map for H860-MRA (Figure 1-2) displays the current H860-MRS-2 along with previous "Selected Response" operation regions.

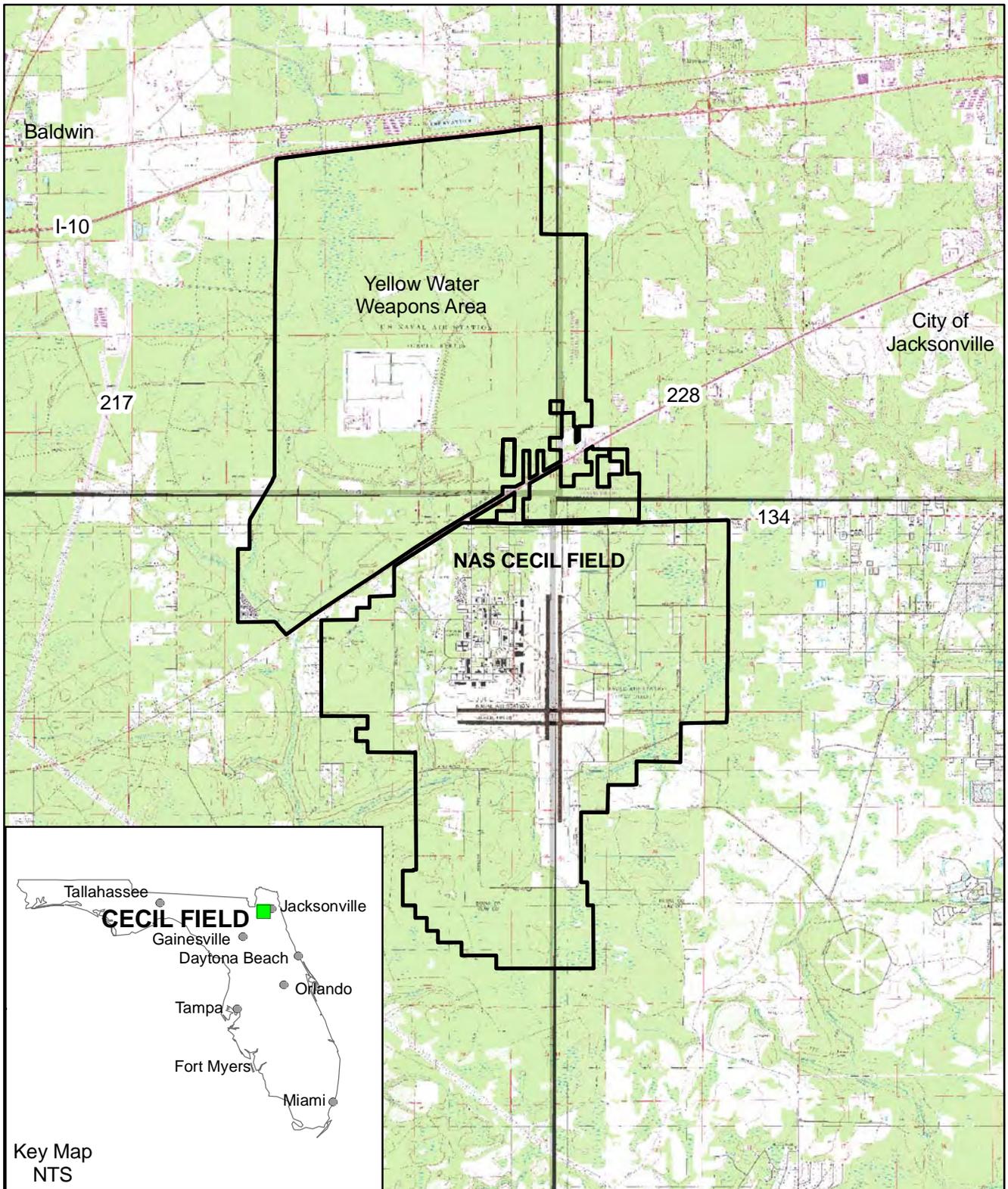
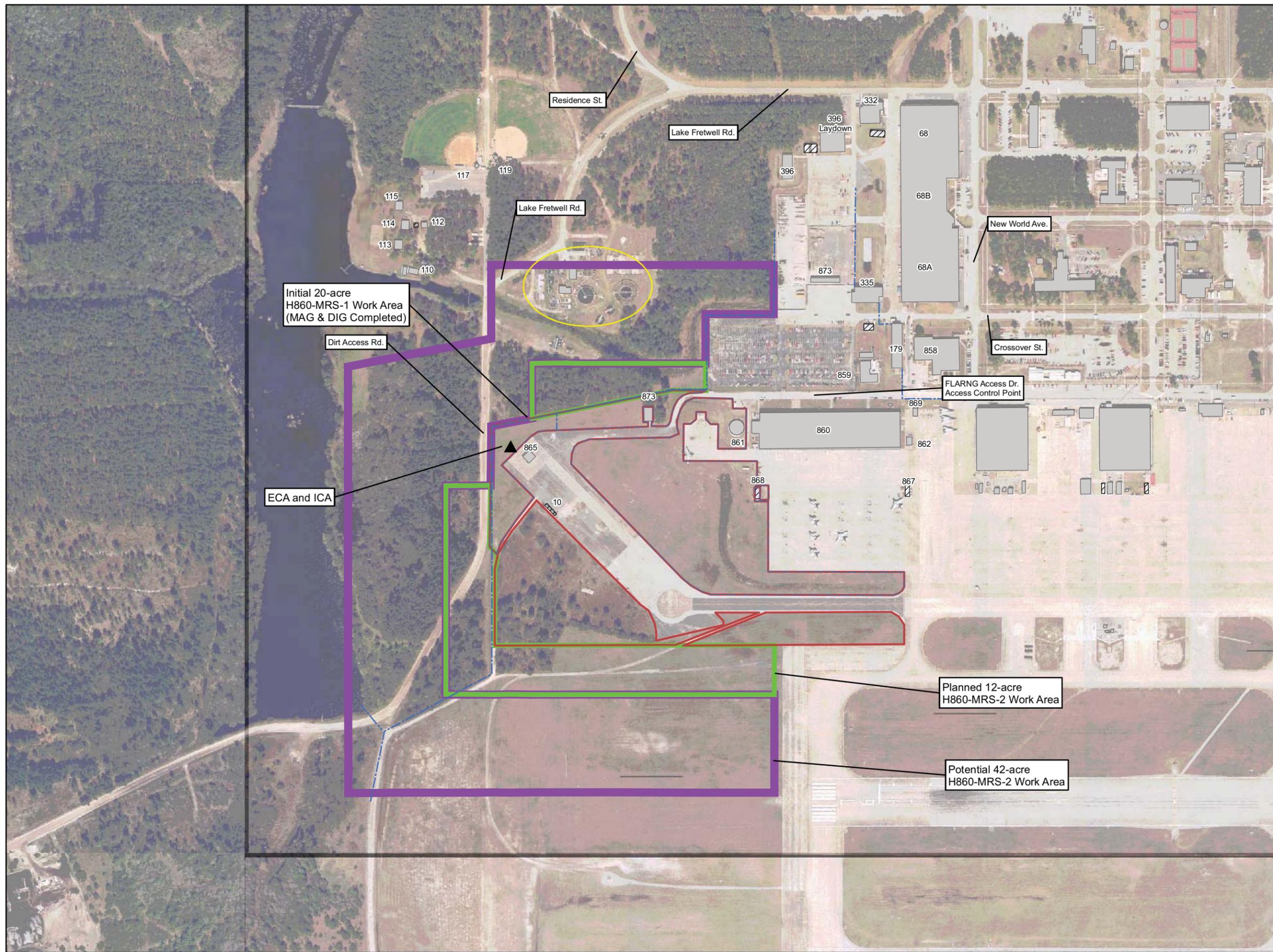
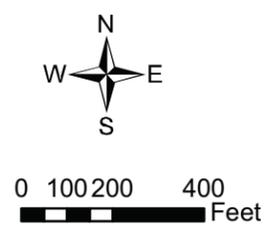


FIGURE 1-1
 Regional Map of
 Former NAS
 Cecil Field

Figure 1-2
 Expansions Map for
 Hangar 860 MRA



- Legend**
- JAA and FLARNG Fence Line
 - Initial MRS Work Area (H860-MRS-1)
 - Hanger_Area_Grids
 - Planned 12-acre Expansion Area (H860-MRS-2)
 - Potential 42-acre Expansion Area (H860-MRS-2)
 - ▲ ECA and ICA
- Structures**
- DEMOLITION
 - PERMANENT
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority



1.4 Scope of Munitions Response

NAVFAC SE is responding to Hangar 860 MRA under ESS Revision No. 00, dated February 2006 (see Appendix E for Department of Defense [DoD] Approval Letters). ESS activities are for a "Selected Response" on Hangar 860 MRA for NAVFAC SE, under Response Action Contracts No. N62467-01-D-0331, Contract Task Order No. 0029 and No. N62470-08-D-1006, Task Order No. JM07. Per Naval Ordnance Safety Security Activity Instruction (NOSSAINST) 8020.15B (Naval Ordnance Safety and Security Activity [NOSSA], 2008), amendments are required when a change to an approved ESS increases explosives safety risks, identifies requirements for additional or increased explosives safety controls, or changes an explosives safety quantity-distance (ESQD) arc. The ESS Amendment No. 01 was for a change in ESQD arcs relating to the original ESS for Hangar 860 MRA by 12 acres with an option to expand up to an additional 42 acres. The removal actions for the primary and expansion area will achieve a determination of reasonably safe for surface activities to continue, such as lawn maintenance, walking, and driving light/medium duty vehicles over the surface without need for onsite MEC construction support. The purpose of this ESS Amendment No.02 is to change the Munition with the Greatest Fragmentation Distance (MGFD) for the Hangar 860 MRA from the M56A4 20-millimeter (mm) High Explosive (HE) Round to the M151 and Mk64 2.75-inch Rocket. Scope areas affected by this scope of work are depicted on Figure 1-2.

1.5 History of MEC Use

Building 865 was constructed in 1976 and used as a ready munitions magazine for S3 squadrons. The building is a one-story cinderblock magazine that is divided into 12 individual storage bays. Temporary storage of munitions is reported to have occurred at this facility. Building 873 was reported as sonobuoy storage (Tetra Tech NUS, Inc. [TtNUS], 1999). Building 873 and 865 are located south and west of H860-MRS-2 within the Hangar 860 MRA

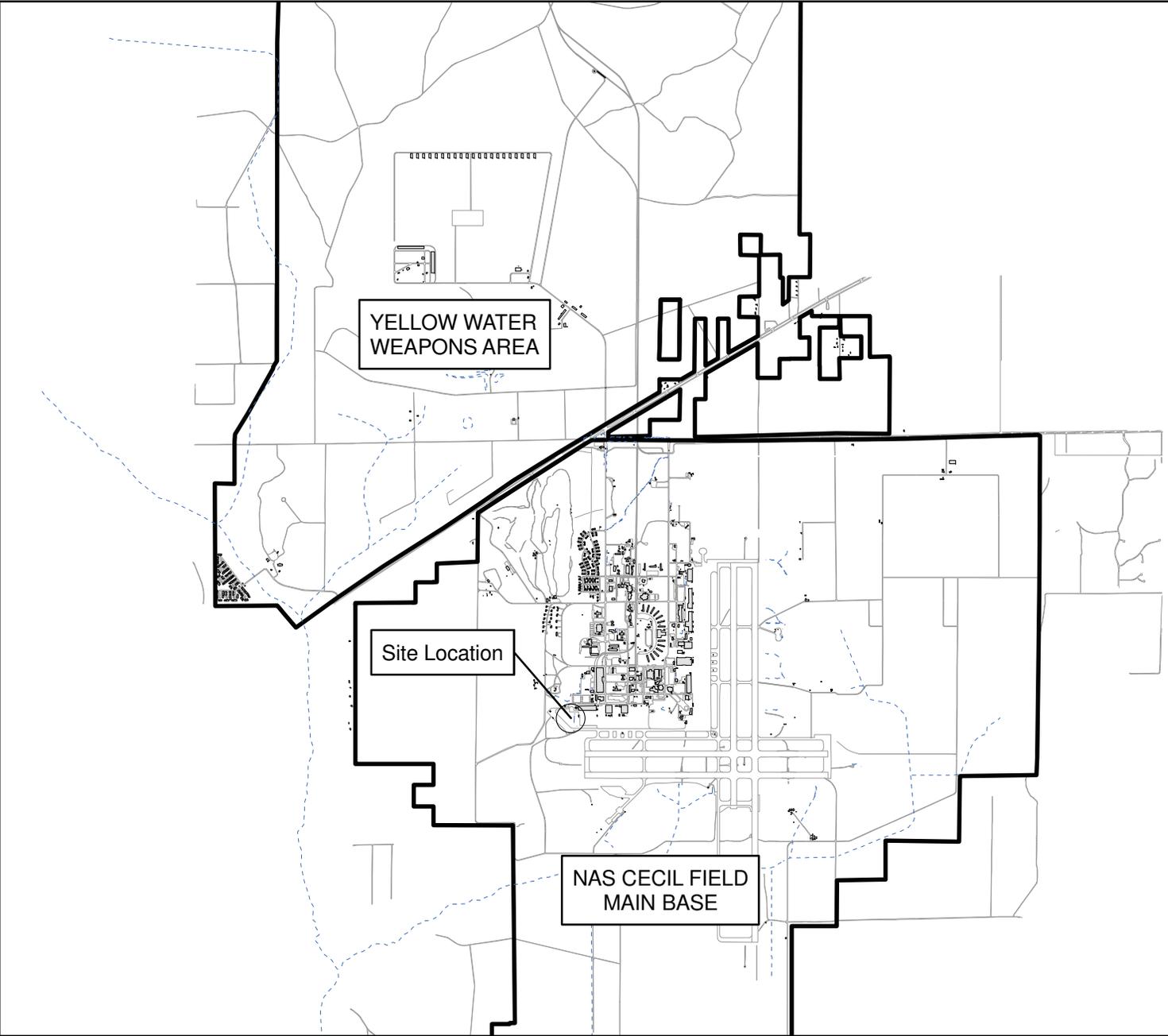
1.6 Previous Studies of Extent of MEC or MPPEH Contamination

During a visual site survey on Friday, February 4, 2005, for a future construction project design, members of the Florida Army Reserve National Guard (FLARNG), the tenant occupying Hangar 860, observed multiple possible MEC items in an open stormwater drainage ditch located to the southwest of Hangar 860 at the former NAS Cecil Field. The stormwater ditch had been cleared approximately 1 month earlier. A Florida Air National Guard (FANG) Explosive Ordnance Disposal (EOD) team responded on February 4, 2005, recovered one of the possible MEC items, and provided an e-mail summary of the FANG EOD response to FLARNG. FANG EOD identified the recovered item as a JAU-22/B cartridge actuated initiator (CAI) with a Net Explosive Weight (NEW) of 0.0116 lb and rated as 1.4C hazard division (HD) explosives. It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response.

FIGURE 1-3
Activity Map of
Former NAS Cecil
Field

Legend

-  Installation Area
-  Permanent Structure
-  Roads



FLARNG notified the JAA of the discovery by e-mail on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC SE. Based on a request from NAVFAC SE, CH2M HILL Constructors, Inc. (CH2M HILL) visited the site with JAA and FLARNG. Approximately 12 to 15 CAIs were observed during the site visit. One CAI was located along the slope of the ditch and the others were located at the bottom of the ditch, visible through standing water. At the request of NAVFAC SE, EOD Mayport responded on Tuesday, February 22, 2005, to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified the CAIs as expended.

Applicable site studies and reports include the Environmental Baseline Survey (EBS) for Transfer report, dated August 1999, prepared by TtNUS; Draft Site Specific After-Action Report, dated July 2006, prepared by USA Environmental, Inc. (USAE); and Project Completion Letter Report, dated December 2006, prepared by CH2M HILL.

The Draft Site Specific After-Action Report (USAE, 2006) and the Project Completion Letter Report (CH2M HILL, 2006e) document the "Selected Response" activities completed on the original H860-MRS-1. A "Selected Response" for H860-MRS-1 work area was completed during the period of May 22, 2006 to June 29, 2006. The "Selected Response" recovered 482 MEC/MPPEH items, including 76 MEC/MPPEH items within periphery grids (Appendix E and F). Based on the results of the completed munitions response, the Project Completion Letter Report (CH2M HILL, 2006e) included the following recommendations:

1. Re-designate the site as an MRA (H860-MRA), comprised of H860-MRS-1 and H860-MRS-2.
2. Expand the munitions response to include H860-MRS-2 (12 acres) due to the recovery of 76 MEC items within north, west, and south periphery grids of H860-MRS-1.
3. The H860-MRS-1 (20 acres) has received a "Selected Response" for MEC/MPPEH to a depth of 1-foot below ground surface (bgs).

During the completed "Selected Response" operations on the initial 20-acre H860-MRS-1 work area, 6,013 anomalies were investigated with 482 anomalies identified as MEC/ Material Potentially Presenting an Explosive Hazard (MPPEH), and 15 pounds (lb) of Munition Debris (MD) and 5,113 lb of non-MEC related debris recovered. Appendix E outlines all recovered MD, MEC, and MPPEH.]

Appendix F displays the locations of MEC removed on previous "Selected Response" operations on H860-MRS-1. H860-MRS-2 regions directly correspond to the MEC items recovered in H860-MRS-1. If MEC items are recovered within H860-MRS-2 initial 12-acre area, "Selected Response" will be conducted within the additional 42-acre expansion area.

"Selected Response" was halted on August 30, 2010 when a positive identification was established from a recovered Mk5 2.75-inch HEAT Rocket within H860-MRS-2.

1.7 Justification for NDAI of NFA Decision

Not Applicable

2.0 Project Dates

2.1 Project Dates

Re-mobilization to H860-MRS-2 is anticipated to begin during the 4th quarter of 2010 with an estimated project duration of 8 to 12 weeks. Work is temporarily suspended until an ESS incorporating the M151 and Mk64 2.75-inch Rocket as the new MGF is approved.

3.0 Types of MEC and MPPEH

3.1 Types and Quantities of MEC and MPPEH

The type and amount of MEC anticipated to be encountered within the H860-MRS-2 expansion is assumed similar to that recovered within H860-MRS-1 and completed H860-MRS-2 with the addition of the recently discovered 2.75-inch rocket Mk5 HEAT warhead. Specific types of MEC suspected are the 2.75-inch rocket Mk5 HEAT warhead, MK19 Impulse Cartridge, JAU-22/B CAI, M56A4 20-mm Projectile, and MK23 Practice Bomb.

3.2 MGFD

Based on the site history and findings of previous munitions response operations at this MRA, the primary MGFD selected for this operation would have been the 2.75-inch rocket Mk5 HEAT warhead. However, since there are no fragmentation data for this round, the selected primary MGFD will be the M151 and Mk64 2.75-inch rocket warheads. There will be no contingency MGFD.

