N60200.AR.004440
NAS CECIL FIELD, FL
5090.3a

WORK PLAN ADDENDUM 23 MUNITIONS RESPONSE FOR DISCARDED MILITARY MUNITIONS AT HANGAR 860 NAS CECIL FIELD FL

4/1/2006

CH2MHILL CONSTRUCTORS INC

Work Plan Addendum No. 23
Munitions Response for
Discarded Military Munitions at Hangar 860

Former Naval Air Station Cecil Field
Jacksonville, Florida

Revision No. 00

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

Submitted to:

U.S. Naval Facilities
Engineering Command
Engineering Field Division South

Prepared by:

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, N.E.
Suite 700
Atlanta, GA 30346

April 2006

Work Plan Addendum No. 23
Munitions Response for
Discarded Military Munitions at Hangar 860

Former Naval Air Station Cecil Field
Jacksonville, Florida

Revision No. 00

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

Submitted to:
U.S. Naval Facilities
Engineering Command
Engineering Field Division South

Prepared by:

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, N.E.
Suite 700
Atlanta, GA 30346

April 2006

Prepared/Approved By:

Michael Halil, Project Manager — Date

Approved By:

Scott Smith, Program Manager — Date

Client Acceptance:

U.S. Navy Responsible Authority — Date

Contents

Acronyms ..... **vi**
1.0 Introduction **1-1**
1.1 Project Authorization 1-2
1.2 Project Purpose 1-2
1.3 Regulatory Framework 1-2
2.0 Background **2-1**
2.1 Location (General/Specific Descriptions) 2-1
2.2 History 2-2
3.0 Scope of Work **3-1**
3.1 Scope of Work 3-1
3.1.1 Mobilization 3-1
3.1.2 Mosquito Control 3-1
3.1.3 Site Layout (Survey) 3-2
3.1.4 Vegetation Removal 3-2
3.1.5 Standing Water Removal 3-2
3.1.6 Anomaly Detection and Intrusive Investigation (Mag & Dig) 3-2
3.1.7 Portable Type 2 HE Storage Magazine Installation and Temporary Storage of MEC 3-3
3.1.8 Disposal of MEC 3-3
3.1.9 Disposition of MPPEH 3-3
3.1.10 Containerization, Characterization, and T&D of Contaminated Materials 3-3
3.1.11 Site Restoration 3-4
3.1.12 Decontamination and Demobilization 3-4
3.1.13 MR After Action Report 3-4
3.2 Project Schedule 3-5
3.3 Communications Plan 3-6
3.4 Traffic Control Plan 3-7
4.0 Munitions Response Operations Plan **4-1**
4.1 Site Visit/Records Review 4-1
4.2 MEC Team Composition 4-1
4.2.1 Personnel Qualifications 4-1
4.2.2 Personnel Responsibilities 4-1
4.2.3 UXO Team Composition and Roles 4-4
4.3 Project Authority 4-4
4.4 Training 4-4
4.4.1 Health and Safety Indoctrination 4-4
4.4.2 Site Specific Training 4-4
4.4.3 MEC Awareness Training 4-5
4.4.4 OSHA Training 4-5
4.4.5 Hazards Communication Training 4-5
4.4.6 Hearing Conservation Training 4-5

4.4.7 First Aid and CPR....4-6
4.4.8 Bloodborne Pathogen Training....4-6
4.4.9 Visitor Training....4-6
4.5 Medical Surveillance....4-6
4.5.1 Medical Examinations....4-6
4.5.2 Exposure Monitoring....4-7
4.5.3 Alcohol and Drug Abuse Surveillance Plan....4-7
4.6 Munitions Response Procedures....4-7
4.6.1 Subsurface Clearance....4-7
4.6.2 Area Preparation....4-8
4.6.3 MEC Intrusive Operations....4-9
4.6.4 Portable Type 2 HE Storage Magazine Installation and Temporary Storage of MEC....4-10
4.6.5 MEC Disposal....4-11
4.6.6 Engineering Controls....4-14
4.6.7 MPPEH Procedures....4-15
4.7 Explosives Management Plan....4-16
4.7.1 Acquisition....4-16
4.7.2 Receipt....4-16
4.7.3 Transportation....4-17
4.7.4 Lost, Stolen, or Unauthorized Use of Explosives....4-18
4.8 Explosives Siting Plan....4-18
4.9 Site Safety and Health Plan....4-18
5.0 Chemical Warfare Materiel....5-1
6.0 Quality Management Program....6-1
6.1 Project QC Personnel and Responsibilities....6-1
6.2 Project Records Maintenance....6-2
6.3 Surveying....6-3
6.4 Testing Requirements....6-4
6.4.1 Equipment....6-4
6.4.2 Identification and Certification of Testing Laboratories....6-4
6.4.3 Construction....6-4
6.4.4 Environmental....6-4
6.4.5 Testing and Sampling....6-4
6.4.6 Test Control....6-4
6.4.7 Completion Inspection....6-5
7.0 Sampling and Analysis Plan....7-1
7.1 Data Quality Levels for Measurement Data....7-1
7.2 Sampling Objectives....7-1
7.3 Waste Characterization Sampling....7-4
7.3.1 Solid Waste Sampling....7-4
7.3.2 Liquid Waste Sampling....7-4
7.4 Backfill Certification....7-5
7.5 Equipment Decontamination....7-5
7.6 Sample Documentation....7-6
7.7 Field Quality Control....7-7
7.8 Analytical Methods....7-7

8.0 Waste Management Plan 8-1
8.1 Waste Characterization 8-1
8.2 Waste Profile 8-1
8.3 Waste Management 8-2
8.3.1 Waste Storage Time Limit 8-2
8.3.2 Labels 8-2
8.3.3 Waste Management Area Requirements 8-3
8.4 Shipping Documentation 8-5
8.5 Transportation 8-7
8.5.1 Transporter Responsibilities 8-7
8.5.2 Transportation and Disposal Log 8-8
8.6 Waste Disposal 8-8
8.7 Records/Reporting 8-8
9.0 Environmental Protection Plan 9-1
9.1 Regulatory Drivers 9-1
9.2 Spill Prevention and Control 9-1
9.3 Spill Prevention 9-1
9.4 Spill Containment and Control 9-1
9.5 Spill Cleanup and Removal 9-2
9.6 Additional Environmental Considerations 9-2
10.0 References 10-1

Tables

3-1 Communications Matrix 3-4
3-2 Project Personnel Directory 3-4
7-1 Data Quality Levels 7-1
7-2 Sampling and Analytical Summary 7-2

Figures

2-1 Regional Map 2-2
2-2 Activity Map 2-3
2-3 Quantity-Distance Map for MRS Work Area 2-4
2-4 Quantity-Distance Map for Portable Outdoor Type 2 High Explosive Storage Magazine 2-5

Appendices

A Project Schedule

B Site Specific Health and Safety Plan

C Explosives Safety Submission

D Explosives Siting Plan

E Example Florida Department of Environmental Protection Emergency Permit for Detonation

Example Emergency Permit Request
Example Emergency Permit Order
Example Emergency Permit Order Public Notice

F Munitions Response Operations Forms

MEC Information
MEC Disposal Checklist
Misfire Checklist
BATF Form 5400.5

G Materials that Present a Potential Explosive Hazard/Munitions Debris Collection and Inspection Procedures

H Quality Control/Transportation and Disposal Attachments

Submittal Register
Testing Plan and Log
Transportation and Disposal Log
Summary of Field Tests Log
Contractor Daily Production Report
Contractor Daily Quality Control Report
Preparatory Phase Report

Acronyms

ACO	Administrative Contracting Officer
AEDA	Ammunition, Explosives, and Dangerous Articles
AFCEE	Air Force Center for Environmental Excellence
AHA	Activity Hazard Analysis
AMP	Air Monitoring Plan
ATF	Alcohol, Tobacco, and Firearms
BATF	Bureau of Alcohol, Tobacco, and Firearms
BIP	Blow-in-Place
BRAC	Base Realignment and Closure
CAD	Cartridge Actuated Device
CAI	Cartridge Actuated Initiator
CDL	Commercial Drivers License
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M HILL	CH2M HILL Constructors, Inc.
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CO	Contracting Officer
CPR	Cardiopulmonary Resuscitation
CTO	Contract Task Order
CWM	Chemical Warfare Materiel
dBA	decibels A scale
dBC	decibels C scale
DDESB	Department of Defense Explosive Safety Board
DID	Data Item Description
DoD	Department of Defense
DOT	Department of Transportation
DMM	Discarded Military Munitions
EBS	Environmental Baseline Survey
ECA	Equipment Check Area
EGIS	Environmental Geographic Information System
EISOPQAM	Environmental Investigative Standard Operating Procedure and Quality Assurance Manual
EMP	Explosives Management Plan
EOD	Explosive Ordnance Disposal
ERG	Emergency Response Guide
ESS	Explosives Safety Submission
ESP	Explosives Siting Plan
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
FAC	Florida Administrative Code
FANG	Florida Air National Guard

FDEP	Florida Department of Environmental Protection
FLARNG	Florida Army Reserve National Guard
GPS	Global Positioning System
HE	High Explosive
HMX	Octahydro-1,3,5,7-tetramitro-1,3,5,7-tetrazine
HSP	Health and Safety Plan
IRCDQM	Installation Restoration Chemical Data Quality Manual
JAA	Jacksonville Airport Authority
lb	pound(s)
LDR	Land Disposal Restriction
MEC	Munitions and Explosives of Concern
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
MR	Munitions Response
MRQCM	Munitions Response Quality Control Manager
MRS	Munitions Response Site
MRSO	Munitions Response Safety Officer
NAS	Naval Air Station
NAVFAC EFD SOUTH	U.S. Naval Facilities Engineering Command, Southern Division
NAVSEA	Naval Sea Systems Command
NEW	net explosive weight
NIOSH	National Institute for Occupational Safety and Health
NOSSA	Naval Ordnance Safety and Security Activity
NPL	National Priorities List
NTR	Navy Technical Representative
NVLAP	National Voluntary Laboratory Accreditation Program
OP	Ordnance Publication
OSHA	Occupational Safety and Health Act
PM	Project Manager
PPE	personal protective equipment
PTSP	Pre-Task Safety Plan
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
QCR	Quality Control Report
RCRA	Resource Conservation and Recovery Act
RPM	Remedial Project Manager
RTK	Real-Time Kinematic
ROICC	Resident Officer in Charge of Construction
SAP	Sampling and Analysis Plan
SCTLs	Soil Cleanup Target Levels
SOPs	Standard Operating Procedures
SUXOS	Senior Unexploded Ordnance Supervisor
T&D	Transportation and Disposal

TAT	Turnaround time
TCRA	Time Critical Removal Action
TtNUS	Tetra Tech NUS, Inc.
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Corps of Engineers, Huntsville Center
USCG	U.S. Coast Guard
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
VOA	Volatile Organic Analyzer

1.0 Introduction

The purpose of this Work Plan Addendum is to outline the procedures to be used to perform munitions response (MR) for discarded military munitions (DMM) and material that potentially present an explosive hazard (MPPEH) in the vicinity of Hangar 860 at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. The MR action is being implemented by CH2M HILL Constructors, Inc. (CH2M HILL) for the U.S. Naval Facilities Engineering Command, Engineering Field Division South (NAVFAC EFD SOUTH), under Response Action Contract No. N62467-01-D-0331, Contract Task Order (CTO) No. 0029.