TABLE 3-1
Primary MGFD

MGFD Type	Munitions Item	MFD-H ⁽²⁾ (feet)	MFD-V ⁽³⁾ (feet)
Primary	M151 and Mk64 2.75-inch Rocket	1,348 ⁽¹⁾	1,067 ⁽¹⁾

⁽¹⁾ Department of Defense Explosive Safety Board (DDESB), Fragmentation Data Review Form, Updated 30 September, 2010

⁽²⁾ Maximum Fragmentation Distance - Horizontal

⁽³⁾ Maximum Fragmentation Distance - Vertical

NOTE: Contingency MGFD are none

If while executing a “selected” munitions response, a MEC item is encountered that has a greater fragment distance than the selected MGFD, the project manager will: 1) direct all munitions response personnel to immediately cease operations; and 2) submit an amended ESS to NOSSA (N53).

3.3 Maximum Credible Event (MCE)

Not Applicable

3.4 Explosive Soil and Contaminated Buildings

The MRA proposes no explosive soil or contaminated building hazards.

4.0 MEC and MPPEH Migration

Due to the climatic conditions in Florida, the site does not have a frostline and has not experienced frost heave. MEC and MPPEH migration are not anticipated.

5.0 Detection Techniques

5.1 Detection Equipment, Method and Standards

Only handheld analog geophysical metal detectors will be used at the site. The CAIs found at the site were historically constructed of both ferrous and non-ferrous metals; therefore, an all-metals detector, the White's XLT (or equivalent), will be utilized. The White's XLT metal detector is approved by the U.S. Army Engineering Support Center, Huntsville (USAESCH), Military Munitions Response Program Center of Expertise (MMRP-CX) for use on munitions response projects. The MMRP-CX program for testing geophysical instruments meets the substantial requirements of the Navy Hazards of Electromagnetic Radiation to Ordnance (HERO) Program. A Schonstedt GA-52Cx (or equivalent) may be used to identify metallic items but will not be used to determine if no metallic items are present. Anomaly discrimination is not proposed.

All personnel who use the instrument for project operations will be required to demonstrate proficiency within the Instrument Certification Area (ICA) under observation by an Unexploded Ordnance Quality Control Specialist (UXOQCS). The ICA will contain 15 flagged and numbered locations. Each flag will be located within or adjacent to ground cover (grass or shrubs) or other forest litter (e.g., duff, debris) to mimic actual site conditions that an operator would experience during the intrusive investigation. The ICA will be located near the Hangar 860 MRA Work Area (Figure 1-2). The ICA at Former Naval Air Station Cecil Field, Building 365 MRA, Jacksonville, Florida, may be used to validate employing UXO Technicians to perform intrusive investigation at Hangar 860 MRA. The ICA will be used to determine whether metallic items are present, 1) on the ground surface but not visible to the eye (e.g., tall grass or brush) or 2) beneath the mineral soil, can be detected by the operator. Twelve locations will have items buried below the mineral soil (so as to not be visible to the operator) to a depth no deeper than 1 foot bgs. The remaining three locations will not contain items. The items emplaced will be inert 20-mm projectiles (or surrogate) and CAIs (or surrogate). Under observation by the UXOQCS, the instrument operator will sweep the ICA in the same manner that would be utilized for the MEC removal operations. The operator will signify to the UXOQCS whether or not an item is suspected to be present at each flagged location. The results will be recorded by the UXOQCS.

After the operator has checked each flagged location, the UXOQCS will evaluate the results. The operator will be considered certified to operate the instrument if:

- 100 percent of the locations with items were correctly identified, AND
- No more than two of the locations that did not have items were identified as having items present. (This will ensure that an operator does not pass by each location and identify it as having an item in order to pass automatically.)

In the event that an operator does not pass the certification, the UXOQCS will ensure the instrument is functioning properly (at the Equipment Check Area [ECA]). The operator will

be required to train again in the use of the instrument by the unexploded ordnance (UXO) contractor's Senior UXO Supervisor (SUXOS) and to reattempt to certify. If an operator fails the test repeatedly, the UXOQCS will make a determination as to whether it is likely that the operator is not suited to perform the task required and will inform the SUXOS and Project Manager that the individual should be used for a different task or removed from the project.

The UXOQCS may change the locations of flags and item locations as needed to ensure that operators who have passed through the ICA are not able to share information regarding the locations of items or the numbers of flags where items are located. It will be left to the discretion of the UXOQCS to determine how often this is required to ensure a valid certification can be performed.

The UXOQCS will document when an operator is certified with a specific instrument. The operator will not be required to re-certify unless:

- He/she has left the project and did not return for at least 6 months,
- He/she has had to replace an instrument, for which the operator AND instrument had been certified previously, or
- The UXOQCS finds cause to re-certify the individual.

5.2 Navigational Equipment, Method and Standards

Final MRA boundary locations will be placed and certified by a Florida Registered Surveyor. Depending on the level of vegetation removal performed and the location within the site, positioning of grid identifying stakes will be accomplished through either Real Time Kinematic (RTK) Differential Global Positioning System (DGPS) or Robotic Total Station (RTS) methods. The most likely method will be RTK DGPS; however, under some conditions other methods may be required.

5.2.1 Real Time Kinematic Differential Global Positioning System

RTK DGPS is a differential global positioning system that utilizes satellites to determine the position of rover antenna placed on the survey instrument and correction data from a base station set up on a control point to determine the system position. Corrections from the base station are sent via radio link to the rover receiver. Accuracy of the RTK DGPS system is sub-centimeter.

5.2.2 Robotic Total Station

RTS is a survey device that uses a survey "gun" setup over a known point that tracks a prism situated on the survey pole to record its position. The survey gun is initially set up at a known point and a prism is positioned over another known point so the gun, via laser, can back sight to locate itself in space. The level of accuracy of the system is similar to RTK DGPS.

5.3 Equipment Checkout

Geophysical instruments will be checked in an ECA prior to and at the end of each day. Two items, one inert 20-mm projectile (or surrogate) and an empty CAI (or surrogate) will be

buried at approximately 1 foot bgs to ensure that these items can be detected to that depth. See Figure 1-2 for ECA location. Because the only MEC found or anticipated to be found at the site consists of Discarded Military Munitions (DMM), it is not anticipated that individual MEC items will be found 1 foot bgs.

Surveyor equipment will be validated on a known or derived benchmark prior to use. Equipment inspections will be performed on a daily basis to ensure they are in proper condition for the day's activities and are compliant with HERO requirements. The equipment inspection requires daily documentation on an inspection sheet. Radios and communications equipment will be tested prior to use for functionality.

5.4 Data Collection and Storage

Records of all data, field forms, maps, photographs, and related files are in CH2M HILL's Jacksonville, Florida Cecil Field office. Electronic files of final MEC data, maps, Quality Assurance/Quality Control (QA/QC) data, and other relevant data are archived on compact disk (CD). Paper and electronic copies of draft and final reports and submittals occur as specified in the project work plan.

6.0 Response Actions

6.1 Response Technique

The following general steps are included:

- Spraying of site for control of heavy mosquito population
- Emplacement of a 100-foot by 100-foot grid system tied to a permanent site monument by a Florida Registered Surveyor
- Removal of vegetation in wooded area of site
- Surface/subsurface removal operation to detect and investigate anomalies potentially related to MEC
- Disposal of MEC/material documented as explosive hazard
- Demilitarization of material documented as safe

Vegetation removal will be accomplished 6 inches above ground surface with gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a tractor equipped with a bush hog mower. If required, tree removal will be performed in regions where the trees hinder the MEC removal operation. MEC avoidance will be performed during vegetation removal. Visual observation of the ground surface by UXO Technicians prior to and during vegetation removal will be instrument-assisted detection using a White's XLT all metals detector (or equivalent). The instrument will be used to check inside heavy vegetation (for example, a thick bush) where it is not possible for the UXO Technician to visually check the area. UXO Technicians will ensure vegetation reduction equipment operates a minimum of 6 inches above ground surface and with escort by qualified UXO personnel.

Following vegetation removal, the MRS will be divided into lanes 5 feet wide marked by string. A UXO Technician will use the White's XLT all metals detector (or equivalent) for searching within the survey lane. When a surface or subsurface anomaly is detected, a UXO Technician will mark and excavate the anomaly to determine if it presents an MEC hazard. Once the anomaly is investigated and a metallic item is removed, the anomaly location will be surveyed again with the White's XLT all metals detector (or equivalent) to determine if more metallic items remain. Initial and maximum quantity-distance maps for Hangar 860 are presented in Figures C-1 and C-2, respectively.

6.2 Exclusion Zones

6.2.1 Exclusion Zone

Table 6-1 provides the exclusion zone (EZ) details.

TABLE 6-1
Exclusion Zones

MGFDs		EZs (feet)				
Description	NEW ⁽¹⁾ (lb)	Fragmentation Effects		Blast Overpressure Effects		
		HFD ⁽³⁾	MFD ⁽⁴⁾	K328	K40	K24
M151 and Mk64 2.75-inch Rocket	2.3 ⁽⁵⁾	258 ⁽⁵⁾	1,348 ⁽⁵⁾	433 ⁽²⁾	53 ⁽²⁾	32 ⁽²⁾

- (1) Net Explosive Weight (NEW)
- (2) Calculated using $D=KW^{1/3}$ rounding to the next highest integer
- (3) Hazardous Fragment Distance
- (4) Maximum Fragment Distance
- (5) DDESB, Fragmentation Data Review Form, Updated 30 September, 2010

6.2.2 Operational EZ

EZ are established by their respective operation. If non-essential personal enter the EZ, work will cease and the EZ will no longer be active. Table 6-2 provides the controlling for the MGFD for this amendment. The ESQD maps are provided in Appendix C.

TABLE 6-2
Controlling Exclusion Zones

Operation	Sited as	ES	Basis	ESQD (feet)
Manual operations	Unintentional detonation	UXO Teams	K40 of the MGFD	55 ⁽¹⁾
Manual operations	Unintentional detonation	Public and non-essential personnel	HFD of the MGFD	258 ⁽¹⁾
Treatment of MGFD	Intentional detonation	Public and all personnel	MFD of MGFD	1,348 ⁽¹⁾⁽²⁾
Sandbagged MGFD and Non-MGFD treatment up to 5 lb TNT equivalent NEW	Intentional detonation	Public and all personnel	Withdrawal distance using engineering controls	200 ⁽³⁾⁽⁴⁾
Portable magazine (up to 15 lb NEW)	Above ground magazine	Non-essential personnel in structures	Inhabited building distance (IBD)	506 ⁽⁵⁾
		Non-essential personnel in open	Public traffic route	304

- (1) DDESB, Fragmentation Data Review Form, Updated 30 September, 2010
- (2) This distance can be reduced by employing engineering controls authorized by DDESB TP-16
- (3) For only one round of M151 or Mk64, with 24 inches of sandbags for roof and walls, in accordance with DDESB TP-16, and the Fragmentation Data Review Form for the M151 or Mk64 round.

- (4) For multiple 20 mm rounds, based on calculations from DDESB Technical Paper 16 and HNC-ED-CS-S-98-7 assuming a maximum of (10) 20-mm projectiles, with up to 5 lb NEW equivalent (including donor charge), and the use of a 24-inch sandbag enclosure as described in Appendix B-2.
- (5) Naval Sea Systems Command (NAVSEA) Operation Procedures (OP) - 5 Volume 1 Seventh Revision Table 7-9 (15 lb NEW for Open)

Inhabited Buildings

There are several inhabited buildings located near H860-MRS-2 (see Figures C-1 and C-2), as described below. A competent person will observe all EZ impacted buildings and will halt work if non-essential personal enter active EZ and execute a resume work order when non-essential personal exit the EZ. Nine inhabited buildings are located within the EZ for Hangar 860 MRA:

- Building 335 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 335 is located directly west of Building 68A. Building 335 is the FLARNG motor pool building and is only occupied during weekend drill activities. This building is constructed of standard concrete block. Building 335 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 335 is beyond that distance. The occupants of the building will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 331 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 331 is located north of Building 68. Building 331 is occupied by approximately 50 business workers. This building is constructed of standard concrete block. Building 331 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 331 is beyond that distance. The occupants of the building will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 332 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 332 is located east of Building 68. Building 332 is occupied by approximately 12 business workers on Monday through Friday 9:30 a.m. until 4:30 p.m. This building is constructed of standard concrete block. Building 332 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 332 is beyond that distance. The occupants of the building will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 547 is located within the EZ for the 12- and 42-acre H860-MRS-2 expansion. Building 547 is located in between Hangar 13 and Hangar 14. Building 547 is occupied by no more than 30 workers. Building 547 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that

vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 547 is beyond that distance. The occupants of the building will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.

- Building 858 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 858 is occupied by FLARNG and used as general office space. At any given time, there are approximately 10 to 15 employees located in the building. Building 858 is constructed of standard concrete block. Building 858 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 858 is beyond that distance. The occupants of the building will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 859 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 859 is occupied by FLARNG and used as general office space. Approximately three employees are located in the building. Building 859 is a collection of temporary metal buildings adjoined to create one building. Building 859 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258-feet applies, but Building 859 is beyond that distance. The building occupants will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 860 is located within the EZ for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 860 is an inhabited FLARNG aircraft maintenance hangar. The west end of the hangar has masonry block and brick walls with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hangar/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ. Building 860 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The building occupants will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.
- Building 68B is located within the EZ for the 12 and 42-acre potential H860-MRS-2 expansion. Building 68B is occupied by U.S. Customs. This building is constructed of standard concrete block. At any given time, approximately 100 employees are located in the building. Building 68B is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Building 68B is beyond that distance. The building occupants will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.

- Hangar 13 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Hangar 13 is located at the southern end of New World Avenue and north of Taxiway C. Hangar 13 is used by the U.S. Coast Guard and contains approximately 30 workers at any given time. Hangar 13 is not encumbered by the MFD-H of 1,348 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 258 feet applies, but Hangar 13 is beyond that distance. The building occupants will be notified of the munitions response activities, and if necessary, will be vacated if present and EZ is active.

In the event MEC item(s) are identified at the site at a location where the IBD ESQD/EZ includes a structure, the following procedures will be implemented:

- If the SUXOS and UXO Safety Officer (UXOSO) determines the item(s) are safe to move, it will be placed in the portable Type 2 HE storage magazine and secured for disposal by detonation at the end of the Time-Critical Removal Action (TCRA).
- If the SUXOS determines the MEC/MDEH item(s) are not safe to move, the item(s) will be flagged and security personnel posted at the end of the operating day. The site will be monitored by security personnel until disposal operations can be performed.
- An attempt will be made to conduct disposal operation within 24 hours. Prior to initiating the disposal, the SUXOS and a UXO Technician III will evaluate the recovered MEC and existing ESQD arcs to ensure that disposal by detonation can be safely effected through the use of appropriate engineering controls, as described in this document. If it is determined that insufficient ESQD arcs exist, due to a contingency not addressed in this ESS (e.g., previously unplanned equipment such as a fuel tank present in the EZ), a plan using alternate engineering controls will be developed and expeditiously submitted via e-mail to NOSSA for review and approval prior to executing disposal by detonation operations. Disposal will be conducted in accordance with EOD Bulletin (EODB) 60A 1-1-31, OP 5 Volume I, and NAVSEA SW060-AA-MMA-010 Volumes I and II. Engineering controls will conform with DDESB TP-16 Revision 1 and USAESCH, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999.
- All nonessential personnel will be evacuated from within the IBD ESQD/EZ for detonation operations.

Uninhabited Buildings

Several buildings that fall within the IBD are classified as “uninhabited,” but may contain potential guests (see Figures C-1 and C-2). Surveillance of uninhabited buildings will be conducted during working hours within the EZ. No work will be conducted in the MRS if uninhabited buildings become occupied. Uninhabited buildings are listed below.

- Building 68 is located within the established EZ for the 42-acre potential H860-MRS-2 expansion. Building 68 is being utilized as a storage area by Boeing. This building is constructed of standard concrete block. No access to Building 68 will be allowed for nonessential personnel if within an active EZ.

- Building 68A is located within the established EZ for the 42-acre potential H860-MRS-2 expansion. Building 68A is being utilized as a storage area by Northrop Grumman. This building is constructed of standard concrete block. No access to Building 68A will be allowed for nonessential personnel if within an active EZ.
- Building 110 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 110 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is used for the storage of maintenance equipment. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 110 will be allowed for nonessential personnel if within an active EZ.
- Building 112 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 112 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public restroom facility. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 112 will be allowed for nonessential personnel if within an active EZ.
- Building 113 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 113 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 113 will be allowed for nonessential personnel if within an active EZ.
- Building 114 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 114 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 114 will be allowed for nonessential personnel if within an active EZ.
- Building 115 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 115 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 115 will be allowed for nonessential personnel if within an active EZ.
- Building 117 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 117 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a softball field and concession stand. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 117 will be allowed for nonessential personnel if within an active EZ.
- Building 119 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 119 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a softball field and scorekeepers building. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 119 will be allowed for nonessential personnel if within an active EZ.

- Building 179 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 179 is occupied by the FLARNG and used as general storage. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 179 will be allowed for nonessential personnel if within an active EZ.
- Building 865 is located within the EZ for the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 865 is an uninhabited cinderblock ready service magazine used by the USCG and FLARNG. No access to Building 865 will be allowed for nonessential personnel if within an active EZ.
- Building 396 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 396 is a storage and laydown area for grass cutting equipment occupied by J&D Maintenance. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 396 will be allowed for nonessential personnel if within an active EZ.
- Building 861 is located within the EZ for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 861 is uninhabited and used as a concrete fire protection water reservoir for Hangar 860.
- Building 862 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 862 is an out-building located on the east side of Building 860 and is used for general storage of maintenance equipment and emergency equipment. No employees use this property as a permanent workplace, and the building is uninhabited. No access to Building 862 will be allowed for nonessential personnel if within an active EZ.
- Building 869 is located within the EZ for the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 869 is a concrete structure that stores equipment for Hangar 860. No access to Building 869 will be allowed for nonessential personnel if within an active EZ.
- Building 873 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 873 is uninhabited and used by the FLARNG for storage of nonhazardous aircraft parts. No access to Building 873 will be allowed for nonessential personnel if within an active EZ.
- The Former Water Treatment Plant is located within the bounds of the 42-acre potential H860-MRS-2 expansion and the EZ for the 12-acre planned H860-MRS-2 expansion. The Former Water Treatment Plant is uninhabited, closed, and secured by the Jacksonville Electric Authority.

6.2.3 Potential Explosive Sites (PESs)

The only PES is a Portable Outdoor Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Type II Hazard Division (HD) 1.1 Storage Magazine, and it will be located within H860 MRA as seen on Figures C-1 and C-2. The Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be used to store recovered DMM. Table 6-3 outlines PES associated with H860-MRA.

TABLE 6-3
PES Encumbering H860-MRS-2

PES Bldg/Area	PES Type/ Operation	Closest Distance to MRS (feet)	IL/K18 ⁽¹⁾ from PES (feet)	PES explosive limits by class/division (C/D) (lb)					
				1.1	1.2.1 (MEC) ⁽²⁾	1.2.2	1.2.3 (MEC)	1.3	1.4
H860-MRS-2-MAG	Portable Outdoor ATF Type II HD 1.1 Storage Magazine	213	66	15	0	0	0	0	0

(1) NAVSEA OP-5 Volume 1 Revision 7, Change 8 Table 7-10 intraline distance C/D 1.1
(2) Maximum Credible Event

6.2.4 Access to EZ

Access to the MRA will be controlled by use of locked gates, barriers, and security guards (if necessary) to prevent entry of unauthorized personnel during munitions response operations. Signs signifying MEC removal operations will be posted around EZs with contact information.