This Work Plan Addendum is organized into ten sections of text as follows and includes eight appendices.

Section 1.0 Introduction includes the project authorization, project purpose, and regulatory framework.

Section 2.0 Background includes the general project background, location, and history.

Section 3.0 Scope of Work describes the project scope of work, schedule, communications plan, and traffic control plan. A detailed project schedule is provided in Appendix A of this Work Plan Addendum. The NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) provides a brief description of the reporting requirements under this contract.

Section 4.0 Munitions Response Operations Plan details the planned Munitions and Explosives of Concern (MEC) team composition, project authority, training, medical monitoring, and operational procedures.

Section 5.0 Chemical Warfare Materiel (CWM) describes actions to take in the event that CWM is discovered at the site.

Section 6.0 Quality Management Program details the quality control (QC) program for the project and includes the testing requirements for work described in this Work Plan Addendum. The QC attachments (submittal register, testing plan and log, etc.) are provided in Appendix H.

Section 7.0 Sampling and Analysis Plan (SAP) provides project sample locations, sample collection frequency, and the required laboratory analyses for samples collected during project activities. The NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) and Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) outline the sample collection methodology including sample handling, labeling, and required collection of quality assurance (QA)/QC samples.

Section 8.0 Waste Management Plan discusses the characterization, onsite management, and transportation and disposal (T&D) of wastes generated during project activities.

Section 9.0 Environmental Protection Plan contains site-specific environmental provisions and references the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998), which

contains the Environmental Protection Plan for all work completed at the former NAS Cecil Field.

Section 10.0 References includes a listing of the documents utilized to develop this Work Plan Addendum.

The site-specific Health and Safety Plan (HSP) that addresses the work described in this Work Plan Addendum is included in Appendix B. The Site Health and Safety Plan included in the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) addresses project-specific health and safety issues for the remedial activities to be completed at the former NAS Cecil Field.

1.1 Project Authorization

CH2M HILL was contracted under Response Action Contract No. N62467-01-D-0331, CTO No. 0029 on August 20, 2005, by NAVFAC EFD SOUTH to prepare this Work Plan Addendum and to perform MR for DMM and MPPEH in the vicinity of Hangar 860 at the former NAS Cecil Field, Jacksonville, Florida.

1.2 Project Purpose

The purpose of the scope of work described in this Work Plan Addendum is to provide MR as a cautionary action to: 1) ensure that the presence of discovered MPPEH was unique to the area where the items were found, 2) protect human health and safety for site personnel, and 3) allow the continued land use of the area.

1.3 Regulatory Framework

The MR action to locate and remove MEC will be performed as a Time Critical Removal Action (TCRA) consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

In the event that MEC is encountered, the actual detonation (that is, "disposal operation") will be carried out under an Emergency Permit as an Emergency Detonation of Certain Hazardous Wastes, in accordance with the provisions of Florida Administrative Code (FAC) Chapter 62-730.320. Because MEC is potentially flammable, shock sensitive, and explosive, it is considered a reactive hazardous waste. Under the Florida hazardous waste rules (FAC Chapter 62-730), FDEP grants authorization for the emergency detonation or treatment of such hazardous wastes under an emergency permit. The provisions for this permit include:

- FDEP must be notified and permission (written or oral) obtained prior to detonation, and the notification must include:
  - Type and amount of MEC to be detonated,
  - Time and place of detonation, and
  - Detonation procedures.
- FDEP grants specific authorization which cannot exceed 90 days.
- Authorization conditions:

- Detonation is conducted/supervised by local law enforcement officials, bomb squads, or other officials/agencies experienced in the handling and disposal of explosives.
- Applicable local, state, and federal approvals and licenses will be obtained.
- Visible residue will be recovered and properly disposed.
- Adequate fire protection will be provided.
- Local FDEP representative will be notified, and may be present to observe detonation activities.
- Prior to detonation, the site will be secured and access controlled.
- Detonation will be conducted only at the times and place specified in the notice.
- Post-detonation soil sampling may be required by FDEP.
- A written summary will be submitted to FDEP within 30 days of detonation.

2.0 Background

The work area covered by this Work Plan Addendum was designated a munitions response site (MRS) by the Naval Ordnance Safety and Security Activity (NOSSA) after receipt of an MRS Identification and Notification Report submitted by NAVFAC EFD SOUTH on February 11, 2005.

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 class/division explosives. It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response.

FLARNG notified the Jacksonville Airport Authority (JAA) of the discovery by e-mail on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC EFD SOUTH. Based on a request from NAVFAC EFD SOUTH, 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 remainder of the CAIs were located in the bottom of the ditch, visible through standing water. EOD Mayport responded on Tuesday, February 22, 2005, at the request of NAVFAC EFD SOUTH to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified the CAIs as expended.

The future FLARNG construction project is planned to consist of converting the open stormwater ditch to underground pipe drainage, filling in the ditch with soil, expanding the aircraft taxiway, and constructing climate controlled hangars for helicopters. The construction project is currently in the preliminary design phase.

The MPPEH discovery has prompted the need for additional MEC support. The additional support is a cautionary action to: 1) ensure that the presence of the discovered MPPEH was unique to the area where the items were found, 2) protect human health and safety for site personnel, and 3) allow the continued land use of the area.

The MRS location, footprint, and details are provided on Figures 2-1, 2-2, 2-3, and 2-4.

2.1 Location (General/Specific Descriptions)

The former NAS Cecil Field is located in the western portion of Duval County and northeast portion of Clay County in northeast Florida (Figure 2-1). NAS Cecil Field was established in 1941 and provided facilities, services, and material support for naval operations. It was added to the National Priorities List (NPL) in 1989. In July 1993, the Base Realignment and

Closure (BRAC) Commission recommended the closure of the Air Station. On September 30, 1999, the Air Station was closed and the majority of the flightline was transferred to the JAA. In September 2000, the majority of the remainder of the Air Station was transferred to the City of Jacksonville.

Buildings 865 and 873 are located approximately 800 feet west-northwest and 450 feet northwest, respectively, of the open stormwater drainage ditch and the location of the discovered CAIs (Figures 2-2, 2-3, and 2-4). Building 865 is a one-story cinderblock magazine constructed in 1976 and used as a ready munitions magazine for S3 squadrons. Building 873 is reported to have been used as sonobuoy storage.