While the EZs and ESQDs are in effect, access to these areas will be limited to personnel essential to the operation and authorized visitors. Unauthorized non-essential personnel and the public are prohibited from entering established EZs while operation is being performed. Access to EZs will be determined on a case-by-case basis as specified in NAVSEA OP-5 Chg 5 Rev 7 Chapter 14 Section 7.5. Non-UXO personnel and visitors authorized to enter the EZ will require intrusive work to be suspended and receive a site specific safety briefing by the UXOSO and sign the signature page. The UXOSO will determine when visitors are authorized to enter the EZ.

The UXOSO is responsible for conducting an operational risk management (ORM) assessment in accordance with OPNAVINST 3500.39 (series) prior to initiating response actions involving MEC. In addition, the UXOSO will determine the maximum number of persons (essential personnel and authorized visitors) that can be in the EZ at one time. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO based on this site specific operational risk analysis.

Based on the risk posed by the munitions response operation underway, the UXOSO may determine that access to the EZ is unsafe for visitors. However, every effort will be made to accommodate the authorized visitor's needs. With concurrence of the responsible project manager, the UXOSO will grant EZ access to authorized visitors. Access to the site will be based upon the operational risk analysis of the scheduled MEC operations and availability of escorts, as well as a demonstrated visitor need and subsequent completion of visitor safety briefings.

Persons requiring access to the EZ must demonstrate a legitimate need for access and obtain authorization from the CH2M HILL Project Manager and UXOSO. At a minimum, the request for authorization will include: names of the individual requesting access, the

identification of emergency contacts for these individuals, purpose of visit; task(s) to be performed; and rationale to support EZ access. Persons requesting access must submit their request to the CH2M HILL Project Manager and UXOSO prior to the proposed date of the site visit. Advance notice will allow time for the UXOSO to support the visit request by assigning a qualified escort, conducting an operational risk analysis on the operations planned for the date of the site visit, and preparing a visitor site specific safety briefing for the planned operations.

Prior to entry, all authorized visitors must receive a site-specific safety briefing describing the specific hazards and safety procedures to be followed within the EZ for operations underway that work day. Each authorized visitor must acknowledge receipt of this briefing in writing.

Authorized visitors to the EZ must be escorted at all times by a UXO-qualified person assigned to the project.

Any authorized visitor that violates the established safety procedures will be immediately escorted out of the EZ and/or site for their own protection and to protect essential personnel working at the site.

Main access will be along Lake Fretwell Road (see Figures C-1 and C-2).

6.3 MEC and MPPEH Hazard Classification, Storage and Transportation

6.3.1 Hazard Classification

MEC/MPPEH will be managed as Hazard/Class Division 1.1 per NAVSEA OP 5.

MEC/MPPEH deemed safe to move by a UXO Technician II and confirmed by the UXO Technician III will be consolidated and temporarily stored within an ATF Type II HD 1.1 storage magazine. The maximum NEW permitted within this magazine is 15 lb NEW.

6.3.2 Portable Outdoor ATF Type II HD 1.1 Storage Magazine

A Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be used for temporary MEC storage during this response. The Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type II magazine as specified in 27 Code of Federal Regulations (CFR) Section 55.208(a) (4). The maximum NEW to be stored in the magazine is 15 lb. This explosives storage area will meet the requirements of:

- Title 27 CFR, ATF, Part 55, Commerce in Explosives
- DoD, 2010, 6055.9-STD – DoD Ammunition and Explosives Safety Standards
- NAVSEA, 2005 OP 5 Volume 1 - Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Seventh Revision, Change 8

The magazine will be located near H860-MRA-2 Work Area, as shown on Figures C-1 and C-2, and secured within a fence.

6.3.3 Onsite Transportation Procedures

Safe to move DMM and MEC items that may be moved to the temporary ATF Type II HD 1.1 storage magazine or to the demolition site may be hand carried in the position found or will be moved by vehicle. All vehicle movements of DMM/MEC will comply with the requirements of SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar.

Explosive donor charges will be delivered by a commercial explosives vendor properly licensed in accordance with NAVSEA SW020-AF-HBK-010, Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials. Explosives will be delivered directly to the MRA work area as needed and immediately will be prepared and used to perform detonation of recovered MEC. Donor charges will not be stored onsite.

6.3.4 Vehicle Requirements

Vehicles transporting DMM and MEC on the project site must comply with NAVSEA SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Rail, and the following requirements:

- Vehicles transporting explosives must be marked with appropriate placards when carrying all Class 1 explosives.
- All vehicles transporting explosives must be equipped with reliable communications, a first-aid kit, and two 10-lb type-BC fire extinguishers.
- Vehicles transporting explosives must be inspected daily when in use, and the inspections must be documented using a Motor Vehicle Inspection Form.
- Vehicles transporting explosives must be operated by a qualified driver with a Commercial Drivers License that includes a Hazardous Materials Endorsement.

6.4 MEC and MPPEH Disposition Processes

Arrangements for delivery of explosives to countercharge discovered MEC have been made with a local explosives distributor and the explosives will be delivered within 24 hours of event. Commercial explosives will not be stored onsite.

In accordance with NAVSEA SW020-AF-HBK-010, Third Edition, the vendor will be required to comply with the licensing requirements of state and local motor vehicle laws. Explosives will be accounted for in writing, from date of receipt to final disposition. An inventory will be maintained that demonstrates the initial receipt of explosives, any discovery of a discrepancy in the quantities on hand versus quantities on inventory, and final disposition (for example, return to distributor or destruction).

6.4.1 Detonation of MEC at MRS

When MEC and/or MPPEH are discovered and are not safe to transport, and the area can withstand a high-order detonation, these materials will be disposed of by detonation where found, or by blow-in-place (BIP). Engineering controls for blast/fragment mitigation may be required, including the evacuation of personnel and protection of property; construction of protective works such as trenching, barricades, or buttresses to protect fixed facilities;

and/or tamping the shot with earth and sand to reduce fragmentation. UXO personnel will follow the protection procedures for personnel and property, and determine the best methods to be used, and will advise the SUXOS of any coordination or assistance required to effect final disposal. Only pre-approved DDESB-approved engineering controls will be used.

The danger area will be marked off and evacuated. Individuals temporarily occupying facilities (i.e., Buildings 335, 331, 332, 547, 858, 859, 860, 68B and Hangar 13) will be notified of all MEC-related activity and will be vacated when necessary based on the established EZ.

6.4.2 Detonation of MEC at Planned Demolition Area

MEC item(s) determined by the SUXOS and UXOSO as safe to move but not safe to transport for offsite disposal and have been moved for temporary staging in an ATF Type II HD 1.1 Outdoor Storage Magazine will be disposed of by detonation at the MEC demolition location shown on Figures C-1 and C-2.

To develop the appropriate level of engineering controls, the fragment velocity and mass must be determined for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. The information provided in Appendices B-1 and B-2 together with the calculations from DDESB TP-16, Revision 2 and BEM (V6.2 July 2010), were utilized to determine the expected maximum fragmentation weight and velocity from a planned detonation of ten 20-mm projectiles laid side by side or one 2.75-inch rocket.

Any required detonations, including approach, timing, and required public notification, will be coordinated through the JAA and FAA air traffic controller, City of Jacksonville (as needed), NAVFAC SE/BRAC PMO SE RPM, and the FE\AD Project Office.

The MEC demolition location will not be utilized as an overnight or longer-term staging area with MEC moved to the location for demolition only.

Disposal will be conducted in accordance with EOD Bulletin 60A 1-1-31, OP 5 Volume I, and NAVSEA SW060-AA-MMA-010 Volumes I and II. Engineering controls will conform with DDESB TP-16 Revision 2 and USAESCH Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999.

6.4.2.1 Treatment of 2.75-inch Rocket

Acceptable to move 2.75-inch rocket warheads may be treated by utilizing the BEM. The munition-specific values provided in DDESB TP 16 Revision 3 do not agree with the September 30, 2010 Fragmentation Database. The fragment weight, fragment velocity, and single TNT equivalent weight for the M151 and Mk 64 rocket warhead from the September 30, 2010 Fragmentation Database may be entered in the User Defined mode.

The BEM (Appendix B-3) dictates that the MEC item will be buried no shallower than 3.51 feet in order to achieve a MFD of 0 feet. Nevertheless, a 200-ft ESQD will be maintained when treating 2.75-inch rockets.

6.4.2.2 Treatment of MEC other than 2.75-inch Rocket

Based on the engineering controls calculations and referencing Table 7, HNC-ED-CS-S-98-7, an enclosure with 24 inches of sandbags on the roof and walls would have a maximum

sandbag throw of 135 feet and would require an ESQD arc of 200 feet. The IBD ESQD arc is shown on Figures C-1 and C-2.

Appendix B-2 provides the detailed engineering controls and ESQD calculations, and operational hazard analysis, as well as sandbag construction examples. This approach and calculations were collaborated with Michelle Crull, Ph.D., PE, USAESCH.

6.4.3 MPPEH and MD

A systematic approach will be used for collecting, inspecting, and segregating site debris. The approach is designed so that materials undergo a continual evaluation/inspection process from the time they are acquired until the time they are removed from the site. Site debris will be classified and segregated into one of two categories: 1) MEC/Material Documented as an Explosive Hazard (MDEH) or 2) Material Documented as Safe (MDAS).

Segregation procedures begin at the time the item is discovered by the UXO Technician. At this point, the UXO Technician makes a preliminary determination as to the classification of the item. If the item is identified as MDAS, it is placed at a temporary MDAS accumulation point located within the current operating grid. MDAS that is characterized by two UXO III Technicians will be processed in accordance with NAVSEA, 2005 OP 5 Volume 1. If the item is identified as acceptable to move MDEH, it is placed at a temporary MDEH collection point located within the current operating grid if it is deemed acceptable to move. If the item is identified as MEC, it is handled as described in Sections 6.4.1 and 6.4.2.

MDAS will be inspected, demilitarized as necessary, certified, and verified as free of explosive hazards prior to being transported to the Defense Reutilization and Marketing Office (DRMO) for disposition. Discussions are underway with DRMO to establish protocols for disposition of MDAS.

6.5 Explosive Soil

Not Applicable

6.6 Contaminated Buildings

Not Applicable

6.7 Operational Risk Management

To assess the operational risk associated with H860-MRA, each process is analyzed separately. Table 6-4 evaluates each individual process before and after hazard mitigation techniques.

TABLE 6-4
Hazard Analysis Matrix

Process Step	Hazard	Triggering Event	Initial Risk Index ⁽¹⁾	Hazard Mitigation	Final Risk Index
1	MEC Avoidance	MEC to direct impact	D/III/4	UXO Tech escort all non-UXO tech personnel and all non-UXO Tech personnel will have 3R Training	D/IV/5
2	Manual MEC removal operations	MEC reacts to impact or movement during soil removal	C/II/3	Initial mechanized excavation beside anomaly; final excavation with hand tools	D/IV/5
3	Transportation of MEC/DMM/MPPEH	MEC reacts to direct impact, or shock	C/II/2	Item determined acceptable to move. Item packed in sand in a wooden box. If item is electrical initiated or electrically fused it will be wrapped in tin foil and placed in a closed metal container (CMC)	D/III/4
4	MPPEH Processing	MPPEH reacts to impact during handling	C/II/4	MPPEH will be certified and verified as MDAS prior to Mechanical Operations for shredding by two UXO Tech III	D/IV/5
5	DMM Storage	DMM reacts to shock, fire, and impact	C/II/2	ATF Type II HD 1.1 Portable Magazine with fire break site IAW NASEA OP5	D/III/5
6	Recovered MEC treatment by Open Detonation	MEC and donor charges react to impact, heat, friction, electro-static discharge	C/II/3	All demo personnel trained; 200-ft ESQD EZ established; all personnel will wear non-static producing ; demo ops will not take place if electrical storm \leq 5 miles	D/II/4

1. NOSSAINST 8020.15B Table 6-4 Operational risk management codes

6.8 Contingencies

In the event a situation is encountered that prevents the primary approach discussed in this ESS from working efficiently or effectively, that activity will be suspended until a plan of action has been prepared and approved. Any amendments or corrections to the ESS will be submitted to NOSSA and DDESB as required in NOSSAINST 8020.15B.

7.0 QC/QA

7.1 QC Implementation

QC for the field activities on this project will include two primary elements: 1) field observation/audits of personnel and procedures and 2) checking equipment and instruments (e.g., geophysical sensors, two-way radios) for functioning and appropriate response prior to use, during usage and after usage. As described in Section 5.3, geophysical instruments will be checked prior to and at the conclusion of daily work to verify that they were functioning properly, and verified at the ECA.

The UXOQCS will oversee the QC activities during the munitions response. The UXOQCS will report issues to the Munitions Response QC Program Manager and the Program QC Manager, and will have the authority to stop non-compliant work. The UXOQCS will be qualified in accordance with DDESB TP18 as discussed in Section 8.2.

At least 35 QC seed items will be placed within regions where the “selected response” will be performed. All seeds will be in place prior to MEC removal operations being performed. Each seed item will be tagged with a label identifying the item as inert and providing a contract reference, a point of contact address, phone number, and a target identifier. CH2M HILL personnel will perform seeding using hand or mechanical tools, depending on soil conditions. The seed locations will be checked using a hand-held analog geophysical instrument by the UXOQCS in MEC avoidance mode to confirm that no existing anomalies are present at the seed location. Once placed, the locations of all seeded items will be surveyed using hand held global positioning system (GPS) equipment. Hand held GPS equipment will fall within 3-meter accuracy. QC seed items will either be inert 20-mm projectile (or surrogate) or an inert CAI (or surrogate) and will be buried at a depth no deeper than 1 foot bgs to ensure that these items can be detected. Detection of the QC seed items will be monitored by CH2M HILL and should an item not be detected, a root-cause analysis will be performed and corrective actions determined.

The UXOQCS will be responsible for implementing the QC Plan, performing peer oversight, inspections, and audits in accordance with pass/fail criteria. Pass-fail criteria identified in Table 7-1 are the basis for conformance and non-conformance to accomplishment of scope objectives. The achievement of each pass criteria with zero failures enables the next phase of the process to progress.

Inspecting and certifying MPPEH-free of explosive hazards results in a determination of MDAS prior to shipment offsite. The UXOQCS is one of the two UXO Technician IIIs who will verify 100 percent of all metal for recycling as MDAS. The UXOQCS will also confirm the proper treatment/disposal of all items and monitor the metal movement offsite to a recycler via chain-of-custody with verified witness destruction.

TABLE 7-1
QC Methods and Pass/Fail Criteria

Operation	Peer Oversight	Inspection	Audit	Pass/fail
Site Preparation DMM/MDEH/MPPEH Holding Area, Soil Erosion Controls, Barricades, Entry Control Points	x	Conforms to Work Plan and or Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	IAW with Work Plan criteria and ESS site plan
ICA placement and Equipment Acceptance	x	Conforms to Work Plan and or Standard Operating Procedures	Geophysicists reviews detection, selection of seed items	100% detection and selection Less than 100%; initiate Corrective Action Request
Land Survey	x	Conforms to Contractor's Standard Operating Procedures	Registered Land Survey (RLS) License verification, Equipment Check- out against know control monument for vertical and horizontal accuracy	Site boundaries achieve centimeter tolerance for traverse closure
Vegetation Reduction	x	Conforms to Contractor's Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	Brush cut to no more than 6 inches above surface, trees greater than 6 inches in diameter remain
Surface and Subsurface Removal	x	Surface Evaluation Program	100% recovery of "blind" seed	Pass = 0 MPPEH, 0 Missed Seeds, or 0 metal > 2 inches x 2 inches; Fail = 1 missed seed, 1 MPPEH, or 1 MEC; Fail = rework of 100-foot by 100-foot grid and repeat QC process
MPPEH Processing	x	Conforms to Contractor's Standard Operating Procedures	100% verification of demilitarization methods to achieve a determination of releasable to a recycler	Visual Inspection of all surface areas, demilitarization IAW DODI 4140.62
MEC/MDEH Disposal	x	Conforms to Contractor's Standard Operating Procedures	100% verification of demilitarization	Item disposed of to remove all explosive hazard

IAW in accordance with
DODI Department of Defense Instruction

7.2 QA Implementation

A qualified UXO technician who will serve as a third party check of the contractors QC activities will perform QA activities. QA personnel will ensure that activities comply with this ESS and the contract's scope of work.

8.0 Technical Support

8.1 EOD

The nearest EOD Team that is available for technical support and/or emergency response is the Navy EOD Mobile Unit 6, Platoon Mayport at Naval Station Mayport, Florida. The EOD platoon contact phone number is (904) 270-5412.

8.2 UXO Contractor

While performing contractual work for the Navy, all MEC operations personnel will have been trained, qualified, and certified by their contract employer to perform MEC project tasks. All UXO Technicians will also be qualified and certified in accordance with the terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel, and DDESB TP-18, Minimum Qualifications for UXO Technicians and Personnel.

All employees involved in hazardous waste site activities receive 40 hours of Occupational Safety and Health Act (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training. They must also have current HAZWOPER 8-Hour Refresher Training prior to working on the site. Any site worker entering the site will be required to have current HAZWOPER training.

All personnel who handle MEC/DMM will be certified in accordance with the Safe Explosive Act of 2003 and will be in process of or has received the Department of Justice /ATF Certification as a "Responsible Person" or Employee Possessor.

The UXO contractor will be licensed in the State of Florida to perform demolitions. UXO contractor will provide personnel with a Florida Blasters license.

Documentation of the above will be available for review.

A SUXOS, UXOSO and UXOQCS will be onsite during all munitions response activities. When permitted, the duties of the UXOSO and UXOQCS may be accomplished by one individual. Under no circumstances will the SUXOS also serve as either the UXOQCS or the UXOSO.

8.3 Physical Security

During munitions response activities, access restrictions apply by placing high visibility signs and or fences around the perimeter of the work area.

9.0 Environmental, Ecological, Cultural, and/or Other Considerations

9.1 Regulatory Statue, Phase, and Oversight

NAVFAC SE/ BRAC PMO SE will conduct this MEC response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) framework, as is consistent with DoD policy. OPNAVINST 8020.14, Department of the Navy Explosives Safety Policy (OPNAV, 1999), requires that all response actions involving real property known or suspected to contain military munitions have approved plans and/or appropriate documentation in accordance with an established process.

In addition, the response action is taken under the delegated authority of the Office of the President of United States by Executive Order (EO) 12580. This EO authorizes the Navy to conduct and finance removal actions. This removal action is also appropriate based on several of the applicable factors under 40 CFR Part 300.415(b)(2). The Navy is the lead agency for this action, and NAVFAC SE is the contracting agency responsible for completing the response action.