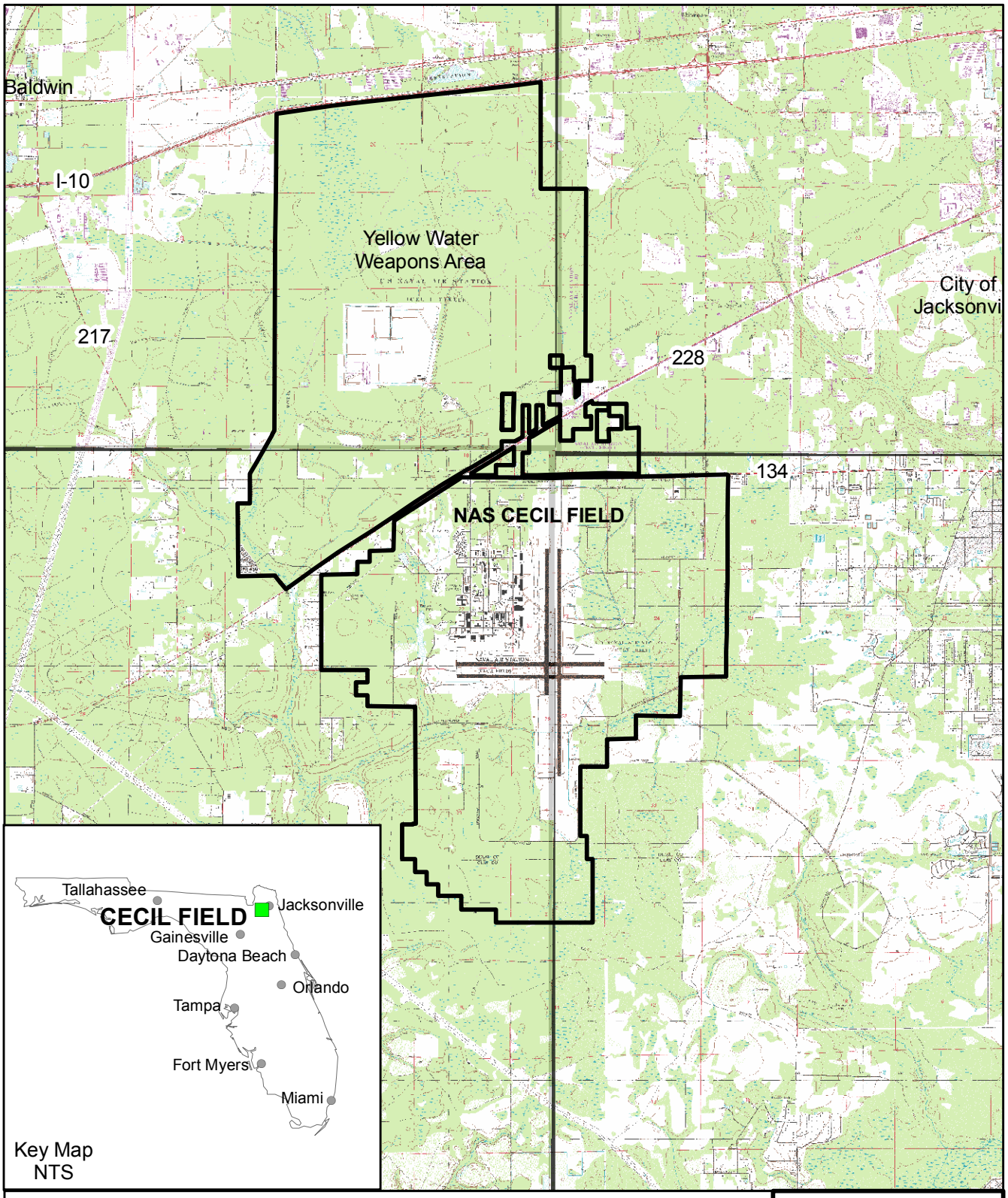
2.2 History

According to the Environmental Baseline Survey (EBS) for Transfer Report (Tetra Tech NUS, Inc. [TtNUS], 1999), 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 in the EBS for Transfer Report (TtNUS, 1999). The MRS work area had been previously found suitable to transfer with property transfer from the Navy to JAA completed in 1999.

No munitions disposal operations are known to have taken place in or near the MRS. It is likely that the recovered MPPEH (23 expended JAU-22/B CAIs) were discarded by person or persons unknown. Although recovery at this site has been limited to MPPEH, the potential presence of a variety of MEC is considered highly probable due to the findings at a similar MRS located near Building 365 at the former NAS Cecil Field. The physical settings and features of the two MRSs are similar in that both are collocated in the vicinity of probable arm/de-arm areas and ready service magazines at the end of their respective runways. The assumption of recovering similar MEC/MPPEH types and quantities to the MRS located near Building 365 was used to develop this Work Plan Addendum.

Following is a summary of the items recovered to date at the MRS located near Building 365:

- (173) each 20-millimeter (mm) high explosive (HE) projectiles (combination of unfired/fuzed with cartridge intact and projectile only)
- (416) each cartridge actuated devices (CADs)/impulse cartridges (unfired/MK2, MK14, MK18, MK19, miscellaneous small)
- (49) each small arms blanks (5.56-mm and 7.62-mm)
- (15) each MK4 bomb dummy unit signal cartridges
- (2) each suspect aircraft part suspected to contain (2) each CADs/impulse cartridges (determined to be type of actuator with two ports labeled for CAD use with caps and leads intact)
- Approximately 720 lbs of MPPEH consisting of expended CADs/impulse cartridges, 20-mm cartridges, 20-mm link belts, and (2) each MK76 bomb dummy units with no signal cartridges
- Approximately 3,500 lbs of non-MEC related scrap metal

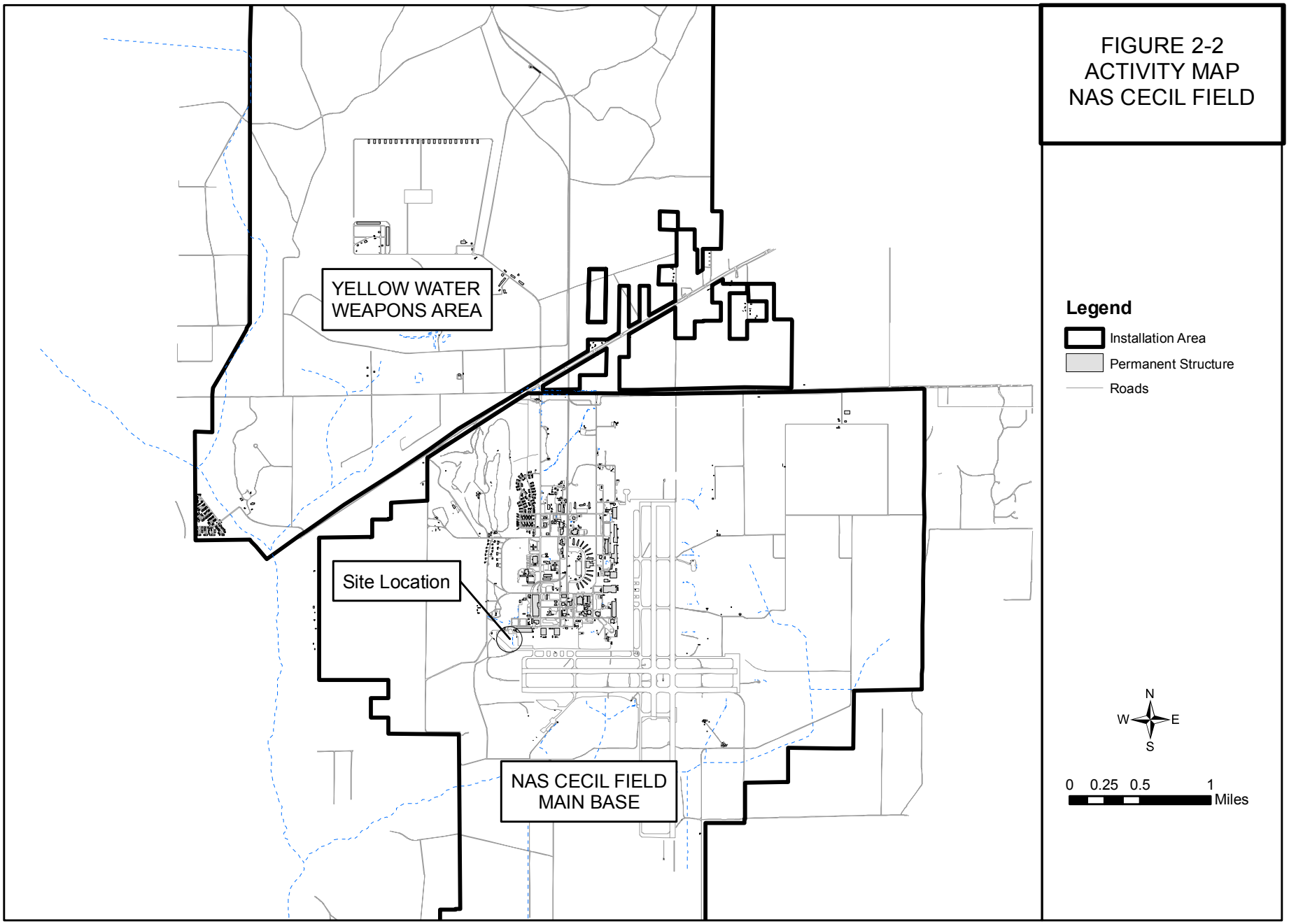


N
W E
S

0 4,000 8,000 16,000
Feet

FIGURE 2-1
REGIONAL MAP
NAS CECIL FIELD

\\volunteer\public\cecil_field\mxd\MRS_Work_Area\Fig2-1_Regional_Map.mxd



\\volunteer\public\cecil_field\mxd\2_Acre_Area\Fig2-2_Activity_Map.mxd

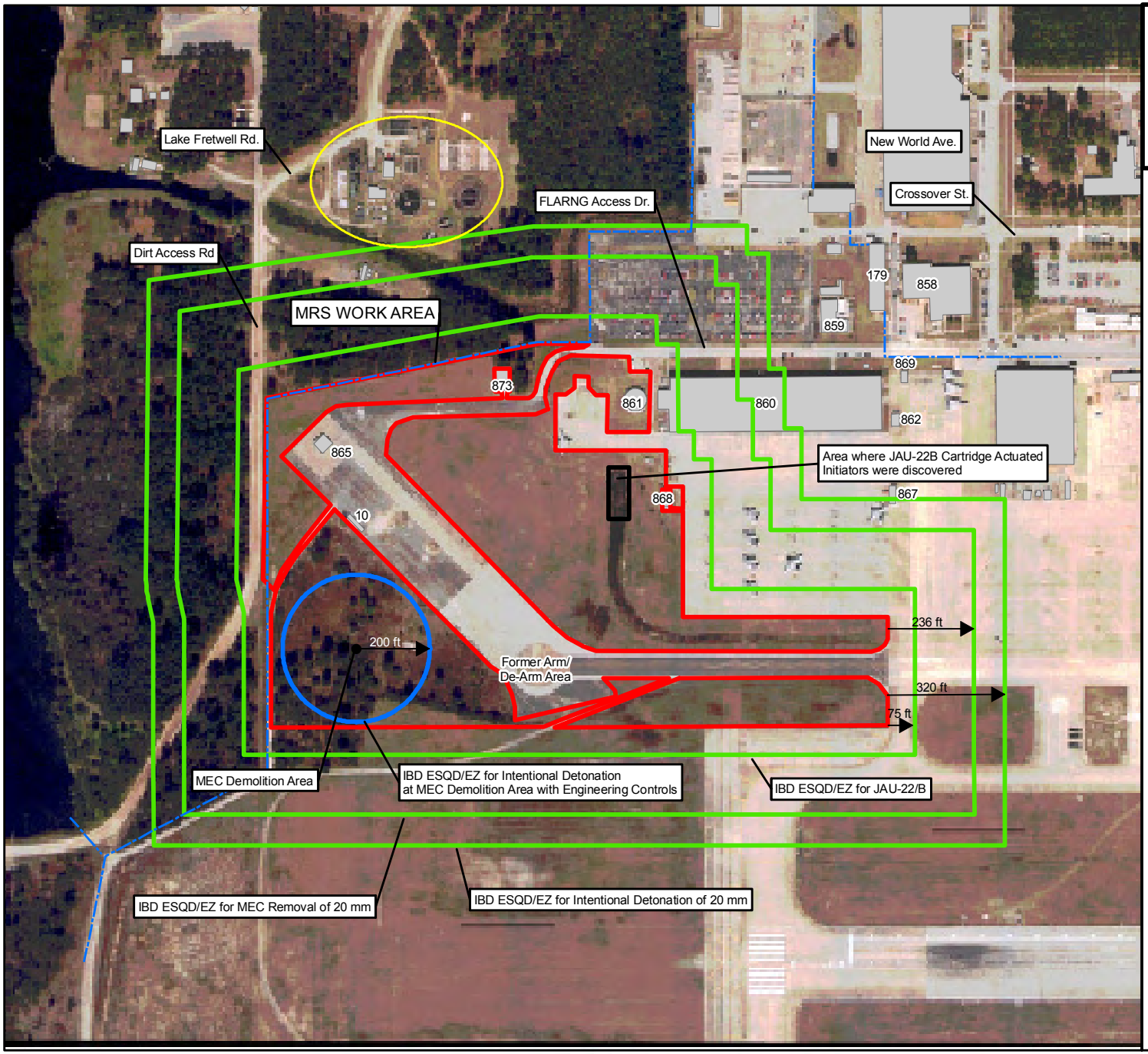


FIGURE 2-3 QUANTITY-DISTANCE MAP FOR MRS WORK AREA AT HANGER 860

Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

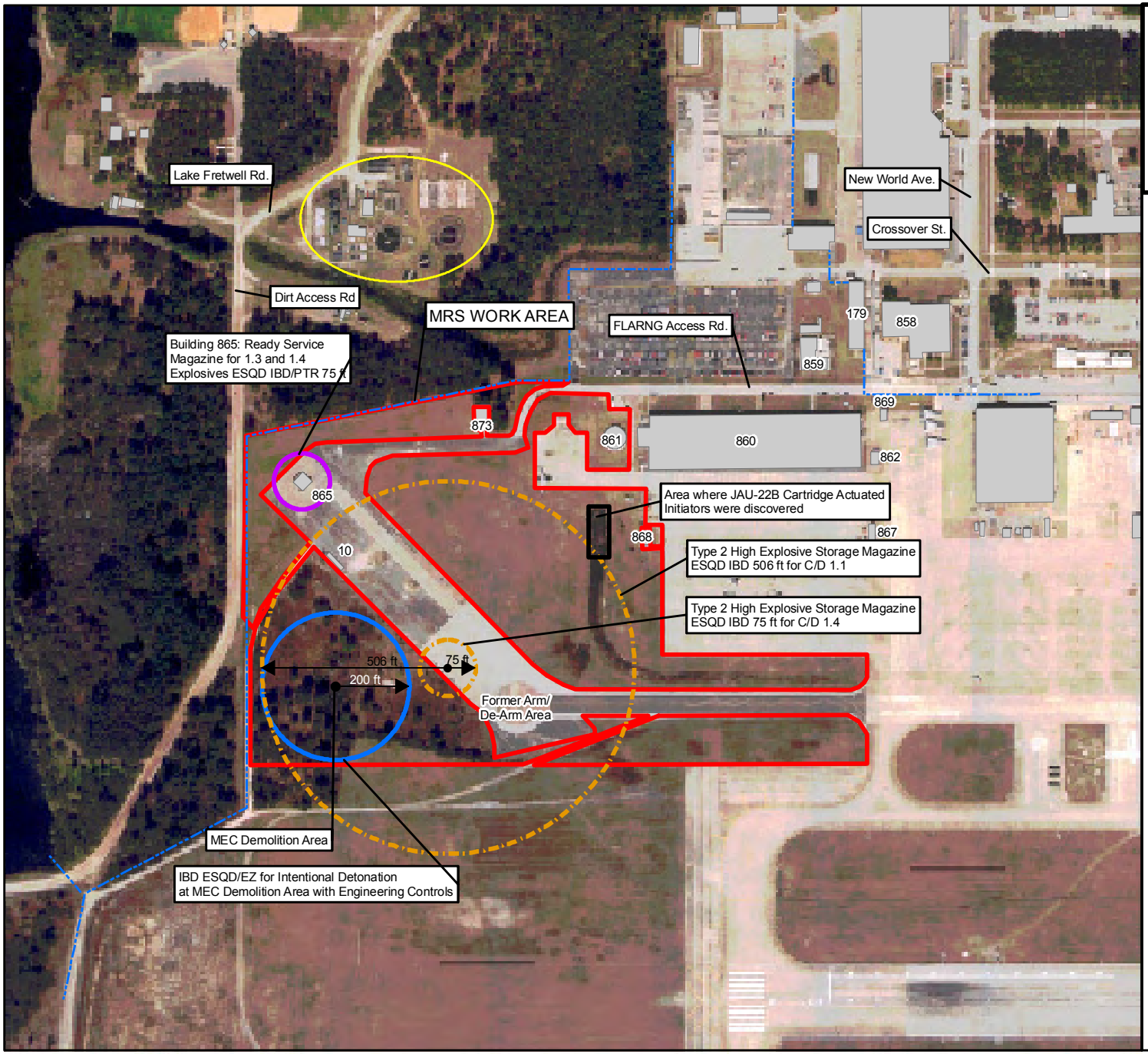
873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-3_20Acre_v2.mxd

FIGURE 2-4 QUANTITY-DISTANCE MAP FOR PORTABLE OUTDOOR TYPE 2 HIGH EXPLOSIVE STORAGE MAGAZINE



Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-4_Type2_Explosive_Storage_v2.mxd

3.0 Scope of Work

The project scope of work, schedule, communications plan, and traffic control plan are described in this section.

3.1 Scope of Work

The activities associated with the scope of work are as follows:

- Mobilization
- Mosquito control
- Site layout (survey)
- Vegetation removal
- Standing water removal from the open stormwater ditch
- Anomaly detection and intrusive investigation (mag & dig)
- Portable Type 2 HE storage magazine installation and temporary storage of recovered MEC
- Disposal of recovered MEC
- Disposition of MPPEH
- Containerization, characterization, and T&D of generated or accumulated contaminated materials
- Site Restoration
- Decontamination and demobilization
- Preparation and submittal of a MR After Action Report

3.1.1 Mobilization

This task will consist of the mobilization of personnel and equipment to the work site and the establishment of temporary facilities and site controls, consisting of portable sanitary facilities, decontamination area, site refuge area, material/equipment laydown area, construction barricades, and security fencing. Project management and scheduling activities, including contractor coordination, will be achieved from the CH2M HILL office located at the former NAS Cecil Field, Jacksonville, Florida.

3.1.2 Mosquito Control

Because of the nature of the operations to be conducted by Unexploded Ordnance (UXO) Technicians at the site and the observed heavy concentration of mosquitoes, mosquito control will be performed prior to conducting site operations. The tasks associated with MR require individuals to be focused and concentrated on visual and audible observations (from handheld geophysical instruments) and the large mosquito population will be a significant distraction if not alleviated or reduced.

3.1.3 Site Layout (Survey)

A site boundary survey will be performed and a uniform system of operational grids established across the site. The boundary survey will be performed first and include placement of colored flagging on stakes along the perimeter of the site to establish work area limits. A system of 100- by 100-foot grids coinciding with the Florida State Plane coordinate system will be established across the site using labeled stakes. Following grid placement, the extents of the exclusion zones (EZs) will be surveyed to include the placement of stakes with colored flagging along the perimeter of each EZ.

The NAS Cecil Field Environmental Geographic Information System (EGIS) (ArcView format) will be used as the basis for a site plan and the locations of buildings, utilities, land features, roadways, any planimetric features, and fence lines.

Site surveys will be performed using a Real-Time Kinematic (RTK) Global Positioning System (GPS). The surveyed horizontal geographic position and state plane coordinates will be referenced to permanent or semi-permanent control points existing on the site and will be accurate to ±0.25 meter. Horizontal control of Class One, third order or better will be established for all new semi-permanent and tertiary control points. Horizontal controls for graphic and non-graphic information are Mercator Projection, GRS 80, State Plane Coordinate System, North American Datum 1983, Lambert Zones 1 through 6 (or appropriate zone for region to be mapped). Vertical controls are Mean Sea Level, North American Vertical Datum, 1988. Data conversions from the metric system to the English system will use 1 meter = 39.37 inches exactly.

3.1.4 Vegetation Removal

Vegetation removal will be accomplished using gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a tractor equipped with a bush hog mower. The brush will be cut to a height of approximately 6 inches above ground surface to allow UXO Technicians to visually observe the ground surface during the mag & dig operations. The total acreage requiring vegetation removal is approximately 3.5 acres. MEC avoidance will be performed during vegetation removal. This includes visual observation of the ground surface by UXO Technicians prior to and during vegetation removal and 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.

3.1.5 Standing Water Removal

Prior to initiating mag & dig operations, a vacuum truck or pumping system will be utilized to remove standing water from the drainage ditch and relocate the water downstream. The intake end of the water transfer hose will have a screen covering with openings no larger than 0.25-inch by 0.25-inch to prevent inadvertent pickup and transfer of MEC items.

3.1.6 Anomaly Detection and Intrusive Investigation (Mag & Dig)

A mag & dig operation will be performed over the approximate 20-acre MRS footprint to locate and excavate the sources of all detectable metallic anomalies in the subsurface. 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 surveying within the survey lane. When a subsurface anomaly is detected, the UXO Technician will mark and excavate the anomaly to determine if it presents a MEC hazard. UXO Technicians will not perform mag & dig operations over areas covered in asphalt or concrete or within approximately 10 feet of buildings, fences, and other structures containing metal.