The response action will be conducted in accordance with the following health and safety regulations and requirements, in addition to the MEC-specific regulations and requirements provided in Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860 NAS Cecil Field, Jacksonville, Florida, Revisions No. 00 (CH2M HILL, 2006c), and No. 01 (CH2M HILL, 2006d):

- 29 CFR, Occupational Safety and Health Act (OSHA) Regulations: Construction (29 CFR 1926) and General Industry (29 CFR 1910), applicable sections
- U.S. Corps of Engineers (USACE), 2003, EM 385-1-1, Safety – Safety and Health Requirements

Section 121(d) of CERCLA requires that remedial actions implemented at CERCLA sites attain any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be Applicable or Relevant and Appropriate Requirements (ARARs). Potential ARARs for the MEC response action at the site have been developed as part of the planning process and are discussed in detail in Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860 NAS Cecil Field, Jacksonville, Florida, Revisions No. 00 (CH2M HILL, 2006c), and No. 01 (CH2M HILL, 2006d).

9.2 Environmental, Ecological, Cultural and/or Other Considerations

USACE Conceptual Permit No. 199801374 (IP-BL), June 2002, indicates that a protection plan is in place for the Eastern Indigo snake.

No cultural sites are known or suspected to be on the MRS.

9.3 Non-Explosive Soil

Non Applicable (see Section 3.4)

10.0 Residual Risk Management

10.1 Residual Risk Management

A continued munitions response from the ground surface to a depth of 1 foot is proposed for the 12-acre H860-MRS-2 and any potential future expansions, and will be completed in an approach consistent with work accomplished to date. Onsite construction support will be recommended for any future intrusive work beyond the 1-foot clearance depth in H860-MRS-2 and the potential expansion area, as needed.

11.0 Safety Education Program

11.1 Safety Education Program

NAVFAC SE/BRAC PMO SE will brief the JAA and City of Jacksonville on the site conditions, completed removal action, and any hazards and risks associated with MEC that may remain following the munitions response action. Onsite construction support will be required for any future intrusive work beyond the 1-foot clearance depth in H860-MRS-2 and the potential 42-acre expansion area, as needed.

12.0 Stakeholder Involvement

12.1 Stakeholder Involvement

The NAS Cecil Field Restoration Advisory Board, consisting of public citizens from the local community and impacted stakeholders, will be kept updated by the NAVFAC SE/ BRAC PMO SE RPM of the site conditions, proposed removal plan, and progress of the removal action.

13.0 References

The following references were consulted during the preparation of this ESS Amendment. Not all are cited in the text.

BRAC PMO SE. 2007. Hangar 860 Munitions Response Work, Former Naval Air Station Cecil Field, Jacksonville, FL. January.

CH2M HILL. 2006a. Explosives Safety Submission for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. February.

CH2M HILL. 2006b. Explosives Siting Plan for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. February.

CH2M HILL. 2006c. Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 00. April.

CH2M HILL. 2006d. Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 01. June.

CH2M HILL. 2006e. Project Completion Letter Report, Munitions Response for Discarded Military Munitions at Munitions Response Site 1, Hangar 860 Munitions Response Area, Former Naval Air Station Cecil Field, Jacksonville, Florida. December.

CH2M HILL. 2007. Explosives Safety Submission for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Amendment No. 01. April.

CH2M HILL 2010. Draft. Notification of MEC Find with Fragmentation Distance Larger than Currently Approved by ESS - Hangar 860 MRS, Former NAS Cecil Field, Jacksonville, FL. August 27, 2010.

CH2M HILL Constructors, Inc. 2003. Contract Management Plan for Response Action Contract No. N62467-01-D-0331. April.

CH2M HILL Constructors, Inc. 2010. Contract Management Plan for Response Action Contract No. N62470-08-D-1006. July.

DDESB. 2005. Technical Paper 16, Methodologies for Calculating Primary Fragment Distances. October 17.

DDESB TP-16 Methods for Predicting Primary Fragmentation Characteristics.

DDESB TP-18 Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel.

Department of Justice, Explosive Safety Act. 2003. July.

Florida Department of Environmental Protection. 2004. Letter to Commanding Officer of NAVFAC SE. MEC Impact to Solid Determination and Pre- and Post-MEC Detonation Site Impact Determination – Soil Analytical Summary Letter Report, Building 365, MRS, Naval Air Station Cecil Field, Florida. March 31.

NAVSEA 8020.7C. Hazards of Electromagnetic Radio to Ordnance Safety Program. 1999. July.

NAVSEA. 2001. SWO20-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar. January 15.

NAVSEA. 2005. Ordnance Publication 5 Volume 1, Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Revision 7, Change 8. September 2009.

NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program.

NOSSA. 2008 Instruction 8020.15B, Military Munitions Response Oversight Program.

Office of the Chief of Naval Operations (OPNAV). 1999. Office of the Chief of Naval Operations Instruction (OPNAVINST) 8020.14, Department of the Navy Explosives Safety Policy.

Title 29 Code of Federal Regulations, Labor, Subtitle B, Regulations Relating to Labor, Chapter XVII, Occupation Safety and Health Administration, Department of Labor.

Title 29 Code of Federal Regulations, Labor, General Industry.

Title 40 Code of Federal Regulations, Protection of Environment, Part 300, National Oil and Hazardous Substance Pollution Contingency Plan. Subpart E – Hazardous Substance Response.

U.S. Army Corps of Engineers, Huntsville Center, Safety Division for Ordnance and Explosives Directorate. 2008. Safety Alert 01-06, 20mm Minimum Separation Distance (MSD) Change. December 31.

United States Executive Order 12580. 1987. 52 FR 2923, 3 CFR, 1987 Comp., p. 193. January 23.

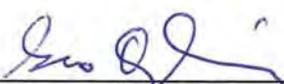
U.S. Army Corps of Engineers, 2003, EM 385-1-1, *Safety – Safety and Health Requirement*.

U.S. Army Corps of Engineers, June 2002. Conceptual Permit No. 199801374 (IP-BL).

APPENDIX A

Signature Page

Table A-1. Signature page

NAVFAC Project		BRAC PMO Project	
Project name: FORMER NAS CECIL FIELD, JACKSONVILLE, FL ESS AMENDMENT NO. 02		Project name:	
Explosive Safety Officer or UXO Contractor Safety Officer		Explosive Safety Officer or UXO Contractor Safety Officer	
			
Signature	10/28/10	Signature	
G. J. DEMETROPOULOS		Printed name	
Printed name	Date	Printed name	Date
Public Works Office Planning Department		Program Management Office Planning Department	
Signature		Signature	
Printed name		Printed name	
Date		Date	
Remedial Project Manager		Remedial Project Manager	
Signature		Signature	
Printed name		Printed name	
Date		Date	

APPENDIX B-1

Fragmentation Data Review Form

FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	HE Rounds	DODIC:	A890
Munition:	20 mm M56A4	Date Record Created:	7/30/2004
Primary Database Category:	projectile	Last Date Record Updated:	7/11/2007
Secondary Database Category:	20 mm	Individual Last Updated Record:	Crull
Munition Case Classification:	Robust	Date Record Retired:	

Munition Information and Fragmentation Characteristics	
Explosive Type:	H-761 (RDX)
Explosive Weight (lb):	0.02640
Diameter (in):	0.7874
Max Fragment Weight (lb):	0.002681
Critical Fragment Velocity (fps):	4941

Theoretical Calculated Fragment Range	
HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	61
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	447
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	558

Overpressure Distances	
Inhabited Building Distance (12 psi), K40 Distance:	13
Inhabited Building Distance (09 psi), K50 Distance:	16
Intentional MSD (0065 psi), K328 Distance:	107

Minimum Thickness to Prevent Perforation	
4000 psi Concrete (Prevent Spall):	1.09
Mild Steel:	0.21
Hard Steel:	0.17
Aluminum:	0.47
LEXAN:	2.16
Plexi-glass:	1.13
Bullet Resist Glass:	0.83

Required Sandbag Thickness	
Max Fragment Weight (lb)SB:	0.002681
Critical Fragment Velocity (fps)SB:	4941
Kinetic Energy 106 (lb-ft ² /s ²)SB:	0.0327
Required Wall Roof Sandbag Thickness (in)SB:	12
Expected Maximum Sandbag Throw Distance (ft)SB:	25
Minimum Separation Distance (ft)SB:	200

Water Containment System and Minimum Separation Distance:	
Max Fragment Weight (lb)W:	0.002681
Critical Fragment Velocity (fps)W:	4941
Kinetic Energy 106 (lb-ft ² /s ²)W:	0.0327
Water Containment System:	5 gal carboys/ inflatable pool
Minimum Separation Distance (ft)W:	200/200

◀
▶
Print This Form
Close Form

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Fragmentation Data Review Form



Database Revision Date 9/30/10

Category:

Munition:

Case Material:

Fragmentation Method:

Secondary Database Category:

Munition Case Classification:

DODIC:

Date Record Created:

Record Created By:

Last Date Record Updated:

Individual Last Updated Record:

Date Record Retired:

Munition Information and Fragmentation Characteristics

Explosive Type:

Explosive Weight (lb):

Diameter (in):

Maximum Fragment Weight (Intentional) (lb):

Design Fragment Weight (95%) (Unintentional) (lb):

Critical Fragment Velocity (fps):

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):

MFD-H [Maximum Fragment Distance, Horizontal] (ft):

MFD-V [Maximum Fragment Distance, Vertical] (ft):

Overpressure Distances

TNT Equivalent (Pressure):

TNT Equivalent Weight - Pressure (lbs):

Unbarricaded Intraline Distance (3.5 psi), K18 Distance:

Public Traffic Route Distance (2.3 psi); K24 Distance:

Inhabited Building Distance (1.2 psi), K40 Distance:

Intentional MSD (0.0655 psi), K328 Distance:

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	<input type="text" value="7.14"/>	<input type="text" value="3.24"/>
Mild Steel:	<input type="text" value="1.34"/>	<input type="text" value="0.62"/>
Hard Steel:	<input type="text" value="1.10"/>	<input type="text" value="0.51"/>
Aluminum:	<input type="text" value="2.76"/>	<input type="text" value="1.34"/>
LEXAN:	<input type="text" value="6.79"/>	<input type="text" value="4.23"/>
Plexi-glass:	<input type="text" value="5.12"/>	<input type="text" value="2.73"/>
Bullet Resist Glass:	<input type="text" value="4.30"/>	<input type="text" value="2.14"/>

Required Sandbag Thickness

TNT Equivalent (Impulse):

TNT Equivalent Weight - Impulse (lbs):

Kinetic Energy 10⁶ (lb-ft²/s²):

Required Wall & Roof Sandbag Thickness (in):

Expected Maximum Sandbag Throw Distance (ft):

Minimum Separation Distance (ft):

Water Containment System and Minimum Separation Distance:

TNT Equivalent (Impulse):

TNT Equivalent Weight - Impulse (lbs):

Kinetic Energy 10⁶ (lb-ft²/s²):

Water Containment System:

Minimum Separation Distance (ft):

Item Notes

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APPENDIX B-2

Risk Assessment, Engineering Controls and Calculations, and Operational Hazard Analysis

Risk Assessment, Calculation of Engineering Controls and Explosives Safety
Quantity Distance, and Operational Hazard Assessment
for
Detonation of Multiple Munitions with Engineering Controls
Area Adjacent to Hangar 860
Cecil Field, Florida

Risk Assessment

1.0 Background: Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determined for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arcs for the M56A4, 20mm HE projectile (refer to Attachment 1).

Based on the attached Operational Hazard Analysis and evaluation of the hazards on site, a Risk Assessment was conducted in accordance with OPNAVINST 3500.39A, Operational Risk Management and Management Guidance for the Defense Environmental Restoration Program dated September 28, 2001. The *recommended Risk Assessment Code (RAC) for this site is RAC 4 - Minor Risk*. A review of the risk evaluation process is provided in the following paragraphs.

2.0 Hazard Severity assessment of the worst credible consequence which can result as a result of the hazard posed by a 20mm High Explosive projectile was judged to be a "*Category II*" - hazard may cause severe injury or property damage.

While a 20mm High Explosive projectile, if detonated in close proximity to an individual, could cause death or severe injury, the 20mm rounds recovered have not been fired and are not armed. For these reasons the "Hazard Severity" recommended is "Category II" - hazard may cause severe injury or property damage.

3.0 Mishap Probability that a hazard will result in a mishap or loss for this site is judged to be "*Sub-category D*" - unlikely to occur.

The following calculation of engineering controls/ESQD and Operational Hazard Analysis, in addition to the application of standard operating procedures, and use of highly experienced and trained UXO Technicians provide controls that reduce the hazard to an acceptable risk. If items with a explosive risk greater than the 20mm HE projectile are encountered this risk analysis and attached documents will be updated and submitted for further review by NOSSA and DDESB if necessary.

Calculations for Engineering Controls and ESQD

1.0 References:

- a. Fragmentation Data Review Form (refer to Attachment 1)
- b. Department of Defense Explosive Safety Board (DDESB) Technical Publication 16, Revision 1, Methodologies for Calculating Primary Fragment Characteristics, dated December 1 , 2003
- c. Department of the Army Technical Manual 43-0001-27, Army Ammunition Data Sheets – Small Caliber Ammunition, dated April 29, 1994
- d. U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999

2.0 Background: Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determine for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arcs for the M56A4, 20mm HE projectile.

3.0 Calculation of Engineering Controls: To determine the specifications for engineering controls for planned detonation activities, the munitions specific information from reference (b) and the calculation from Chapter 5, reference (c) were utilized to determine the expected maximum fragmentation weight and velocity from a detonation of (10) each, 20mm projectiles laid side by side.

The following is an excerpt from Chapter 5, of reference (c) for calculating maximum fragment ranges for multiple round detonations:

“Maximum Fragment Ranges

As indicated above, the effect of detonating stacks of munitions is to increase the fragment initial velocity by as much as a factor of 2 and to increase the fragment mass by as much as 50%.”

Reference (b) provides the following data for a M56A4, 20mm HE projectile:

- Explosive Weight: 0.02640 lb
- Max Fragment Weight: 0.002681 lb
- Critical Fragment Velocity: 4,941 feet/second

Reference (b) identifies the explosive filler for the M56A4, 20mm projectile as H761 explosives as the explosive filler. H761 explosives is a member of the A-3 explosives family which has a explosives equivalent of 1.09 of the TNT standard of 1.00 as listed in Table A-2, of reference (c).

The donor charge will consist of .75-lb PETN boosters with a total explosive weight 3.75-lbs. PETN has a explosive equivalent of 1.27 of the TNT standard of 1.00 as listed in Table A-2 of reference (c).

Therefore the calculations for maximum fragment weight, expected initial velocity, and NEW are:

- The **maximum fragment weight** = 1.5 x weight from Table B-1 (1.5 x 0.002681 lbs. = **0.0040 lbs.**)
- The **expected initial velocity** = 2.0 x velocity from Table B-1 (2.0 x 4,941 feet/second = **9,882 feet/second**)
- **NEW** = NEW Donor (TNT Eq) + NEW Projectiles (TNT Eq.) (3.75 (1.27) + 10(0.02640)(1.09) = **5.0503 lbs. of TNT Eq**)

Reference (e) has the following directions for determining the thickness of sand bags for protection:

“To determine the minimum wall and roof thickness for a particular shell other than those found in Table 5, the approach is as follows:

- (1) Determine the initial fragment velocity (V_F) in ft/s, the maximum fragment weight (W_F) in pounds, and the kinetic energy ($W_F V_F^2 / 2$) in lb-ft²/s² for the particular munition.
- (2) Identify the munition with the next largest kinetic energy, from Table 6.
- (3) Use the sandbag wall and roof thickness from Table 5 for the munition with the next largest kinetic energy shown in Table 6.”

Therefore the calculations for a M56A4, 20mm HE projectile are:

Kinetic Energy ($W_F V_F^2 / 2$) = (0.0040 x 9,882² / 2) = 195,307.8480 or 0.195307 x 10⁶ lb-ft²/s²

Take into account for the total NEW of the planned detonation (**5.0503 lbs. of TNT Eq**) and use Table 7 of reference (d) for the NEW and the closest Kinetic Energy to determine the wall and roof thickness for sand bags, sandbag throw, and withdrawal distances. This would be either the 105mm M1 or the 4.2 inch M39A2.

A withdrawal zone is necessary for any detonation. This withdrawal zone applies to everyone, both public and operational personnel. The **withdrawal zone is the maximum of the sandbag throw distance, the distance to a sound level of 140 decibels, or 200 feet**. For all munitions tested, the sound level at 100 feet was substantially less than 140 decibels. At 200 feet, the sound level will be even less. The withdrawal zones are also listed in Table 7 of reference (e).

According to Table 7, reference (e), an enclosure which has **24 inches of sandbags on the roof and walls**, would have a **maximum sandbag throw of 135 feet**, and would require a **ESQD arc of 200 feet**.

This approach and calculations were collaborated with Michelle Crull, Ph.D., PE, USAESCH.

4.0 Example Engineering Controls: An example of proper sandbag construction was obtained from U. S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999 and is shown below.



Figure 5 – Sandbag Enclosure for an 81 mm M374A2 mortar.

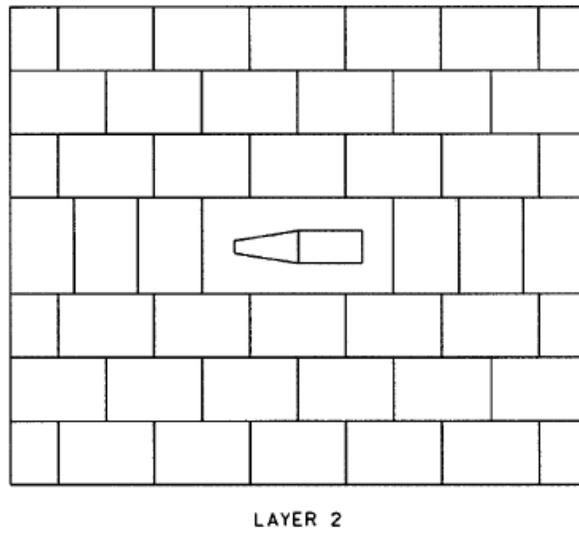
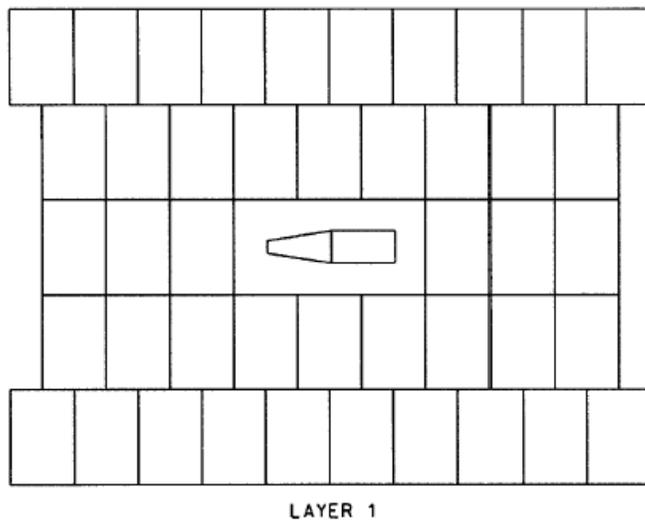
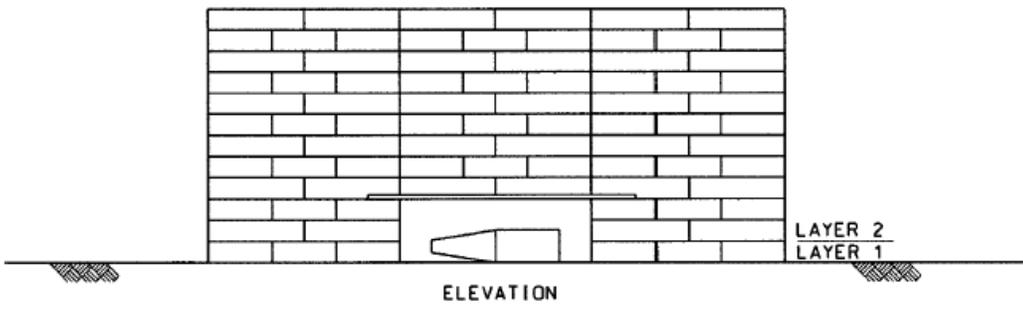


Figure 6 - Interlocking Alternate Layers of Sandbags

Operational Hazard Analysis – Destruction of MEC (20-mm projectiles and Misc. Cartridge Actuated Devices (CAD's) at former NAS Cecil Field

1.0 Process:

The MEC items will be disposed of by electrically initiated detonation utilizing engineering controls designed in compliance with DDESB TP-16, Chapter 5, Multiple Round Detonations, and HNC-ED-CS-S-98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions.

2.0 Process Outline:

I – Movement of MEC from Storage to Detonation Area

- Step 1: Inspect MEC to insure they are safe to Move
- Step 2: Place MEC items into a proper container for Transportation
- Step 3: Use appropriate materials to ensure MEC will not have excess movement during transportation
- Step 4: Secure container in a proper transport vehicle
- Step 5: Drive vehicle to Detonation area

II – Construction of Engineering Controls

- Step 1: Place appropriate amount of sandbags on the ground, connecting them to make a complete enclosure which is at least 24 inches thick. A 6-inch clearance (air gap) is required between the MEC items and the sandbags.
- Step 2: Place the MEC and Detonation materials into the center IAW Process III
- Step 3: Place the ¾ inch thick plywood sheet across the top of the sandbag wall
- Step 4: Place sandbags on top of the plywood to finish the enclosure which will be at least 24 inches thick on top and the sides.

III – Preparation of the MEC for detonation

- Step 1: Remove the MEC container from the Transport vehicle
- Step 2: Place no more than 10 each 20 MM projectiles or CAD's in a single layer, side to side in the center of the sandbag enclosure.
- Step 3: Place the Appropriate amount of Donor explosives (not to exceed 4 lbs.) onto the MEC items.
- Step 4: Prime the Charge IAW applicable demolition procedures

IV – Receive Ammunition and Explosives

- Step 1: Prepare staging areas
- Step 2: Note any discrepancies prior to signing for receipt
- Step 3: Place ammunition and explosives in staging areas

V – Detonation of MEC

- Step 1: Ensure the Evacuation area is cleared and secured
- Step 2: Receive clearance to perform detonation IAW local policies and procedures
- Step 3: Prime the Explosive Package IAW applicable Demolition Procedures
- Step 4: Sound an audible alarm within 1 minute of the Detonation
- Step 5: Function the primed explosive package IAW applicable Demolition Procedures
- Step 6: Disconnect the firing device and make notifications as required

VI – Misfire Procedures

WARNING

All personnel must observe the OSHA mandatory 30-minute wait time for all electrical demolition misfires.

- Step 1: Immediately notify all personnel in operational area.
- Step 2: Disconnect the firing device from the circuit
- Step 3: Follow applicable demolition mis-fire procedures
- Step 4: If it still does not fire, Record time, and begin 30-minute wait time
- Step 5: After 30- minute wait, SUXOS will approach and investigate miss-fire
- Step 6: Remove detonator from explosive train.
- Step 7: Attach another detonator to the explosive train and follow applicable demolition procedures outlined in Process Step V.

VII – Post Detonation Procedures

- Step 1: Carefully uncover the engineering controls
- Step 2: Check for any MEC items which may still be intact
- Step 3: If any MEC items are discovered intact- determine if they are safe to move IAW applicable procedures
- Step 4: Separate and remove all MEC related scrap for inspection
- Step 5: Remove all other debris and fill in any disturbed ground

3.0 Preliminary Hazards List:

I – Movement of MEC from Storage to Detonation Area

- Step 1: Inspect MEC to insure they are safe to Move
- a) Functioning of Ordnance from Heat / Shock / Friction
 - b) Hand injuries from sharp metal edges
- Step 2: Place MEC items into a proper container for Transportation
- a) Functioning of Ordnance from Heat / Shock / Friction
 - b) Hand injuries from sharp metal edges
- Step 3: Use appropriate materials to ensure MEC will not have excess movement during transportation
- Step 4: Secure container in a proper transport vehicle
- a) Functioning of Ordnance from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
- Step 5: Drive vehicle to Detonation area
- a) Functioning of Ordnance from Heat / Shock / Friction
 - b) Accidents from improper vehicle operations

II – Construction of Engineering Controls

- Step 1: Place appropriate amount of sandbags on the ground, connecting them to make a complete enclosure which is at least 24 inches thick.
- a) Lifting sandbags up to 50 pounds in weight
 - b) Walking across uneven surfaces, tripping / falling
- Step 2: Place the MEC and Detonation materials into the center IAW Process III
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
- Step 3: Place the $\frac{3}{4}$ inch thick plywood sheet across the top of the sandbag wall
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Hand injuries from splinters and uneven wooden edges
- Step 4: Place sandbags on top of the plywood to finish the enclosure which will be at least 24 inches thick on top and the sides.
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Hand injuries from splinters and uneven wooden edges

III – Preparation of the MEC for detonation

- Step 1: Remove the MEC container from the Transport vehicle
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
- Step 2: Place no more than 10 each 20 MM projectiles or CAD's in a single layer, side to side in the center of the sandbag enclosure.
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Hand injuries from sharp metal edges
- Step 3: Place the Appropriate amount of Donor explosives (not to exceed 4 lbs.) onto the MEC items.
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
- Step 4: Prime the Charge IAW applicable demolition procedures
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Electro-Static Discharge (ESD) functioning of electric detonators.

IV – Receive Ammunition and Explosives

Step 1: Prepare staging areas

- Step 2: Note any discrepancies prior to signing for receipt
- a) Initiation of explosives from heat / shock or friction
 - b) Hand / eye injuries from removal of banding materials

- Step 3: Place ammunition and explosives in staging areas
- a) Initiation of explosives from heat / shock or friction
 - b) Lifting heavy items
 - c) Walking across uneven surfaces
 - d) Receiving incorrect amount of explosives or ammunition
 - e) Receiving damaged or deteriorated explosive or ammunition

V – Detonation of MEC

Step 1: Ensure the Evacuation area is cleared and secured

-
- Step 2: Receive clearance to perform detonation IAW local policies and procedures
- Step 3: Prime the Explosive Package IAW applicable Demolition Procedures
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Electro-Static Discharge (ESD) functioning of electric detonators.
- Step 4: Sound an audible alarm within 1 minute of the Detonation
- Step 5: Function the primed explosive package IAW applicable Demolition Procedures.
- a) Flying debris from detonation
 - b) Blast wave from detonation
- Step 6: Disconnect the firing device and make notifications as required

VI – Misfire Procedures

WARNING

All personnel must observe the OSHA mandatory 30-minute wait time for all electrical demolition misfires.

- Step 1: Immediately notify all personnel in operational area.
- Step 2: Disconnect the firing device from the circuit
- Step 3: Follow applicable demolition miss-fire procedures
- a) Flying debris from detonation
 - b) Blast wave from detonation
- Step 4: If it still does not fire, Record time, and begin 30-minute wait time
- Step 5: After 30- minute wait, SUXOS will approach and investigate miss-fire
- Step 6: Remove detonator from explosive train.
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Electro-Static Discharge (ESD) functioning of electric detonators.
- Step 7: Attach another detonator to the explosive train and follow applicable demolition procedures outlined in Process Step V.
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Walking across uneven surfaces, tripping / falling
 - c) Electro-Static Discharge (ESD) functioning of electric detonators.

VII – Post Detonation Procedures

-
- Step 1: Carefully uncover the engineering controls
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Hand injuries from damaged wood and sharp metal edges
 - c) Eye hazards from detonation debris
 - d) Walking across uneven surfaces / tripping / falling
- Step 2: Check for any MEC items which may still be intact
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - B) Hand injuries from damaged wood and sharp metal edges
 - c) Eye hazards from detonation debris
 - D) Walking across uneven surfaces / tripping / falling
- Step 3: If any MEC items are discovered intact- determine if they are safe to move IAW applicable procedures
- a) Functioning of Ordnance and Explosives from Heat / Shock / Friction
 - b) Hand injuries from damaged wood and sharp metal edges
 - c) Eye hazards from detonation debris
 - d) Walking across uneven surfaces / tripping / falling
- Step 4: Separate and remove all MEC related scrap for inspection
- a) Hand injuries from damaged wood and sharp metal edges
 - b) Eye hazards from detonation debris
 - c) Walking across uneven surfaces / tripping / falling
- Step 5: Remove all other debris and fill in any disturbed ground
- a) Lifting heavy object up to 50 pounds
 - b) Hand injuries from damaged wood and sharp metal edges
 - c) Eye hazards from detonation debris
 - d) Walking across uneven surfaces / tripping / falling
-

4.0 Operations Hazard Analysis

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
I – Movement of MEC Items from Storage							
Step 1	Functioning of Ordnance	<ul style="list-style-type: none"> • Dropping of MEC items • MEC Items not safe to move • Mishandling of MEC items 	<ul style="list-style-type: none"> • Initiation of ammunition and/or explosives • Initiation of ammunition and/or explosives • Initiation of ammunition and/or explosives 	I B	<ul style="list-style-type: none"> • Only qualified UXO personnel will handle MEC • Limit number of personnel handling MEC Items 	II D	<ul style="list-style-type: none"> • UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
	Hand Injuries	<ul style="list-style-type: none"> • Handling MEC items with sharp metal edges 	<ul style="list-style-type: none"> • Cuts and abrasions 	III B	<ul style="list-style-type: none"> • Wearing of Leather work gloves 	IV B	<ul style="list-style-type: none"> • UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC • Personnel will be required to wear appropriate hand protection while performing operations
Step 2	Functioning of Ordnance	<ul style="list-style-type: none"> • Dropping of MEC items • MEC Items not safe to move • Mishandling of MEC items 	<ul style="list-style-type: none"> • Initiation of ammunition and/or explosives • Initiation of ammunition and/or explosives • Initiation of ammunition 	I B	<ul style="list-style-type: none"> • Only qualified UXO personnel will handle MEC • Limit number of personnel handling MEC Items 	II D	<ul style="list-style-type: none"> • UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
				I B	<ul style="list-style-type: none"> • Only qualified UXO personnel will handle MEC 	II D	<ul style="list-style-type: none"> • UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
			and/or explosives		<ul style="list-style-type: none"> Limit number of personnel handling MEC Items 		<ul style="list-style-type: none"> Conduct Daily Safety Briefing for the type and hazards of MEC
Step 3	<ul style="list-style-type: none"> Hand Injuries Functioning of Ordnance 	<ul style="list-style-type: none"> Handling MEC items with sharp metal edges Mishandling of MEC items 	<ul style="list-style-type: none"> Cuts and abrasions Initiation of ammunition and/or explosives 	<ul style="list-style-type: none"> III B I B 	<ul style="list-style-type: none"> Wearing of Leather work gloves Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items 	<ul style="list-style-type: none"> IV B II D 	<ul style="list-style-type: none"> Personnel will be required to wear appropriate hand protection while performing operations UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC
Step 4	<ul style="list-style-type: none"> Hand Injuries Walking across uneven ground Functioning of Ordnance 	<ul style="list-style-type: none"> Handling MEC items with sharp metal edges Tripping while walking across uneven surfaces Dropping of MEC items Mishandling of MEC items 	<ul style="list-style-type: none"> Cuts and abrasions Disabling knee, leg or ankle injury Initiation of ammunition and/or explosives Initiation of ammunition and/or explosives 	<ul style="list-style-type: none"> III B I B I B 	<ul style="list-style-type: none"> Wearing of Leather work gloves Keep operational area free from debris and tripping hazards Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items 	<ul style="list-style-type: none"> IV B IV C II D II D 	<ul style="list-style-type: none"> Personnel will be required to wear appropriate hand protection while performing operations Remind operational personnel to remove debris as it is generated UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC
Step 5	<ul style="list-style-type: none"> Functioning of Ordnance 	<ul style="list-style-type: none"> Dropping of MEC items Mishandling of MEC items 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Initiation of ammunition 	<ul style="list-style-type: none"> I B I B 	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Only qualified UXO personnel will handle MEC 	<ul style="list-style-type: none"> II D II D 	<ul style="list-style-type: none"> UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC UXO personnel will be certified IAW DOD Policy

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
II Construct Engineering Controls	Step 1	• Vehicle Accident	• Improper vehicle operations or vehicle malfunction	• Injuries to vehicle operators, pedestrians or property	III C	<ul style="list-style-type: none"> Limit number of personnel handling MEC Items Only licensed operators can operate vehicle Performance of daily inspections and maintenance 	<ul style="list-style-type: none"> IV C Conduct Daily Safety Briefing for the type and hazards of MEC Document daily safety inspections and maintenance Conduct daily safety briefings for operators
		• Walking across uneven ground	• Tripping while walking across uneven surfaces	• Disabling knee, leg or ankle injury	III B	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards 	<ul style="list-style-type: none"> IV C Remind operational personnel to remove debris as it is generated
	Step 2	• Lifting & Carrying Heavy Loads	<ul style="list-style-type: none"> • Bending to lift heavy items • Turning while lifting heavy items 	<ul style="list-style-type: none"> • Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury 	III B	<ul style="list-style-type: none"> Keep operational area free to debris or unnecessary objects that could create tripping hazards Limit single person lifting to below 40 pounds 	<ul style="list-style-type: none"> IV B All personnel will receive back safety and proper lifting technique training Operations personnel will be certified IAW local command directives
		• Walking across uneven ground	• Tripping while walking across uneven surfaces	• Disabling knee, leg or ankle injury	III B	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards 	<ul style="list-style-type: none"> IV C Remind operational personnel to remove debris as it is generated
	Step 3	• Functioning of Ordnance	• Mishandling of MEC items	• Initiation of ammunition and/or explosives	I B	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items 	<ul style="list-style-type: none"> II D UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC
		• Functioning of Ordnance	• Dropping plywood on MEC and Explosives	• Initiation of ammunition and/or explosives	I B	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items 	<ul style="list-style-type: none"> II D UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC
		• Walking across	• Tripping while	• Disabling knee,	III B	<ul style="list-style-type: none"> Keep operational area free 	<ul style="list-style-type: none"> IV C Remind operational

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
Step 4	uneven ground	walking across uneven surfaces	leg or ankle injury		from debris and tripping hazards		personnel to remove debris as it is generated
	• Hand Injuries	• Handling plywood with rough edges	• Minor Cuts , splinters and abrasions	III B	• Wearing of Leather work gloves	IV B	• Personnel will be required to wear appropriate hand protection while performing operations
	• Walking across uneven ground	• Tripping while walking across uneven surfaces	• Disabling knee, leg or ankle injury	III B	• Keep operational area free from debris and tripping hazards	IV C	• Remind operational personnel to remove debris as it is generated
III Preparation of MEC for Detonation	• Functioning of Ordnance	• Dropping sandbags on MEC and Explosives	• Initiation of ammunition and/or explosives	I B	• Only qualified UXO personnel will handle MEC	II D	• UXO personnel will be certified IAW DOD Policy
	• Hand Injuries	• Handling plywood with rough edges	• Minor Cuts , splinters and abrasions	III B	• Wearing of Leather work gloves	IV B	• Conduct Daily Safety Briefing for the type and hazards of MEC
	• Personnel will be required to wear appropriate hand protection while performing operations						
Step 1	Walking across uneven ground	Tripping while walking across uneven surfaces	Disabling knee, leg or ankle injury	III B	Keep operational area free from debris and tripping hazards	IV C	Remind operational personnel to remove debris as it is generated
	Functioning of Ordnance	Mishandling of MEC items	Initiation of ammunition and/or explosives	I B	Only qualified UXO personnel will handle MEC	II D	UXO personnel will be certified IAW DOD Policy
					Limit number of personnel handling MEC Items		Conduct Daily Safety Briefing for the type and hazards of MEC
Step 2	Walking across uneven ground	Tripping while walking across uneven surfaces	Disabling knee, leg or ankle injury	III B	Keep operational area free from debris and tripping hazards	IV C	Remind operational personnel to remove debris as it is generated
	Functioning of Ordnance	Mishandling of MEC items	Initiation of ammunition and/or explosives	I B	Only qualified UXO personnel will handle MEC	II D	UXO personnel will be certified IAW DOD Policy
					Limit number of personnel		Conduct Daily Safety

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
					handling MEC Items		Briefing for the type and hazards of MEC
	• Hand Injuries	• Handling MEC items with sharp metal edges	• Cuts and abrasions	III B	• Wearing of Leather work gloves	IV B	• Personnel will be required to wear appropriate hand protection while performing operations
Step 3	• Walking across uneven ground	• Tripping while walking across uneven surfaces	• Disabling knee, leg or ankle injury	III B	• Keep operational area free from debris and tripping hazards	IV C	• Remind operational personnel to remove debris as it is generated
	• Functioning of Ordnance	• Mishandling of MEC items	• Initiation of ammunition and/or explosives	I B	• Only qualified UXO personnel will handle MEC • Limit number of personnel handling MEC Items	II D	• UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
Step 4	• Walking across uneven ground	• Tripping while walking across uneven surfaces	• Disabling knee, leg or ankle injury	III B	• Keep operational area free from debris and tripping hazards	IV C	• Remind operational personnel to remove debris as it is generated
	• Functioning of Ordnance	• Mishandling of MEC items	• Initiation of ammunition and/or explosives	I B	• Only qualified UXO personnel will handle MEC • Limit number of personnel handling MEC Items	II D	• UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
	• Functioning of Electric Detonators	• Electro-static discharge	• Initiation of explosive detonators	II B	• Proper grounding techniques • Enforcement of approved EMR procedures	II D	• Conduct Daily safety briefing on hazards of EMR and proper grounding techniques • Training of personnel on approved EMR procedures
V – Receive Ammunition and Explosives							
Step 1	• Walking across	• Tripping while	• Disabling knee,	III B	• Keep operational area free	IV C	• Remind operational