3.1.7 Portable Type 2 HE Storage Magazine Installation and Temporary Storage of MEC

A portable Type 2 HE storage magazine will be used for temporary storage of MEC that has been determined as safe to move. The Type 2 HE storage magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type 2 magazine as described in Section 55.208(a) of Alcohol, Tobacco, and Firearms (ATF) P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations. The maximum NEW to be stored in the magazine is 15 lbs. The explosives storage area will meet the requirements of:

- ATF P 5400.7 – Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- Department of Defense (DoD), 2004, 6055.9-STD – DoD Ammunition and Explosives Safety Standards
- Naval Sea Systems Command (NAVSEA), 2004, Ordnance Publication (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 2

The magazine will be installed in accordance with this Work Plan Addendum, Explosives Safety Submission (ESS) (Appendix C), and Explosives Siting Plan (ESP) (Appendix D) on an existing concrete pad and secured within a fence.

3.1.8 Disposal of MEC

All MEC recovered at the site will be disposed of by open detonation in accordance with this Work Plan Addendum and all applicable state (FAC Chapter 62-730.320) and federal regulations.

Following MEC disposal, visible residual materials and/or impacted soil will be recovered from the site and managed, transported, and disposed of in accordance with Section 8.0 Waste Management Plan of this Work Plan Addendum.

3.1.9 Disposition of MPPEH

All MPPEH will be inspected, demilitarized if necessary, certified and verified as free of explosive hazards and suitable for recycling. Handling and disposal procedures for MPPEH are provided in Appendix G.

3.1.10 Containerization, Characterization, and T&D of Contaminated Materials

Recovered visible residual materials and/or impacted soil and any generated decontamination wastes will be containerized in 55-gallon drum(s); sampled and characterized in accordance with Section 7.0 Sampling and Analysis Plan of this Work Plan

Addendum; and managed, transported, and disposed in accordance with Section 8.0 Waste Management Plan of this Work Plan Addendum.

3.1.11 Site Restoration

As necessary, disturbed areas caused by MR activities (mag & dig, MEC detonations, etc.) will be restored to match previous conditions. Disturbed areas will be backfilled to original grade in an even distribution with certified "clean" granular fill material from an offsite source. Fill material will be placed in maximum of 1-foot lifts and machine-compacted. Topsoil is not required; however, the offsite material used for backfill will be capable of supporting vegetation. In addition, restoration will include grading to provide drainage and re-seeding to match the existing grass type.

If additional fill materials are necessary, certified "clean" fill furnished from an offsite source(s) will be used. Approved-laboratory analytical results from a representative sample of each fill material are required to certify as "clean." One sample from each fill source is required and the required analyses are specified in Section 7.0 Sampling and Analysis Plan of this Work Plan Addendum. Fill material must meet FDEP Soil Cleanup Target Levels (SCTLs) for Direct Exposure – Residential or Leachability based on Groundwater Criteria, whichever is lower, as specified in FAC Chapter 62-777 to be certified as "clean."

3.1.12 Decontamination and Demobilization

Personnel and equipment will be properly decontaminated to remove all contamination that may be adhering to personnel or equipment as a result of project activities. Any water accumulated during the decontamination process will be containerized in 55-gallon drum(s); sampled in accordance with Section 7.0 Sampling and Analysis Plan of this Work Plan Addendum; and managed, transported, and disposed in accordance with Section 8.0 Waste Management Plan of this Work Plan Addendum. Decontamination of personnel and equipment will be performed in accordance with the HSP provided in Appendix B and the applicable provisions of 29 Code of Federal Regulations (CFR) 1910.120.

During demobilization, temporary facilities and equipment will be removed from the site. In addition, any debris or solid waste material remaining from project activities will be removed and properly disposed of offsite in accordance with Section 8.0 Waste Management Plan of this Work Plan Addendum.

3.1.13 MR After Action Report

A MR After Action Report will be prepared to document the activities performed to complete the scope of work in accordance with NOSSA Instruction 8020.15. The After Action Report will include the following:

- Executive Summary
- The known or reasonably anticipated end use of the MRS
- Tabulation of all UXO, munitions scrap, and other related material recovered during the MR action
- QA/QC Summary

- Discussion of the methods and technology used to remove or remediate munitions, including relative effectiveness, lessons learned, and advice for future operations
- Documentation for final disposition of munitions-related scrap
- Information about the surveyed actual response boundary
- Information about any MR sites where MR activities were not conducted with rationale
- Estimate of the hazards/risks remaining after response actions
- Any institutional controls in place
- Information regarding required recurring reviews
- Rationale for deviations from the approved ESS
- Summary of the MR site area (acres), response action cost, and labor hours to perform the response action
- Figures (scale 1:400) showing anticipated land use, residual hazard/risk, and munitions constituent sampling locations
- Figure of subsurface geophysical anomalies
- Dig sheets for all excavations
- Color photographs
- Videotape with voice narration showing major response activities and UXO discoveries
- Laboratory analytical results
- Transportation and disposal of generated wastes documentation
- Any archaeological sites or environmentally sensitive areas encountered with mitigative or corrective actions taken
- Number of acres of re-vegetation or re-seeding
- Damage to trees, utilities, or facilities, with corrective actions taken

3.2 Project Schedule

A project schedule has been prepared that includes each project activity. The schedule addresses the project management, field tasks, reports and deliverables and associated review periods for the project. The proposed schedule might vary depending on the actual conditions encountered in the field. Appendix A provides a schedule for the work to be performed.

3.3 Communications Plan

A communication matrix outlining the lines of communications for NAVFAC EFD SOUTH and CH2M HILL is presented in Table 3-1. Table 3-2 provides a project personnel directory.

TABLE 3-1
Communications Matrix

CH2M HILL Position	Navy Direct Report
Phil Smith, Executive Sponsor	Eva Clement, CO
Scott Smith, Program Manager	Dorothy Okamoto, COTR Richard Stanley, ACO
Michael Halil, CTO Project Manager	Dorothy Okamoto, COTR Richard Stanley, ACO Mark Davidson, RPM Larry Blackburn, NTR/ROICC

CO – Contracting Officer
ACO – Administrative Contracting Officer
NTR – Navy Technical Representative
RPM – Remedial Project Manager
COTR – Contracting Officer's Technical Representative

TABLE 3-2
Project Personnel Directory

Contact	Company
Scott Smith, Program Manager Joe Giandonato, Contracts Administration Manager Richard Rathnow, Health and Safety Manager Theresa Rojas, QA/QC Manager	CH2M HILL Constructors, Inc 115 Perimeter Center Place, N.E. Suite 700 Atlanta, GA 30346-1278 770/604-9095
Michael Halil, Project Manager	CH2M HILL Constructors, Inc 6219 Authority Avenue Jacksonville, FL 32221 904/777-4812 x. 233
Eva Clement, CO	NAVFAC EFD SOUTH P.O. Box 190010 North Charleston, SC 29419-9010 843/820-5518
Richard Stanley, ACO	As above 843/820-5939
Dorothy Okamoto, COTR	As above 843/820-5940
Mark Davidson, RPM	As above 843/820-5526
Larry Blackburn, NTR/ROICC	Engineering Field Activity Southeast Environmental Programs Coordinator/Resident Officer in Charge of Construction P. O. Box 139, Building 13 NAS Jacksonville, FL 32212-0139 904/542-8745 ext.1116

3.4 Traffic Control Plan

Traffic control will be the responsibility of CH2M HILL. CH2M HILL will minimize disturbance to established traffic patterns during project activities. CH2M HILL will consult with onsite JAA, FLARNG, and U.S. Coast Guard (USCG) personnel to evaluate site access, placement of equipment, and traffic flow to minimize the impact of this work. CH2M HILL will review all regulations and standard operating procedures regarding vehicle movement and control on the airfield. All personnel will obtain *Runway and Ramp* training from JAA.

4.0 Munitions Response Operations Plan

4.1 Site Visit/Records Review

CH2M HILL performed site visits on February 8, 2005 and August 11, 2005, and a records review was performed in development of the ESS (Appendix C) and this Work Plan Addendum. No additional site visits or records review activities are planned.

4.2 MEC Team Composition

4.2.1 Personnel Qualifications

UXO personnel assigned to positions UXO Technician I, UXO Technician II, UXO Technician III, UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), or Senior UXO Supervisor (SUXOS), will be qualified and certified in accordance with NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program; terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel; and Department of Defense Explosives Safety Board (DDESB) TP-18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and personnel.

4.2.2 Personnel Responsibilities

Project Manager

The CH2M HILL Project Manager (PM), Mr. Michael Halil, reports to the CH2M HILL Activity Manager. He is responsible for ensuring that all activities performed by CH2M HILL at the former NAS Cecil Field are conducted in accordance with contractual specifications and approved work plans. The PM will also coordinate with the Navy representative. The CH2M HILL PM is responsible for management of all operations conducted for the project. He will ensure that all personnel assigned to the project, including subcontractors, have reviewed the technical plans before any task associated with the project begins. The CH2M HILL PM will monitor the budget and schedule to ensure availability of necessary personnel, equipment, subcontractors, and services. He will also participate in the development of the field program, evaluation of data, and reporting.

CH2M HILL Munitions Response Manager

The CH2M HILL MR Manager, Mr. Ben Redmond, provides specialized technical support and training during the implementation of MR activities. The MR Manager monitors advances in MR technology and advances the state of the art for MR operations. He also ensures that the best technical approach is utilized on each MR project.

Munitions Response Safety Officer

The CH2M HILL MR Safety Officer (MRSO) is responsible for developing MR Safety policy and guidance for project delivery teams and for providing oversight for the implementation of MR specific sections of the HSP for MR related projects. Overall, the MRSO is responsible for ensuring the safety of all project personnel involved in MR operations.

Munitions Response Quality Control Manager

The CH2M HILL MR Quality Control Manager (MRQCM) provides oversight for implementation of MR specific sections of CH2M HILL's QC Program for all MR related projects. The MRQCM is responsible for ensuring that all MR work complies with stipulated contractual requirements and is in compliance with all DoD, federal, state, and local statutes and codes.