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
	uneven ground	walking across uneven surfaces	leg or ankle injury		from debris and tripping hazards		personnel to remove debris as it is generated
Step 2	<ul style="list-style-type: none"> Initiation of explosives from shock or friction Sharp banding under tension 	<ul style="list-style-type: none"> Dropping or mishandling ammunition and explosives Cutting banding without PPE or using a non-standard cutting device 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Hand, arm, head or eye injury from banding when cut and hits operator 	<ul style="list-style-type: none"> I B III B 	<ul style="list-style-type: none"> Allow only qualified and certified personnel to handle ammunition and explosives Provide PPE and standard band cutting device 	<ul style="list-style-type: none"> II D IV B 	<ul style="list-style-type: none"> Operations personnel will be certified IAW local command directives
Step 3	<ul style="list-style-type: none"> Initiation of explosives from shock or friction Lifting Heavy Items Walking across uneven surfaces Receiving incorrect amount of explosives Receiving damaged or deteriorated explosives or 	<ul style="list-style-type: none"> Dropping or mishandling ammunition and explosives Bending to lift heavy items Turning while lifting heavy items Tripping while carrying explosives Dropping ammunition and explosive items Tripping while walking across uneven surfaces Contract carrier having incorrect amount of explosives Contract Carrier delivering damaged or 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Disabling back injury Disabling back injury Disabling leg, knee and ankle injury Initiation of explosives from shock and friction Disabling knee, leg or ankle injury Exceeding explosive limits and requiring work stoppage Hazardous explosives which requires 	<ul style="list-style-type: none"> I B III B IV B IV B III B IV B IV B 	<ul style="list-style-type: none"> Allow only qualified and certified personnel to handle ammunition and explosives Place explosives storage boxes on elevated platforms to prevent having to bend Keep operational area free to debris or unnecessary objects that could create tripping hazards Allow only certified personnel to handle ammunition and explosives Keep operational area free from debris and tripping hazards Do not accept delivery of more explosives than required SUXOS will inspect all explosives prior to accepting delivery from 	<ul style="list-style-type: none"> II D IV B IV C IV D IV D 	<ul style="list-style-type: none"> Operations personnel will be certified IAW local command directives All personnel will receive back safety and proper lifting technique training Operations personnel will be certified IAW local command directives Remind operational personnel to remove debris as it is generated Verify amount of explosives ordered with amount of explosives delivered. Document the condition of explosives prior to accepting delivery

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
	ammunition	deteriorated explosives	evacuation		contract carrier		
V- Detonation of MEC							
Step 1	<ul style="list-style-type: none"> Walking across uneven surfaces 	<ul style="list-style-type: none"> Tripping while walking across uneven surfaces 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury 	III B	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards 	IV C	<ul style="list-style-type: none"> Remind operational personnel to remove debris as it is generated
Step 2	NO HAZARDS						
Step 3	<ul style="list-style-type: none"> Walking across uneven ground Functioning of Ordnance/ Explosives Functioning of Electric Detonators 	<ul style="list-style-type: none"> Tripping while walking across uneven surfaces Mishandling of MEC items Electro-static discharge 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury Initiation of ammunition and/or explosives Initiation of explosive detonators 	III B I B II B	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Proper grounding techniques Enforcement of approved EMR procedures 	IV C II D II D	<ul style="list-style-type: none"> Remind operational personnel to remove debris as it is generated UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Conduct Daily safety briefing on hazards of EMR and proper grounding techniques Training of personnel on approved EMR procedures
Step 4	NO HAZARDS						
Step 5	<ul style="list-style-type: none"> Flying debris Blast wave 	<ul style="list-style-type: none"> Intentional Detonation of MEC and Explosives Intentional Detonation of MEC and Explosives 	<ul style="list-style-type: none"> Injury from flying debris Injury from blast wave 	II B II B	<ul style="list-style-type: none"> All personnel will be out to the established ESQD Distance All personnel will be out to the established ESQD Distance 	IV D IV D	<ul style="list-style-type: none"> Brief personnel on the ESQD distances Visual check of area for personnel prior to the detonation Brief personnel on the ESQD distances Visual check of area for personnel prior to the detonation

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
Step 6	NO HAZARDS						
VI- Miss-Fire Procedures							
Step 1	NO HAZARDS						
Step 2	NO HAZARDS						
Step 3	<ul style="list-style-type: none"> Flying debris Blast wave 	<ul style="list-style-type: none"> Intentional Detonation of MEC and Explosives Intentional Detonation of MEC and Explosives 	<ul style="list-style-type: none"> Injury from flying debris Injury from blast wave 	<ul style="list-style-type: none"> II B II B 	<ul style="list-style-type: none"> All personnel will be out to the established ESQD Distance All personnel will be out to the established ESQD Distance 	<ul style="list-style-type: none"> IV D IV D 	<ul style="list-style-type: none"> Brief personnel on the ESQD distances Visual check of area for personnel prior to the detonation Brief personnel on the ESQD distances Visual check of area for personnel prior to the detonation
Step 4	NO HAZARDS						
Step 5	<ul style="list-style-type: none"> Walking across uneven ground 	<ul style="list-style-type: none"> Tripping while walking across uneven surfaces 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury 	<ul style="list-style-type: none"> III B 	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards 	<ul style="list-style-type: none"> IV C 	<ul style="list-style-type: none"> Remind operational personnel to remove debris as it is generated
Step 6	<ul style="list-style-type: none"> Walking across uneven ground Functioning of Ordnance/ Explosives Functioning of Electric Detonators 	<ul style="list-style-type: none"> Tripping while walking across uneven surfaces Mishandling of MEC items Electro-static discharge 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury Initiation of ammunition and/or explosives Initiation of explosive detonators 	<ul style="list-style-type: none"> III B I B I B 	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Proper grounding techniques Enforcement of approved EMR procedures 	<ul style="list-style-type: none"> IV C II D II D 	<ul style="list-style-type: none"> Remind operational personnel to remove debris as it is generated UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Conduct Daily safety briefing on hazards of EMR and proper grounding techniques

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
Step 7	<ul style="list-style-type: none"> Walking across uneven ground Functioning of Ordnance/ Explosives Functioning of Electric Detonators 	<ul style="list-style-type: none"> Tripping while walking across uneven surfaces Mishandling of MEC items Electro-static discharge 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury Initiation of ammunition and/or explosives Initiation of explosive detonators 	<ul style="list-style-type: none"> III B I B II B 	<ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Proper grounding techniques Enforcement of approved EMR procedures 	<ul style="list-style-type: none"> IV C II D II D 	<ul style="list-style-type: none"> Training of personnel on approved EMR procedures Remind operational personnel to remove debris as it is generated UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Conduct Daily safety briefing on hazards of EMR and proper grounding techniques Training of personnel on approved EMR procedures
VII- Post Detonation Procedures Step 1	<ul style="list-style-type: none"> Functioning of Ordnance/ Explosives Hand Injuries Flying debris Walking across uneven ground 	<ul style="list-style-type: none"> Mishandling of MEC items Handling MEC items with sharp metal edges, demolition debris Moving demolition debris Tripping while walking across 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Cuts, splinters and abrasions Eye hazards Disabling knee, leg or ankle injury 	<ul style="list-style-type: none"> I B III B III B III B 	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Wearing of Leather work gloves Personnel will be required to wear ANSI approved safety glasses. Keep operational area free from debris and tripping 	<ul style="list-style-type: none"> II D IV B IV C IV C 	<ul style="list-style-type: none"> UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Personnel will be required to wear appropriate hand protection while performing operations Personnel will be required to wear appropriate eye protection while performing operations Remind operational personnel to remove debris

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
		uneven surfaces			hazards		as it is generated
Step 2	<ul style="list-style-type: none"> Functioning of Ordnance/ Explosives Hand Injuries Flying debris Walking across uneven ground 	<ul style="list-style-type: none"> Mishandling of MEC items Handling MEC items with sharp metal edges, demolition debris Moving demolition debris Tripping while walking across uneven surfaces 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Cuts, splinters and abrasions Eye hazards Disabling knee, leg or ankle injury 	<ul style="list-style-type: none"> I B III B III B III B 	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Wearing of Leather work gloves Personnel will be required to wear ANSI approved safety glasses. Keep operational area free from debris and tripping hazards 	<ul style="list-style-type: none"> II D IV B IV C IV C 	<ul style="list-style-type: none"> UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Personnel will be required to wear appropriate hand protection while performing operations Personnel will be required to wear appropriate eye protection while performing operations Remind operational personnel to remove debris as it is generated
Step 3	<ul style="list-style-type: none"> Functioning of Ordnance/ Explosives Hand Injuries Flying debris Walking across uneven ground 	<ul style="list-style-type: none"> Mishandling of MEC items Handling MEC items with sharp metal edges, demolition debris Moving demolition debris Tripping while walking across 	<ul style="list-style-type: none"> Initiation of ammunition and/or explosives Cuts, splinters and abrasions Eye hazards Disabling knee, leg or ankle injury 	<ul style="list-style-type: none"> I B III B III B III B 	<ul style="list-style-type: none"> Only qualified UXO personnel will handle MEC Limit number of personnel handling MEC Items Wearing of Leather work gloves Personnel will be required to wear ANSI approved safety glasses. Keep operational area free from debris and tripping 	<ul style="list-style-type: none"> II D IV B IV C IV C 	<ul style="list-style-type: none"> UXO personnel will be certified IAW DOD Policy Conduct Daily Safety Briefing for the type and hazards of MEC Personnel will be required to wear appropriate hand protection while performing operations Personnel will be required to wear appropriate eye protection while performing operations Remind operational personnel to remove debris

OPERATION HAZARD ANALYSIS							
	PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
		uneven surfaces			hazards		as it is generated
Step 4	<ul style="list-style-type: none"> Hand Injuries Flying debris Walking across uneven ground 	<ul style="list-style-type: none"> Handling MEC items with sharp metal edges, demolition debris Moving demolition debris Tripping while walking across uneven surfaces 	<ul style="list-style-type: none"> Cuts, splinters and abrasions Eye hazards Disabling knee, leg or ankle injury 	<ul style="list-style-type: none"> I B III B III B 	<ul style="list-style-type: none"> Wearing of Leather work gloves Personnel will be required to wear ANSI approved safety glasses. Keep operational area free from debris and tripping hazards 	<ul style="list-style-type: none"> II D IV B IV C 	<ul style="list-style-type: none"> Personnel will be required to wear appropriate hand protection while performing operations Personnel will be required to wear appropriate eye protection while performing operations Remind operational personnel to remove debris as it is generated
Step 5	<ul style="list-style-type: none"> Lifting & Carrying Heavy Loads Hand Injuries Flying debris 	<ul style="list-style-type: none"> Bending to lift heavy items Turning while lifting heavy items Tripping while carrying explosives Dropping ammunition and explosive items Handling MEC items with sharp metal edges, demolition debris Moving 	<ul style="list-style-type: none"> Disabling back injury Disabling back injury Disabling leg, knee and ankle injury Initiation of explosives from shock and friction Cuts, splinters and abrasions Eye hazards 	<ul style="list-style-type: none"> I B III B III B 	<ul style="list-style-type: none"> Place explosives storage boxes on elevated platforms to prevent having to bend Keep operational area free to debris or unnecessary objects that could create tripping hazards Allow only certified personnel to handle ammunition and explosives Wearing of Leather work gloves Personnel will be required 	<ul style="list-style-type: none"> II D IV B IV C 	<ul style="list-style-type: none"> All personnel will receive back safety and proper lifting technique training Operations personnel will be certified IAW local command directives Personnel will be required to wear appropriate hand protection while performing operations Personnel will be required

OPERATION HAZARD ANALYSIS							
PROCEDURE		BRANCH		REVISION NUMBER		Page __ of __	
PROCESS STEP NUMBER	HAZARD	MISHAP TRIGGERING EVENT	POTENTIAL MISHAP	PRELIM RISK INDEX	HAZARD MITIGATION REQTS	FINAL RISK INDEX	EMERGENCY / PREVENTATIVE ACTIONS
	<ul style="list-style-type: none"> Walking across uneven ground 	demolition debris <ul style="list-style-type: none"> Tripping while walking across uneven surfaces 	<ul style="list-style-type: none"> Disabling knee, leg or ankle injury 	III B	to wear ANSI approved safety glasses. <ul style="list-style-type: none"> Keep operational area free from debris and tripping hazards 	IV C	to wear appropriate eye protection while performing operations <ul style="list-style-type: none"> Remind operational personnel to remove debris as it is generated

KEY to RISK INDEX:

The risk index is obtained by assigning a Hazard Severity Category and Mishap Probability Sub-Category and applying them to the Risk Assessment Code Matrix:

Where:

Hazard Severity Categories = I (death, loss or grave damage), II (sever injury, damage, or inefficiencies), III (minor injuries, damage or inefficiencies), IV (minimal threat to personnel and property)

Mishap Probability Subcategory = A (likely to occur immediately), B probably will occur in time), C (may occur in time), and D (unlikely to occur)

Hazard Severity	Mishap Probability Rating			
	A	B	C	D
I	1	1	2	4
II	1	2	3	4
III	2	3	4	5
IV	3	4	5	5

- 1 = Critical
- 2 = Serious
- 3 = Moderate
- 4 = Minor
- 5 = Negligible

APPENDIX B-3

60-mm M49A5 BEM (V6.2 November 2010)

BURIED EXPLOSION MODULE

(Version 6.2)

*Based on DDESB Technical Paper 16 Revision 3, EARTHEX software,
and NSWCDD/TR-92/196
(ENGLISH UNITS)*

SELECT BURIAL MEDIUM Soil	SELECT ITEM DESCRIPTION OTHER (User Defined)
SELECT SOIL TYPE (See TP 16, Revision 3 for soil details) Dry Sand	

USER DEFINED FRAGMENT CHARACTERISTICS

FRAGMENT WEIGHT (lbs)	0.046
ENTER FRAGMENT VELOCITY (ft/s)	5,677.00
SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	2.67

ENTER TOTAL NUMBER OF ITEMS	1
ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00

SINGLE ITEM NEW (lbs)	2.67
SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.0463
FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.0463
SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	5,677
FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	5,677
TOTAL TNT WEIGHT USED (lbs)	3.97

ENTER DEPTH OF BURIAL (ft)	3.51
ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	200

CRATER OR CAMOUFLET?
CAMOUFLET

CAMOUFLET CAVITY RADIUS (ft)	1.85

FRAGMENT EXIT VELOCITY (ft/s)	0.0	FRAGMENT LAUNCH ANGLE (°)	0.0
MAXIMUM FRAGMENT DISTANCE (ft)		0.0	

Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)	N/A*
Open Air Withdrawal Distance, K328 (ft)	519.3	
	Fragment Hazard Distance (ft) **	0.0
	Pressure at Fragment Hazard Distance	(psi) N/A*
		(dB) N/A*
	Pressure at Range Entered	(psi) N/A*
		(dB) N/A*

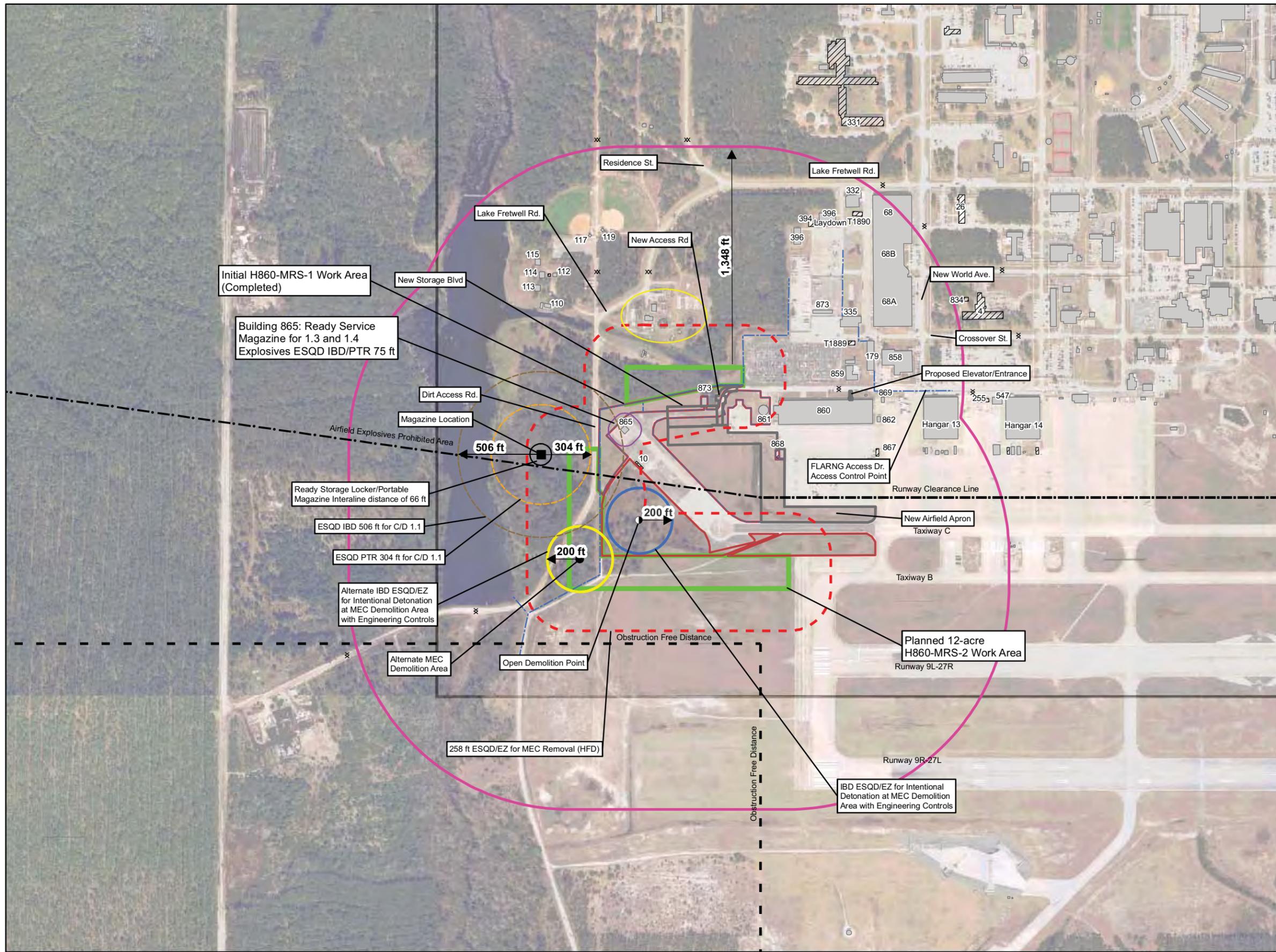
***Airblast methodology not applicable (N/A) for Camouflet conditions!**

****Depth too great--no fragments expected**

APPENDIX C

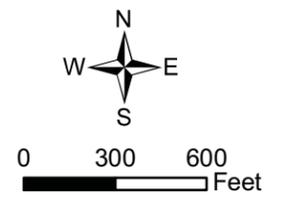
ESQD Maps

FIGURE C-1
Quantity-Distance Map
for H860-MRS-2 (Initial)



Legend

- Magazine Location
- Open Demolition Point
- xx Barricaded Road Way (When Applicable EZ in Effect)
- - - Airfield Explosives Prohibited Area
- - - Obstruction Free Distance
- - - Runway Clearance Line
- - - JAA and FLARNG Fence Line
- Hangar Area Grids
- Initial MRS Work Area
- MFD for MGFD
- Existing Demolition Area
- Alternate Demolition Area
- Planned 12-acre H860-MRS-2 Work Area
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority
- - - 258 ft ESQD/EZ for MEC Removal (HFD)
- ▨ Demolition Structure
- Permanent Structure
- - - ESQD IBD 506 ft for C/D 1.1
- - - ESQD PTR 304 ft for C/D 1.1
- - - Ready Storage Locker/Portable Magazine Interline distance of 66 ft
- Building 865: Ready Service Magazine ESQD IBD/PTR 75 ft



APPENDIX D

Approval Letters



DEPARTMENT OF THE NAVY
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY
FARRAGUT HALL BLDG D-323
23 STRAUSS AVENUE
INDIAN HEAD MD 20640-5555

8020
Ser N537/769
17 May 06

From: Commanding Officer, Naval Ordnance Safety and Security Activity

To: Commander, Naval Facilities Engineering Command,
Engineering Field Division South

Subj: EXPLOSIVES SAFETY SUBMISSION AND EXPLOSIVES SITING
PLAN MUNITIONS RESPONSE FOR DISCARDED MILITARY
MUNITIONS AT HANGAR 860 FORMER NAVAL AIR STATION
CECIL FIELD JACKSONVILLE, FLORIDA [N60200/S-139A]

Ref: (a) NAVFAC EFD South ltr ES32 of 17 Jan 2006 (w/encl)
(b) NAVSEA OP 5, Volume 1, Seventh Revision of 27 Jul 04
(c) NOSSAINST 8020.15, Military Munitions Response
Program Oversight dtd 8 Mar 04
(d) NOSSA ltr 8020 Ser N537/508 of 28 Mar 06

1. The Naval Ordnance Safety and Security Activity (NOSSA) reviewed the document forwarded under reference (a) for a munitions response at the former Naval Air Station Cecil Field Hangar 860 area and found it meets the requirements of references (b) and (c). NOSSA endorsed it to the Department of Defense Explosives Safety Board (DDESB) under reference (d) and requested that they approve it.