Health and Safety Manager

The Program Health and Safety Manager (a Certified Industrial Hygienist [CIH]) oversees the development and implementation of the HSP to ensure that it meets all of the specific needs of the project and that the appropriate health and safety requirements have been defined. He routinely coordinates directly with the MR Manager, MRSO, MRQCM, PM, SUXOS, and UXOSO onsite to answer technical questions and to provide assistance to the work sites. He also performs health and safety program audits and inspections to ensure compliance with company health and safety policy.

Senior UXO Supervisor

The SUXOS will possess the qualifications stated in Section 4.2.1. This individual will have at least 15 years of UXO experience, which may be a combination of active duty military EOD and contractor UXO experience, and will include 10 years in supervisory positions. The SUXOS will be able to fully perform all of the functions enumerated in the following sections for UXO Technicians II and III. In addition, the ability to perform the following functions is a requirement for the SUXOS: planning, coordinating, and supervising all contractor onsite UXO activities; preparation of SOPs for MEC operations; ensuring compliance with DoD directives as well as local, State, and Federal statues and codes; and certification of Ammunition, Explosives, and Dangerous Articles (AEDA) and/or range scrap as ready for turn-in or disposal in accordance with current policies. The SUXOS must also be fully capable of supervising multiple project teams that may be performing MEC- and MEC-related activities (for example, vegetation clearance; land surveying; reconnaissance and classification of MEC, pyrotechnic items, and military explosives and demolition materials; locating surface and subsurface MEC; destroying MEC by burning or detonation; and/or transporting and storing MEC and explosives material).

UXO Safety Officer

The UXOSO will have the same minimum qualifications as a UXO Technician III, as listed below. In addition, this individual will have the specific training, knowledge, and experience necessary to implement the HSP and verify compliance with applicable health and safety requirements. This individual will be able to perform all functions enumerated in the following sections for UXO Technicians II and III. In addition, the UXOSO will have the ability to implement the approved MEC and explosives safety program in compliance with

all DoD, Federal, State, and local statutes and codes; analyze MEC and explosives operational risks, hazards, and safety requirements; establish and ensure compliance with all site-specific safety requirements for MEC and explosives operations; enforce personnel limits and safety EZs for MEC clearance operations, MEC and explosives transportation, storage, and destruction; conduct safety inspections to ensure compliance with MEC and explosives safety codes; and operate and maintain air monitoring equipment as required for airborne contaminants.

UXO Quality Control Specialist

The UXOQCS will have the same minimum qualifications as a UXO Technician III as listed below. In addition, this individual will have documented QC training. This individual will be able to fully perform all functions enumerated for UXO Technicians II and III. The UXOQCS will have the ability to implement the UXO-specific sections of this Work Plan Addendum for all MEC-related tasks, conduct QC inspections of all MEC and explosives operations for compliance with established procedures, and direct and approve all corrective actions to ensure all MEC-related work complies with contractual requirements.

A UXOQCS is not required full-time onsite. The SUXOS will act as the UXOQCS for the former NAS Cecil Field site.

UXO Technician III

A UXO Technician III will possess the qualifications stated in Section 4.2.1. This individual will have experience in MEC clearance operations and supervising personnel, and will have at least 10 years combined active duty military EOD and contractor UXO experience. This individual will be able to fully perform all functions enumerated in the following section for UXO Technician II. In addition, the ability to perform the following functions is a requirement for the UXO Technician III: supervising and performing onsite disposal of MEC, preparing explosives storage plans in accordance with all applicable guidance, preparing required MEC administrative reports, preparing SOPs for onsite MEC operations, performing risk hazard analyses, conducting daily site safety briefings, and supervising the conduct of all onsite evolutions directly related to MEC operations.

UXO Technician II

A UXO Technician II will possess the qualifications stated in Section 4.2.1. As an exception, a UXO Technician II may be a UXO Technician I with at least 5 years combined military EOD and contractor UXO experience. In addition, the ability to perform the following functions is a requirement of the UXO Technician II: properly storing MEC material in accordance with applicable guidance, identifying fuzes and determining fuze condition, determining a magnetic azimuth using current navigational/locating equipment, performing field expedient identification procedures to identify explosives contaminated soil, preparing an onsite holding area for MEC material, and operating modes of transportation for transporting MEC material, when appropriate.

Essential Personnel

The SUXOS/UXOSO may approve additional personnel for entry inside the EZ if they have specialized skills needed to accomplish the project objectives and have documented specialized training.

Heavy Equipment Operators

Subcontractors who will be responsible for the operation and maintenance of heavy equipment on site must be properly trained and certified to perform the tasks assigned. It is the responsibility of the subcontractor to provide the required documentation and medical surveillance records for their personnel. Heavy equipment operators will report directly to the SUXOS.

4.2.3 UXO Team Composition and Roles

The UXO team will consist of one SUXOS, one UXOSO, one UXO Technician III, and three UXO Technicians II team members.

4.3 Project Authority

The SUXOS has final onsite authority for MR safety.

4.4 Training

4.4.1 Health and Safety Indoctrination

Prior to commencement of site activities, the CH2M HILL PM will ensure that all employees engaged in hazardous waste operations are informed of the nature and degree of exposure to hazards which are likely to result from participation in site operations. CH2M HILL will accomplish this by ensuring that all personnel entering the site have received the appropriate Occupational Safety and Health Administration (OSHA) and site-specific training prior to participating in site activities.

4.4.2 Site Specific Training

Health and safety training requirements for onsite project personnel have been established in accordance with OSHA requirements for hazardous site workers (29 CFR 1910.120). These training requirements are specified in the HSP (Appendix B), and will be met before project personnel can begin site work. All personnel working onsite will review this HSP with the SUXOS. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the HSP.

Activity Hazard Analysis (AHA) will be prepared using the AHA form provided in the HSP Attachments as a guide before beginning each project activity posing health and safety hazards to project personnel. The AHA will identify the work tasks required to perform each activity, along with potential health and safety hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements, and training requirements for the safe operation of the equipment listed must be identified. Daily safety meetings held with all project personnel in attendance will review the hazards posed and required health and safety procedures/AHAs that apply for each day's project activities.

At the start of each day's activities during the daily safety meeting, the SUXOS will complete the Pre-Task Safety Plan (PTSP), provided in the HSP attachments, with input

from the work crew. The PTSP serves the same purpose as the general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required health and safety procedures, as identified in the AHA. The use of PTSPs, better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required health and safety procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

4.4.3 MEC Awareness Training

Initial MEC Training

Initial MEC awareness training is an appropriate safety precaution for all personnel working on this project. MEC awareness consists of training in basic MEC characteristics, identification, and reporting procedures.

Repetitive MEC Training

On the first workday of each work week/period, or more frequently if needed, a pertinent MEC-related topic will be selected and discussed by the SUXOS during the Tailgate Safety Briefing. These safety meetings will help ensure the safety and health of field personnel in the performance of regular work activities and in emergency situations. Safety meetings will be documented.

4.4.4 OSHA Training

All employees involved in hazardous waste site activities receive 40 hours of OSHA 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.

4.4.5 Hazards Communication Training

OSHA's standard for hazard communication requires all workers be informed of potentially hazardous materials used in their work area. Employees will be provided information and training on hazardous materials at their work site at the time of their initial assignment and whenever a new material is introduced or found that could present a potential hazard. Personnel will be briefed on the general requirements of the OSHA hazard communication standard and duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site also will be briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

4.4.6 Hearing Conservation Training

The risk management of noise requires the identification of noise sources, assessment of potential to cause injury, and control of all noise sources, such that no personnel should be exposed to potentially harmful noise levels. A full systematic approach must be implemented to successfully manage site noise. The amount of noise or its loudness is measured for continuous noise in decibels on the A scale (dBA), slow response mode. The

limit for unprotected noise exposure is 85 dBA averaged over an 8-hour day. Noise levels above 85 dBA generally require raising one's voice to be heard at a distance of 3 feet (approximately 1 meter). The higher the noise level, the shorter the allowable limits of unprotected exposure time. Hearing protection should be utilized for all noise exposures above 85 dBA. The level of impulsive or impact noise is measured on the C scale (dbC) using a "peak hold" or impact setting. The maximum limit for impulsive noise is 140 dbC for a single impulse. Whenever CH2M HILL employee noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA and/or an impact noise level of 140dbC from use of heavy equipment or explosions from the detonation of MEC, hearing protection will be required.

4.4.7 First Aid and CPR

At least two site personnel will be required to have first aid and cardiopulmonary resuscitation (CPR) training and appropriate certification. CPR certification is renewed annually; first aid certification is renewed every 3 years. All first aid/CPR training is American Red Cross-approved or in accordance with OSHA standards. Additionally, first aid/CPR qualified personnel received bloodborne pathogen training as required by 29 CFR 1910.1030.

4.4.8 Bloodborne Pathogen Training

Bloodborne Pathogen training is required for all personnel working on MR sites who could reasonably come in contact with blood or other potentially infectious materials, as the result of performing their job duties.

4.4.9 Visitor Training

Visitors to the site may include representatives from the Navy or JAA. These personnel, even if escorted, must receive, as a minimum, a briefing on site conditions, hazards, and emergency response procedures. Visitors must possess the appropriate level of OSHA training. The SUXOS will provide the visitor briefing. All visitors to the site will be escorted at all times. Visitors not complying with the above requirements will not enter the site.

4.5 Medical Surveillance

The Medical Surveillance Program is designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures. The employer (prime/subcontractor) is responsible for the medical surveillance of their employees. The employer (prime/subcontractor) must vouch for the medical eligibility of their employees.