2. NOSSA recognizes the need to implement the munitions response as soon as possible. Therefore, and in accordance with the provisions of reference (c), NOSSA authorizes you to take the proposed munitions response actions described in reference (a), accepting that the DDESB approval process may impose different or additional requirements.

3. The NOSSA point of contact for this interim approval is Mr. Rick Urbanski, who can be contacted at DSN 354-4450 or commercial (301) 744-4450.


PAMELA G. CLEMENTS
By direction

Copy to: (see next page)

Subj: EXPLOSIVES SAFETY SUBMISSION AND EXPLOSIVES SITING
PLAN MUNITIONS RESPONSE FOR DISCARDED MILITARY
MUNITIONS AT HANGAR 860 FORMER NAVAL AIR STATION
CECIL FIELD JACKSONVILLE, FLORIDA [N60200/S-139A]

Copy to:
CNO (N411, N45)
COMNAVENGCOM HQ (EN.RM, EN.MD)
NAVFAC EFD South (ES32)
NOSSA ESSOLANT (N5L)
NOSSA (N542)



DEPARTMENT OF THE NAVY
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY
FARRAGUT HALL BLDG D-323
23 STRAUSS AVENUE
INDIAN HEAD MD 20640-5555

8020
Ser N537/508
28 Mar 06

FIRST ENDORSEMENT on NAVFACENCOM Engineering Field Division
South ltr ES32 of 17 Jan 06

From: Commanding Officer, Naval Ordnance Safety and Security
Activity
To: Chairman, Department of Defense Explosives Safety Board
(DDESB-KO)
Subj: EXPLOSIVES SAFETY SUBMISSION AND EXPLOSIVES SITING PLAN
MUNITIONS RESPONSE FOR DISCARDED MILITARY MUNITIONS AT
HANGAR 860 FORMER NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA [N60200/S-139]
Ref: (a) DoD 6055.9-STD
(b) DDESB Technical Paper 16, Revision 1

1. In accordance with reference (a), the enclosed Explosives Safety Submission (ESS) and Explosives Siting Plan/Site Approval Request (ESP/SAR) are forwarded for your review and concurrence.

2. The munitions response effort associated with this project is to locate and remove Munitions and Explosives of Concern (MEC) and Material Potentially Presenting an Explosive Hazard (MPPEH) from excavation exclusion zones in the vicinity of Hangar 860 at the former Naval Air Station Cecil Field, Jacksonville, Florida. A MEC demolition area and a portable magazine for temporary MEC storage are also required for this project.

3. The most probable munition is the JAU-22/B cartridge actuated initiator, H/D 1.4C, with an Inhabited Building Distance (IBD) of 75 feet. The Munition with the Greatest Fragmentation Distance (MGFD) found at a different munitions response site on this property is the 20 mm projectile with a hazardous fragment distance of 236 feet and a maximum fragmentation distance of 320 feet. Since all work with 20 mm projectiles was conducted well outside of the Hanger 860 area, this area is not suspected of being contaminated with 20 mm projectiles. Accordingly, the work will be initiated with the exclusion zones appropriate for the cartridge, but will be

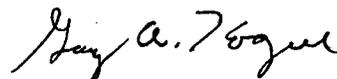
Subj: EXPLOSIVES SAFETY SUBMISSION AND EXPLOSIVES SITING PLAN
MUNITIONS RESPONSE FOR DISCARDED MILITARY MUNITIONS AT
HANGAR 860 FORMER NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA [N60200/S-139]

extended to the 20 mm projectile requirements if any 20 mm
projectiles are found during this work.

4. The respective exclusion zones for cartridges and
projectiles at the response site are shown in Figure 2-3 of the
ESP/SAR. If it becomes necessary to use the 20 mm projectile
exclusion zones, all personnel will be evacuated from Hanger 860
for any work that extends an arc over the hanger. The hanger is
the only inhabited building within any of the exclusion zones.

5. As discussed in Part II of NAVFAC Form 11010/31 and
paragraph 2.1.2 of the ESP/SAR, the exclusion zone for the
proposed demolition area for less than 6 pounds net explosives
weight (NEW) of H/D 1.1 20mm projectiles is shown on Figure 2-3
and Figure 2-4. The exclusion zone of 200 feet is based on
engineering controls conforming to reference (b). The
engineering controls are further discussed in paragraph 2.2.6.1
and Attachment 1 of the ESP/SAR. The type II HE portable
storage magazine is described in paragraph 2.2.5.2 of the
ESP/SAR. The exclusion zones for storage of up to 15 pounds NEW
of H/D 1.4 and/or up to 15 pounds of 1.1 H/D MEC materials are
described in Table 2-3 and shown on Figure 2-4 of the ESP/SAR.

6. The NOSSA point of contact for the ESS is Mr. Rick Urbanski
who can be contacted at DSN 354-4355 or commercial (301)-744-
4355. The point of contact for the SAR is Mr. Ed Klinghoffer
who can be contacted at DSN 354-4966 or commercial (301)-744-
4966.



GARY A. HOGUE

By direction

Copy to:
CNO (N411, N45C)
COMNAVENGCOM HQ (EN.RM, EN.MD)
NAVFAC EFD South (ES32)
NOSSA ESSOLANT (N5L)
NOSSA (N542)

APPENDIX E

Recovered MEC, DMM, and MD

Summary of Recovered MEC/MPPEH

Grid ID No.	MEC Type	Condition Found	No. of Anomalies	MEC Quantity	MEC Depth to Tip	Filler	Date Found	Date Disposed
A1	MK19 Impulse Cartridge	Unfired	47	6	< 12"	Low Explosive	6/14/06	6/28/06
A2	JAU-22/B CAI	Unfired	63	1	< 12"	NOSOL Propellant	6/14/06	6/28/06
A5	20-mm Projectile	Unfired	29	1	< 12"	High Explosive	6/15/06	6/28/06
A11	MK 23 Practice Bomb	Unfired	12	1	< 12"	Practice	6/21/06	6/28/06
B1	JAU-22/B CAI	Unfired	60	1	< 12"	NOSOL Propellant	6/14/06	6/28/06
	MK 2 Impulse Cartridge	Unfired	--	2	< 12"	Low Explosive	6/14/06	6/28/06
B2	JAU-22/B CAI	Unfired	40	54	< 12"	NOSOL Propellant	6/15/06	6/28/06
C9	AN M 31 Signal Cartridge	Unfired	128	1	< 12"	Low Explosive	6/19/06	6/28/06
E2	20-mm Projectile	Unfired	31	1	< 12"	High Explosive	6/14/06	6/28/06
	JAU-22/B CAI	Unfired	--	1	< 12"	NOSOL Propellant	6/14/06	6/28/06
E9	AN M 31 Signal Cartridge	Unfired	132	2	< 12"	Low Explosive	6/19/06	6/28/06
E10	JAU-22/B CAI	Unfired	25	2	< 12"	NOSOL Propellant	6/19/06	6/28/06
F1	JAU-22/B CAI	Unfired	93	2	< 12"	NOSOL Propellant	6/16/06	6/28/06
	MK 23 Practice Bomb	Unfired	--	2	< 12"	Practice	6/16/06	6/28/06
F10	JAU-22/B CAI	Unfired	53	1	< 12"	NOSOL Propellant	6/20/06	6/28/06
G2	20-mm Projectile	Unfired	11	1	< 12"	High Explosive	6/16/06	6/28/06
G10	JAU-22/B CAI	Unfired	189	70	12" – 36"	NOSOL Propellant	6/2/06	6/28/06
G11	JAU-22/B CAI	Unfired	280	147	12" – 36"	NOSOL Propellant	6/2/06	6/28/06
	MK2 Impulse Cartridge	Unfired	--	10	12" – 36"	Low Explosive	6/2/06	6/28/06
H9	20-mm Projectile	Unfired	40	1	< 12"	High Explosive	6/19/06	6/28/06
H10	JAU-22/B CAI	Unfired	172	89	12" – 36"	NOSOL Propellant	6/2/06	6/28/06
H11	JAU-22/B CAI	Unfired	142	80	12" – 36"	NOSOL Propellant	6/21/06	6/28/06
I8	20-mm Projectile	Unfired	198	2	< 12"	High Explosive	6/7/06	6/28/06
	JAU-22/B CAI	Unfired	--	1	< 12"	NOSOL Propellant	6/7/06	6/28/06
J7	JAU-22/B CAI	Unfired	32	1	< 12"	NOSOL Propellant	6/21/06	6/28/06
J8	JAU-22/B CAI	Unfired	35	1	< 12"	NOSOL Propellant	6/21/06	6/28/06

Grid ID No.	MEC Type	Condition Found	No. of Anomalies	MEC Quantity	MEC Depth to Tip	Filler	Date Found	Date Disposed
K5	20-mm Projectile	Unfired	21	1	< 12"	High Explosive	6/19/06	6/28/06
Total Anomalies Investigated:				1,833				
Total MEC Found:				482				

Summary of Recovered MD/Non-MEC related Debris

Grid ID No.	Debris Type	No. of Anomalies	Munitions Debris (lbs)	Scrap (lbs)	Date Found
A3	Misc. Metallic Scrap	32	0	52	6/14/06
A4	Misc. Metallic Scrap	27	0	6	6/15/06
A6	MK 23 Practice Bomb (Expended)	48	3	5	6/15/06
A7	Misc. Metallic Scrap	21	0	4	6/15/06
A8	Misc. Metallic Scrap	69	0	18	6/21/06
A9	Misc. Metallic Scrap	58	0	15	6/21/06
A12	Misc. Metallic Scrap	15	0	10	6/21/06
A13	Misc. Metallic Scrap	15	0	30	6/21/06
A14	Misc. Metallic Scrap	20	0	10	6/21/06
A15	Misc. Metallic Scrap	20	0	20	6/21/06
A16	Misc. Metallic Scrap	15	0	10	6/21/06
A17	Misc. Metallic Scrap	10	0	10	6/21/06
	Misc. Metallic Scrap	7	0	3	6/21/06
B3	Misc. Metallic Scrap	40	0	30	6/16/06
B4	Misc. Metallic Scrap	18	0	5	6/16/06
B5	Misc. Metallic Scrap	15	0	5	6/16/06
B6	Misc. Metallic Scrap	21	0	5	6/16/06
B7	Misc. Metallic Scrap	61	0	20	6/15/06
C1	Misc. Metallic Scrap	25	0	2	6/14/06
C2	Misc. Metallic Scrap	37	0	15	6/14/06
C3	Misc. Metallic Scrap	21	0	1	6/14/06
C4	Misc. Metallic Scrap	23	0	31	6/15/06
C5	Misc. Metallic Scrap	25	0	21	6/15/06
C6	Misc. Metallic Scrap	30	0	310	6/15/06
C7	Misc. Metallic Scrap	90	0	116	6/15/06
C10	Misc. Metallic Scrap	28	1	10	6/20/06
C11	Misc. Metallic Scrap	18	0	5	6/20/06
C12	Misc. Metallic Scrap	15	0	5	6/20/06
C13	Misc. Metallic Scrap	16	0	5	6/20/06
C14	Misc. Metallic Scrap	12	1	2	6/20/06
C15	Misc. Metallic Scrap	36	1	25	6/20/06
C16	Misc. Metallic Scrap	90	0	20	6/21/06
C17	Misc. Metallic Scrap	85	0	5	6/21/06
C18	Misc. Metallic Scrap	30	0	5	6/21/06
D1	Misc. Metallic Scrap	10	0	150	6/21/06

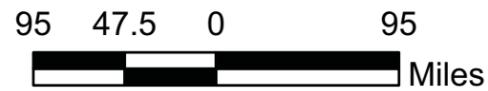
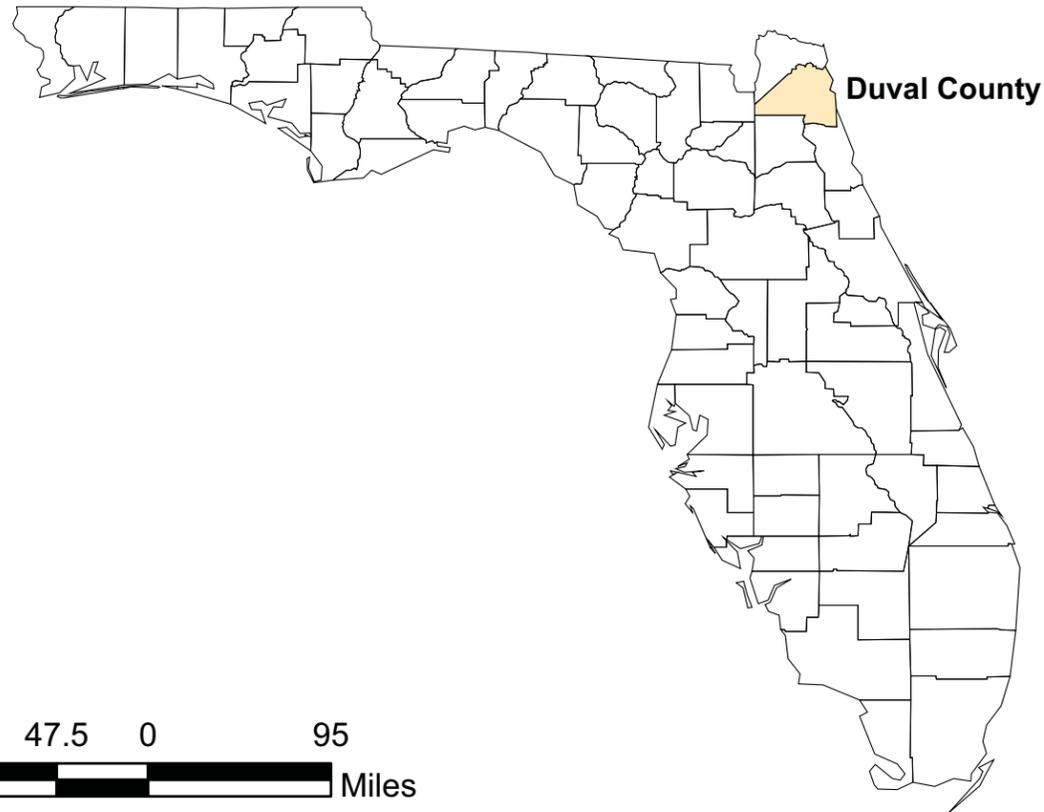
Grid ID No.	Debris Type	No. of Anomalies	Munitions Debris (lbs)	Scrap (lbs)	Date Found
D2	Misc. Metallic Scrap	17	0	15	6/14/06
D3	Misc. Metallic Scrap	21	0	5	6/14/06
D4	Misc. Metallic Scrap	43	0	20	6/15/06
D5	Misc. Metallic Scrap	48	0	60	6/16/06
D6	Misc. Metallic Scrap	97	0	20	6/16/06
D9	Misc. Metallic Scrap	83	1	70	6/8/06
E1	Misc. Metallic Scrap	13	0	21	6/15/06
E3	Misc. Metallic Scrap	19	0	25	6/16/06
E4	Misc. Metallic Scrap	43	0	35	6/15/06
E5	Misc. Metallic Scrap	22	0	8	6/16/06
E7	Misc. Metallic Scrap	153	1	30	6/8/06
E11	Misc. Metallic Scrap	48	0	20	6/20/06
E12	Misc. Metallic Scrap	47	0	10	6/20/06
F2	Misc. Metallic Scrap	9	0	15	6/16/06
F3	Misc. Metallic Scrap	71	0	20	6/15/06
F4	Misc. Metallic Scrap	52	0	48	6/15/06
F6	Misc. Metallic Scrap	131	0	20	6/14/06
F8	Misc. Metallic Scrap	140	11	35	6/8/06
F9	Misc. Metallic Scrap	68	0	35	6/19/06
F11	Misc. Metallic Scrap	17	0	175	6/21/06
F12	Misc. Metallic Scrap	62	0	20	6/21/06
G1	Misc. Metallic Scrap	87	0	100	6/16/06
G3	Misc. Metallic Scrap	18	0	20	6/15/06
G5	Misc. Metallic Scrap	53	0	5	6/14/06
G7	Misc. Metallic Scrap	53	1	35	6/12/06
G8	Misc. Metallic Scrap	183	21	90	6/7/06
G9	Misc. Metallic Scrap	37	0	25	6/19/06
G12	Misc. Metallic Scrap	73	0	50	6/20/06
H1	Misc. Metallic Scrap	23	0	5	6/16/06
H2	Misc. Metallic Scrap	5	0	5	6/16/06
H4	Misc. Metallic Scrap	6	0	2	6/12/06
H6	Misc. Metallic Scrap	38	0	300	6/12/06
H7	Misc. Metallic Scrap	93	1	700	6/12/06
H8	Misc. Metallic Scrap	177	1	50	6/6/06
H12	Misc. Metallic Scrap	25	0	5	6/21/06
I1	Misc. Metallic Scrap	36	0	10	6/16/06
I2	Misc. Metallic Scrap	20	0	5	6/16/06

Grid ID No.	Debris Type	No. of Anomalies	Munitions Debris (lbs)	Scrap (lbs)	Date Found
I5	Misc. Metallic Scrap	67	3	25	6/12/06
I6	Misc. Metallic Scrap	123	0	1,500	6/14/06
I7	Misc. Metallic Scrap	106	2	45	6/12/06
J1	Misc. Metallic Scrap	48	0	5	6/16/06
J2	Misc. Metallic Scrap	109	0	35	6/16/06
J3	Misc. Metallic Scrap	42	0	300	6/19/06
J4	Misc. Metallic Scrap	38	0	15	6/19/06
J5	Misc. Metallic Scrap	43	0	3	6/19/06
J6	Misc. Metallic Scrap	23	0	15	6/20/06
J9	Misc. Metallic Scrap	108	1	10	6/6/06
J11	Misc. Metallic Scrap	71	1	25	6/7/06
K4	Misc. Metallic Scrap	46	1	15	6/19/06
K6	Misc. Metallic Scrap	40	0	10	6/20/06
K7	Misc. Metallic Scrap	52	0	5	6/21/06
K8	Misc. Metallic Scrap	30	0	5	6/21/06
Total:		4,180	51 lbs	5,113 lbs	

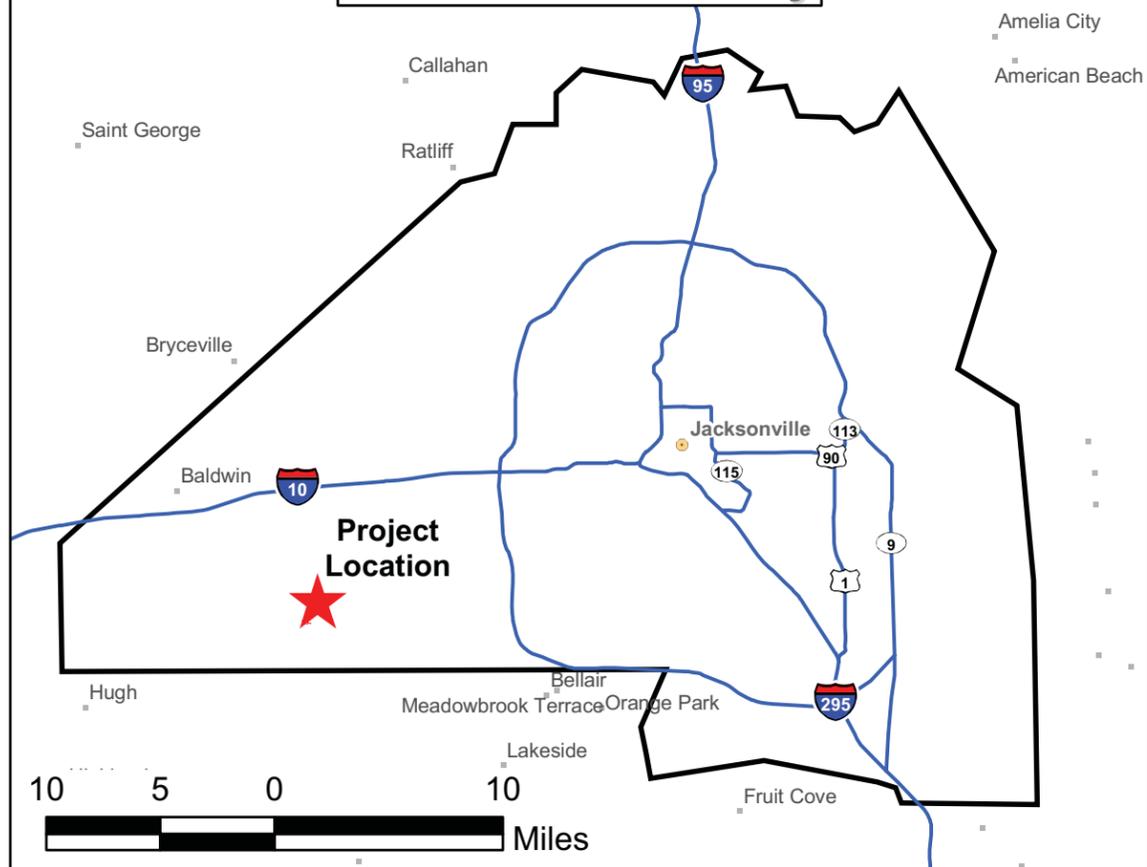
APPENDIX F

Recovered MEC Map

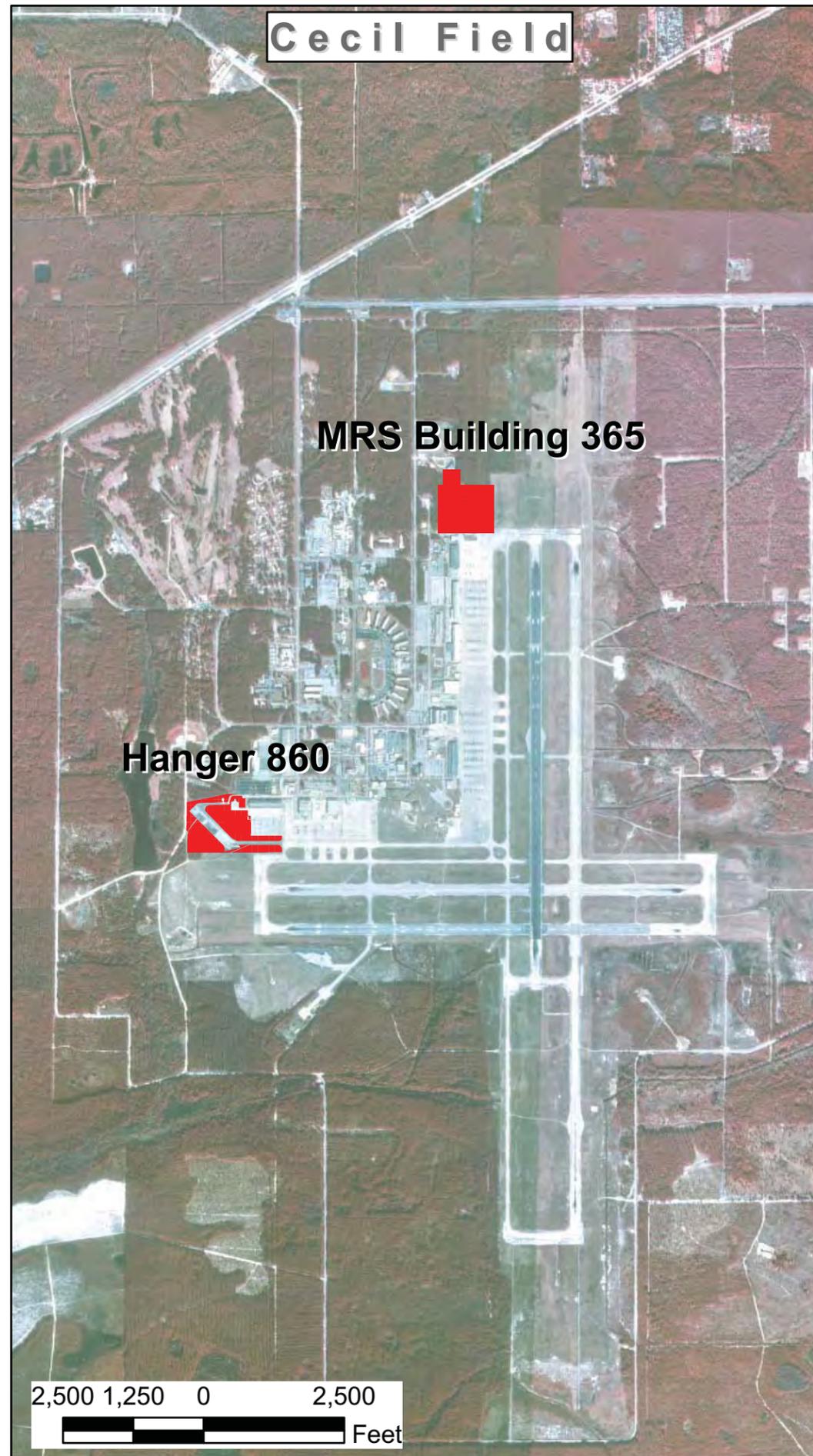
Florida



Duval County



Cecil Field



Scale Varies

Data is projected to the State Plane Coordinate System:
Florida East Zone, NAD83, Units in Feet.

CH2M Hill Constructors, Inc.
For
Former Naval Air Station
Cecil Field

Location Map

Contract No. N62467-01-D-0331
Task Order No. 0029

Jacksonville, FL

Legend

- City Type**
- National Capital
 - State Capital; State Capital County Seat
 - County Seat
 - Other
 - Interstate Highways
 - Project Location
 - County Boundary

USA
Environmental, Inc.

CH2M Hill

Drawn By: JAL Scale: Varies Rev:

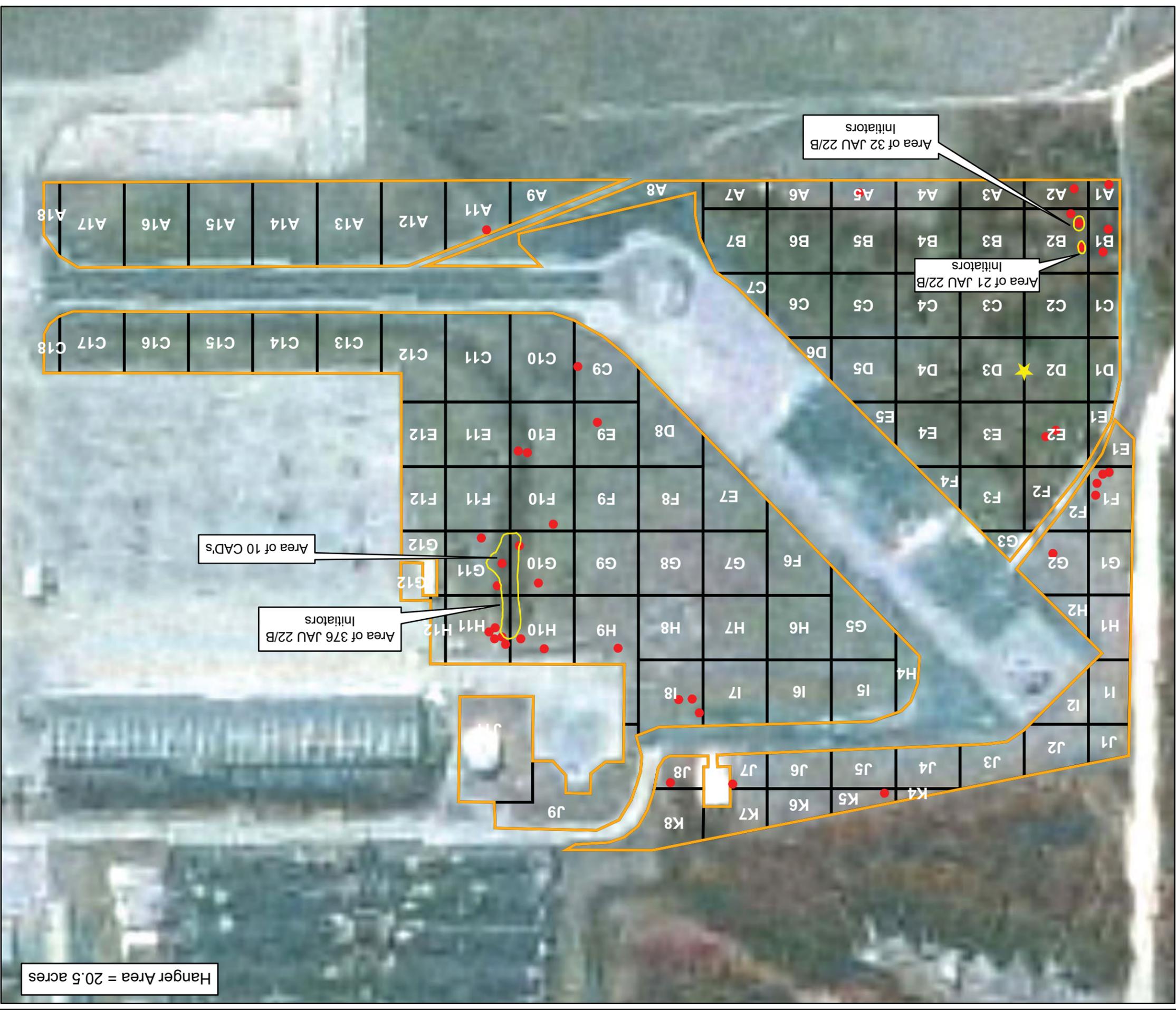
Checked By: Date Drawn: 4-08-2005

Submitted By: Revision Date: 7-17-2006



Path:
c:\projects\cecilfield\Location Map.mxd





Hanger Area = 20.5 acres



Data is projected to the State Plane Coordinate System: Florida East Zone, NAD83, Units in Feet.

CH2M Hill Constructors, Inc.

For

Former Naval Air Station

Cecil Field

MRS Hanger 860

Intrusive Results

Contract No. N62467-01-D-0331
Task Order No. 0029

Jacksonville, FL

Legend

- MEC Locations
- ★ Demo Holes/Trenches
- Area of Initiators
- Hanger Area Boundary
- Hanger Area Grids



Drawn By: JAL Scale: 1" = 150' Rev:

Checked By: Date Drawn: 07-17-2006

Submitted By: MS Revision Date:

Path: s:\cecil field\ Hanger Area Intrusive Results.mxd

NOSSA Endorsement Letter



DEPARTMENT OF THE NAVY
NAVAL ORDNANCE SAFETY AND SECURITY ACTIVITY
FARRAGUT HALL
3817 STRAUSS AVENUE, SUITE 108
INDIAN HEAD, MD 20640-5151

8020
Ser N54-DC/3154
03 Feb 11

From: Commanding Officer, Naval Ordnance Safety and Security Activity
To: Director, Base Realignment and Closure Program Management Office, Southeast (BPMOSE/AS)

Subj: EXPLOSIVES SAFETY SUBMISSION, AMENDMENT 2, FINAL, DATED APRIL 2010, EXECUTION OF SELECTED RESPONSE FOR DISCARDED MILITARY MUNITIONS, HANGAR 860 MUNITIONS RESPONSE AREA, SITE 2, FORMER NAVAL AIR STATION, CECIL FIELD, JACKSONVILLE, FLORIDA [N60200/ESS/CROSS REF BB-043 & S-139/CC-006F]

Ref: (a) *Amendment No. 02 Final, Explosives Safety Submission for Execution of a Selected Response for Discarded Military Munitions, Hanger 860 Munitions Response Area, dtd November 10*
(b) NOSSA ltr 8020 Ser N54-DC/3066 of 06 Dec 10 [CC-006]

Encl: (1) DDESB memo DDESB-PE of 06 Jan 11 [CC-006]

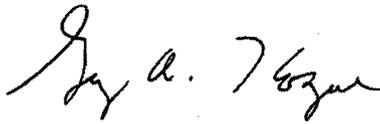
1. Enclosure (1), which provides final safety approval for the Explosives Safety Submission (ESS) for removal and treatment of material potentially presenting an explosive hazard (MPPEH), and munitions and explosives of concern (MEC), at former Naval Air Station (NAS), Cecil Field, Jacksonville, Florida, is forwarded for continuing action. Final safety approval is based upon adherence to the conditions provided in references (a) and (b), and enclosure (1).

2. Note that changes to the project were made after submission of reference (b). The exclusion zone (EZ) distances in reference (a), Table 6-1, are modified as follows: K328 distance is 455 feet; K40 distance is 55 feet; and K24 distance is 33 feet, in accordance with the Department of Defense Explosives Safety Board (DDESB) Fragmentation Data Review Form, updated 30 September 2010.

3. If changes occur during or after completion of this effort, which could increase explosive hazards to site workers or the public, an amendment to this ESS must be submitted through the Naval Ordnance Safety and Security Activity (NOSSA), to the DDESB, for review and approval.

Subj: EXPLOSIVES SAFETY SUBMISSION, AMENDMENT 2, FINAL, DATED:
APRIL 2010, EXECUTION OF SELECTED RESPONSE FOR DISCARDED
MILITARY MUNITIONS, HANGAR 860 MUNITIONS RESPONSE AREA,
SITE 2, FORMER NAVAL AIR STATION, CECIL FIELD,
JACKSONVILLE, FLORIDA [N60200/ESS/CROSS REF BB-043 &
S-139/CC-006F]

4. The NOSSA point-of-contact for questions relating to the explosives safety aspects of this project is Mr. David Crispell, N541, at DSN: 354-6082; Commercial: (301) 744-6082; or E-mail: david.w.crispell@navy.mil; and for questions relating to the environmental aspects of this project is Mr. Douglas Murray, N539, at DSN: 354-5630; Commercial: (301) 744-5630; or E-mail: douglas.murray@navy.mil.



GARY A. HOGUE
By direction

Copy to (w/ encl):
CNO (N411; N411C; N411C2; N411C4; N45)
COMNAVFACENGCOM (ENV3)
NOSSA (N539)
NOSSA ESSOLANT (N5L; N5L3; N5L6)



**DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331-0600**

JAN 06 2011

DDESB-PE

**MEMORANDUM FOR COMMANDING OFFICER, NAVAL ORDNANCE SAFETY AND
SECURITY ACTIVITY (ATTENTION: CODE N54)**

**SUBJECT: DDESB Approval of Explosives Safety Submission, Amendment 2, Execution of
Selected Response for Discarded Military Munitions, Hanger 860 Munitions
Response Area, Site 2, Former Naval Air Station, Cecil Field, Jacksonville, FL
[N60200/ESS/CROSS REF BB-043 & S-139/CC-006]**

- References:
- (a) NOSSA ltr 8020 Ser N54-DC/3066 of 6 December 2010, First Endorsement on BRAC PMO Southeast Ser BPMOSE med/0026 of 9 November 2010, Subject: Explosives Safety Submission, Amendment 2, Final, Dated November 2010, Execution of Selected Response for Discarded Military Munitions, Hanger 860 Munitions Response Area, Site 2, Former Naval Air Station, Cecil Field, Jacksonville, Florida [N60200/ESS/CROSS REF BB-043 & S-139/CC-006]
 - (b) Email from Mr. Dave Crispell (NOSSA) to Mr. Tony Dunay (DDESB), dated 22 December 2011, Subject: FW: Cecil Field Amend 2
 - (c) DoDM 6055.09-M, DoD Ammunition and Explosives Safety Standards, 29 February 2008, Administratively Reissued 4 August 2010

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject Amendment 2 to the explosives safety submission (ESS) forwarded by reference (a), as modified by reference (b), against the requirements of reference (c). Based on the information provided, approval is granted for removal and treatment of material potentially presenting an explosive hazard and munitions and explosives of concern (MEC) at Former Naval Air Station, Cecil Field, Jacksonville, FL. This approval is based on the following:

- a. This amendment changes the munition with the greatest fragmentation distance (MGFD) for Munitions Response Area (MRA) Hangar 860.
- b. The MGFD for the MRA is the 2.75-inch Rocket Mk5 HEAT Warhead and the 2.75-inch M151 & Mk 64 Warhead serves as a conservative analogy for the MGFD; the MSD for teams for manual and mechanized operations employing anomaly avoidance is 55 feet (ft) based on K40 of the MGFD; the MSD for nonessential personnel from manual and mechanized operations employing anomaly avoidance is 258 ft based on the hazardous fragment distance MGFD; and the MSD for nonessential personnel from intentional detonations is 1,348 ft based on the maximum fragment distance of the MGFD.

ENCL (1)

All other stipulations and requirements established via the original ESS and subsequent amendment remain in effect.

The point of contact for this action is Mr. Tony Dunay, (703) 325-3513, DSN 221-3513,
E-mail address: tony.dunay@ddesb.osd.mil.

Dr. J. M. Ward
CURTIS M. BOWLING
Chairman
DDESB