4.5.1 Medical Examinations

Each employee must receive a baseline physical, which can be part of an annual medical monitoring program, prior to being permitted to enter the EZ. The content of the physical will be determined by the employer (prime/subcontractor), but should be based on National Institute for Occupational Safety and Health (NIOSH)/OSHA/USCG/U.S. Environmental Protection Agency's (EPA) Occupational Safety & Health Guidance Manual

for Hazardous Waste Site Activities. The minimum medical monitoring requirements for work at the site are as follows:

- Complete medical and work histories
- Physical examination
- Pulmonary function tests (FVC and FEV1)
- Blood chemistry (CBC and SMAC 24)
- Urinalysis with microscopic examination
- Audiometric testing
- Eye examination and visual acuity
- Chest x-ray (as directed by the Occupational Physician)
- Electrocardiogram (as directed by the Occupational Physician)
- Other biological testing as prescribed by the Occupation Physician
- Serum lead
- Zinc protoporphyrin
- Arsenic

In addition to a baseline physical, employers (prime/subcontractors) must provide their employees a physical every 12 months.

Any employee found to have a medical condition that could directly or indirectly be aggravated by exposure to these site contaminants cannot be employed for the project.

4.5.2 Exposure Monitoring

A review of the site location and conditions has resulted in the determination that an Air Monitoring Plan (AMP) is not anticipated to be needed for execution of the MR for this project. Should changes in project-specific site conditions warrant, a site-specific AMP will be developed.

4.5.3 Alcohol and Drug Abuse Surveillance Plan

CH2M HILL employees who perform or oversee MR operations are subject to the provisions of HSE-105, *Drug-Free Workplace*.

Subcontractors are responsible for ensuring that their employees who perform MR operations on CH2M HILL projects are on a drug abuse surveillance program that meets the requirements of HSE-105.

4.6 Munitions Response Procedures

4.6.1 Subsurface Clearance

Safety Considerations

Subsurface clearance actions will be accomplished in strict accordance with the HSP (Appendix B), ESS (Appendix C), and ESP (Appendix D). The UXO team should review these plans and any archival information available regarding the MRS. The UXO team will determine the probable types of MEC that may be encountered and specific safety considerations. Prior to commencing subsurface clearance activities, the UXO team will

provide a general work and safety briefing to all onsite personnel. This briefing will address the following:

- Probable site hazards and site-specific safety considerations
- UXO safety support procedures
- Responsibilities and lines of authority for any MEC-related response
- Emergency response procedures

Underground Utilities

Utility clearance and/or excavation permits, if required, will be obtained prior to the commencement of any intrusive activities. The UXO Team is responsible for verifying that all necessary excavation permits are on site prior to commencing operations. In the event subsurface utilities are suspected in an excavation area, the UXO team will attempt to verify their location using geophysical survey instrumentation (only utilities with a ferrous content are detectable with a magnetometer). All located utilities should be marked with a series of pin flags to visually delineate their approximate subsurface routing.

Exclusion Zones

EZs will be established in accordance with the ESS (Appendix C) and ESP (Appendix D) for all MEC clearance procedures (for example, anomaly excavation, accessing and identification of MEC, MEC recovery, and MEC destruction). During these operations, all non-essential personnel will withdraw to a location outside the EZ. Essential personnel include only those UXO team personnel necessary to accomplish the specific MEC subsurface clearance task.

4.6.2 Area Preparation

Area preparation includes mosquito control, site layout (survey), and reduction and/or removal of vegetation and standing water that may impede or limit the effectiveness of subsurface clearance actions. The anomaly avoidance procedures will be followed during area preparation. Teams working in areas not previously cleared of MEC will be accompanied by UXO qualified personnel.

Mosquito Control

Mosquito control will be completed by the City of Jacksonville Mosquito Control, schedule permitting, or by a local pest control company. The project site will be sprayed by airplane or fog truck.

Site Layout (Survey)

Site surveys will be performed using a RTK GPS. A site boundary survey will be performed and a uniform system of operational grids established across the site. The boundary survey will be performed first and include placement of colored flagging on stakes along the perimeter of the site to establish work area limits. A system of 100- by 100-foot grids coinciding with the Florida State Plane coordinate system will be established across the site using labeled stakes. Following grid placement, the extents of the EZs will be surveyed to include the placement of stakes with colored flagging along the perimeter of each EZ. Stake locations will be checked by a UXO Technician with a handheld all-metals detection

instruments (White's XLT metal detector or comparable) that can detect both ferrous and non-ferrous metallic items prior to any stakes being driven.

Vegetation Removal

Vegetation removal will be accomplished using gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a tractor equipped with a bush hog mower. The brush will be cut to a height of approximately 6 inches above ground surface to allow UXO Technicians to visually observe the ground surface during the mag & dig operations. The total acreage requiring vegetation removal is approximately 3.5 acres. MEC avoidance will be performed during vegetation removal. This includes visual observation of the ground surface by UXO Technicians prior to and during vegetation removal and 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.

Standing Water Removal

Prior to initiating mag & dig operations, a vacuum truck or pumping system will be utilized to remove standing water from the drainage ditch and relocate the water downstream. The intake end of the water transfer hose will have a screen covering with openings no larger than 0.25-inch by 0.25-inch to prevent inadvertent pickup and transfer of MEC items.

4.6.3 MEC Intrusive Operations

A mag & dig operation will be performed over the approximate 20-acre MRS footprint to locate and excavate the sources of all detectable metallic anomalies in the subsurface.

Equipment Check Area

Geophysical instruments will be checked in an Equipment Check Area (ECA) prior to use each day. Three items, one inert 20-mm projectile (or surrogate), an empty CAI (or surrogate), and an empty CAD (or surrogate) will be buried at approximately 1 foot below the ground surface to ensure that these items can be detected to that depth each day prior to beginning operations. Because the only MEC found or anticipated to be found at the site consist of DMM, it is not anticipated that individual MEC items will be found below 1 foot.

Mag & Dig

A SUXOS will oversee the MEC Clearance Team (one UXOSO, one UXO Technician III [Team Leader], and three UXO Technicians II) as they proceed back and forth across the grid, sweeping handheld all-metals detectors (White's XLT metal detector or comparable), across their 5-foot wide sweep lane. The UXO Technicians will detect subsurface ferrous metal anomalies by observing the sound produced by the detector. Upon detecting an anomaly, the UXO Technician will immediately investigate by hand excavation. As an alternate method the anomaly may be marked with a pin flag to be excavated later. Using this method, the SUXOS will record the number and location of the pin flags on a grid sheet. After completing the subsurface geophysical survey, the UXO Technicians will return to the grid, equipped with the grid sheet, and will excavate and investigate the anomalies to determine their identification.

Navigation within the grid will be performed using the survey land method to mark the boundary of the surveyed area. The spacing between members of the sweep line will not be larger than 5 feet, and the SUXOS will ensure that the MEC Clearance Team covers the entire area assigned to them.

The advantages of a mag & dig operation is that it is an accepted and proven method and the equipment is relatively inexpensive and reliable. The disadvantages of this method are that it is labor intensive, not verifiable because there is no recorded data that can be examined later to verify the quality of the overall MEC Clearance Team, and the required attention to detail of the individual team members.

MEC Excavation

The MEC Excavation Team consists of one SUXOS, one UXOSO, one UXO Technician III (Team Leader), and three UXO Technicians II. The MEC Excavation Team will use hand tools to excavate all anomalies. While excavating, they will use handheld all-metals detectors (White's XLT metal detector or comparable) to pinpoint the exact location of the anomaly and will also remove the scrap metal from the grid. The UXO qualified personnel will carefully hand excavate, using standard EOD hand excavation techniques, until the source of the anomaly is reached. The excavation team will uncover the item sufficiently to allow identification without shocking, jarring, or disturbing the item.

4.6.4 Portable Type 2 HE Storage Magazine Installation and Temporary Storage of MEC

In the event an MEC item is identified at the site, the SUXOS will secure the site and notify the CH2M HILL PM, who in turn will notify the NAVFAC EFD SOUTH RPM and FDEP representative. If the SUXOS and one other qualified UXO Technician determines the MEC item(s) safe to move, the MEC item(s) will be placed in a portable Type 2 HE storage magazine for temporary storage, and secured for disposal by detonation at the end of the MR. If the SUXOS determines the MEC item(s) not safe to move, the site will remain secured until disposal operations can be performed.

The Type 2 HE storage magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type 2 magazine as described in Section 55.208(a) of ATF P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations. The maximum NEW to be stored in the magazine is 15 lbs. This explosives storage area will meet the requirements of:

- ATF P 5400.7 – Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DoD, 2004, 6055.9-STD – DoD Ammunition and Explosives Safety Standards
- NAVSEA, 2003, 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 2

The magazine will be installed in accordance with the ESS (Appendix C) and ESP (Appendix D) on an existing concrete pad and secured within a fence.

Inspections

The magazine will be inspected at least every 7 days to determine whether there has been unauthorized entry or attempted entry into the magazine, or unauthorized removal of the contents of the magazine.

Physical Security

Magazine locks will meet the standards for ATF Type 2 magazines, as specified in Section 55.208(a)(4), ATF P 5400.7. The magazine will have two locks. The SUXOS will hold a key to one of the locks, and the UXOSO will hold the key to the other. Access to the explosives will require both individuals.

Placards

The magazine will display the placards required by Department of Transportation 49 CFR Part 172, Subpart F, for the appropriate hazard division and class. A hazard identification for fire fighting personnel will also be displayed at the magazine storage area. Signs stating “EXPLOSIVES” and "NO SMOKING" will be posted on the fence surrounding the magazines.

Lightning Protection System

The magazine will be grounded for lightening protection.

Fire Protection

Fire extinguishers of 10 pounds and type BC will be located in the magazine area. Smoking, matches, open flames, spark-producing devices, and firearms will not be permitted within 50 feet of the magazine. The land surrounding the magazine will be kept clear of all combustible materials for a distance of at least 50 feet.

Housekeeping

The area surrounding the magazine will be kept clear of rubbish, dry grass, or trees (except live trees more than 10 feet tall), for not less than 25 feet in all directions.

Safety Distances

Determination of appropriate safety distances will be in accordance with the ESS (Appendix C) and ESP (Appendix D). A safety distance of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage. An intermagazine distance of at least 51 feet will be maintained.

4.6.5 MEC Disposal

All MEC recovered at the site will be disposed of by open detonation in accordance with this Work Plan Addendum and all applicable state (FAC Chapter 62-730.320) and federal regulations.

In the event an MEC item is identified at the site, the SUXOS will secure the site and notify the CH2M HILL PM, who in turn will notify the NAVFAC EFD SOUTH RPM and FDEP representative. The SUXOS is responsible for completing the MEC Information form

provided in Appendix F. If the SUXOS and one other qualified UXO Technician determine the MEC item(s) are safe to move, the MEC item(s) will be placed in a portable Type 2 HE storage magazine for temporary storage, and secured for disposal by detonation at the end of the MR. If the SUXOS determines the MEC item(s) not safe to move, the site will remain secured until disposal operations can be performed. Determination of appropriate safety distances will be in accordance with the ESS (Appendix C), ESP (Appendix D), and FAC Chapter 62-730.320(2e). Coordination with the FDEP for detonation of recovered MEC requires an Emergency Permit for Detonation. Examples of a completed Emergency Permit Request, Emergency Permit Order, and Emergency Permit Order Public Notice are provided in Appendix E.

MEC item(s) which have been moved for temporary storage in a portable Type 2 HE storage magazine will be disposed of by detonation at the MEC demolition location shown in the ESS (Appendix C) and ESP (Appendix D). Engineering controls which conform with DDESB TP-16 Revision 1 and U.S. Army Corps of Engineers, Huntsville Center (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, will be used to maintain the appropriate safety distances. Calculations for the engineering controls are discussed in the ESS (Appendix C) and ESP (Appendix D).

The safest and most expeditious methods of disposal will be utilized in every case. Disposal will be conducted in accordance with EODB 60A 1-1-31, OP 5 Volume I, and NAVSEA SW060-AA-MMA-010 Volumes I and II and the procedures outlined below.

Movement of UXO

Recovered MEC will not be moved unless it is safe to do so. MEC items that are required to be moved onsite (that is, to the temporary Type II HE storage magazine or from the storage magazine to the demolition site) will primarily be moved by hand; however, these items may be moved by vehicle across the open areas within the MRS. The terrain within the MRS is flat and vegetation is either mowed or will be removed as part of site preparation activities. All vehicle movements of MEC within the MRS will comply with the requirements of SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar.

The following rules are applicable:

- Movement of UXO is only performed when a UXO Technician can make a positive identification that the munition is safe to move and have his/her identification verified by at least one other UXO Technician prior to movement.
- Fuzed UXO and UXO that is determined as not safe to move will be destroyed by blow-in-place (BIP) if the area can withstand a high-order detonation.
- MEC that is not safe to move must be treated in-place or moved using remote means.

Procedures if MEC Cannot be Moved

If the area cannot withstand a high-order detonation and the MEC is not safe to be moved, the MEC may be rendered safe by military EOD. If rendered safe or movement is not an option, then design and implementation of engineering controls to mitigate the effects of a

high-order detonation must be effected. Coordination with and approval by NOSSA is required before detonating a MEC.

MEC Destruction

Handling and disposal of MEC is a hazardous process. The detonation of MEC will be done in accordance with the ESS (Appendix C), ESP (Appendix D), and FAC Chapter 62-730.320. The SUXOS and another qualified UXO Technician must agree on the positive identification of the item and the disposition of the item prior to implementing any disposal operations. If the area where the item is found is determined to be incapable of withstanding a high-order detonation, protective works, such as sandbags, dirt revetments, or trenches will be used. Engineering controls must be pre-approved by NOSSA or submitted to NOSSA for review and approval prior to being implemented. MEC must not be destroyed unless a positive identification can be made. In the event assistance is needed to make a positive identification, military EOD assistance will be requested as an emergency response.

Only the SUXOS and UXO Team members will be allowed within the EZ once the disposal operations have begun. The SUXOS will have overall control of the site. All UXO personnel will ensure safe work practices are observed.

When possible, detonations will be initiated electrically or with shock tube systems. This method offers the SUXOS the maximum amount of control over the detonation and allows the detonation to be aborted up to the instant of initiation. An MEC Disposal Checklist (provided in Appendix F) provides step-by-step checks to ensure that the demolition team has completed each step for detonation of MEC. The checklist provides procedures for preparation of the detonation charge.

The SUXOS is responsible for scheduling the detonation operations and for ensuring that all project personnel are accounted for before disposal operations begin.

The Disposal Team, comprised of the SUXOS and a UXO Technician, will inspect the location and condition of each MEC slated for detonation to ensure positive identification of the MEC and to determine the NEW for calculation of safety distances.

Prior to initiation, the SUXOS will ensure that guards are stationed at the roadblocks, scan the hazard/fragmentation area with binoculars, and sound three distinct blasts on an air or vehicle horn. The SUXOS will then scan the area again and initiate the demolition charge if all is clear.

In the event of a misfire, a 60-minute wait time will be observed. Then a new double-primed initiator will be prepared and used to initiate the charges. The Misfire Checklist (provided in Appendix F) will be completed by the SUXOS and filed with the Field Daily Activity Logs.

During demolition activities, the SUXOS will have overall control of the site. An EZ will be established around the demolition site according to the ESS (Appendix C), ESP (Appendix D), and FAC Chapter 62-730.320(2e). Only the SUXOS, UXO Team, and UXO-qualified safety personnel will be allowed within the EZ once the disposal operations have begun. The UXOSO will ensure safe work practices are observed, and the UXO Technician III will perform the necessary steps to safely dispose of the military munitions. The following general procedures will be followed for all disposals by detonation:

- The UXO Team, comprised of the UXO Technician III and a UXO Technician II, will inspect the location, condition, and NEW of the military munitions to be disposed of.
- The UXO Technician III will ensure that permission to detonate explosives has been obtained from the SUXOS.
- The SUXOS will schedule the detonations and to ensure that all project personnel are accounted for before disposal operations begin.
- A minimum separation distance of 25 feet will be observed for initiators and main-charge explosives while at the disposal site.
- Upon arrival at the safe firing point, the UXO Team will lay out the firing wire. If several military munitions are located in close proximity to each other, a mainline/branchline shot may be used to destroy these military munitions simultaneously to increase the efficiency of the operation. The UXO Team will ensure that the total NEW of the military munitions to be destroyed does not increase the EZ minimum separation distance to a radius that is larger than has been evacuated.
- All detonations will be double-primed. The firing wire and initiators will be tested for continuity and the UXO Technician III will observe the UXO Technician II position the explosive charge against the military munition. The disposal shot may be tamped to minimize the effects of the detonation. However, the initiators (blasting caps) should never be buried.
- The initiators will then be connected to the firing wire and secured to the end of the detonating cord or placed into the main charge.
- The UXO Technician III will then inspect the disposal shot and return to the safe firing point.

Post-demolition Operations

After successful initiation of the explosive charge, the UXO Team will conduct an inspection of the detonation site to ensure complete destruction of the military munitions. After verification that no more detonations will be required, an "all clear" notification will be sent out to all parties on the notification list.

The UXO Team will collect for disposal all sandbag fragments, large munition fragments, and other debris; and generally clean and restore the area.

Visible residual materials and/or impacted soil will be recovered from the site and managed, transported, and disposed of in accordance with Section 8.0 of this Work Plan Addendum.

4.6.6 Engineering Controls

Fragment or blast mitigation may be provided by appropriate DDESB-approved engineering controls. Typical engineering controls for intentional detonation include tamping and sandbags. The design of such an engineering control will be based on the munition with the greatest fragmentation distance (MGFD). The NEW used for the design of the engineering control will be the total NEW of all munitions plus the initiating explosives.

Sandbag Thickness for Intentional Detonations

The amount of sandbagging required to contain all fragmentation depends on the munition, and is described in Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7, August 1998.

Sandbag Enclosure Construction Method

The gradations and physical composition of sand for the sandbags are not critical, but should be at least typical of local construction practice for sand used in foundations and backfill. Minor inclusions of clay or soils materials are permitted. However, no rocks or stones will be placed in the sandbags.

Four walls of identical thickness will surround the munition. The sandbag walls will be stacked to maintain a clear standoff distance of 6 inches between the munition and the inside face of each wall. The interior face of each wall should be vertical but the exterior face can be built with a 1:6 slope (2 inches horizontal to 12 inches vertical). If a sloped outer face is used, the thickness of the wall at the top must be no less than the specified required thickness.

At a minimum, a double layer of sandbags will be used. For example, when a 12-inch thickness is required, the sandbags should be oriented so that two sandbags are necessary to achieve this thickness. The sandbags will be placed tightly against each other. All vertical joints will be staggered and there should be no clear line of sight from the munition to the exterior. As the wall is built, each new layer of sandbags will run in opposite direction to the layer below, so that the layers are interlocked.

After the walls are constructed to a height of 6 inches above the upper surface of the munition, the counter charge or other initiator will be placed on the shell. The counter charge should be located on the side of the munition. Sensitized detonating cord will lead through a polyvinyl chloride (PVC) pipe to the counter charge. The blasting cap used to initiate the detonating cord will not be attached until the sandbag enclosure has been completed and permission to fire has been granted.

A sheet of 0.75-inch thick Douglas fir (or equivalent) plywood will be cut to the dimensions of the cavity between the walls, plus 12 inches in each direction. The plywood sheet will then be centered on the walls so that it bears on 6 inches of each wall. The additional sandbags that make up the roof of the enclosure are then placed on top. As with the walls, the roof sandbags will be stacked with staggered horizontal joints and alternating directions in each layer. The exterior sides of the roof may also be vertical or have a 1:6 slope. The thickness of the sandbag roof above the plywood panel must be the same as the required wall thickness.

After the sandbag layers of the roof have been placed to the correct height, the enclosure is complete and the munition may be detonated.

4.6.7 MPPEH Procedures

Handling and disposal procedures for MPPEH are provided in Appendix G.

4.7 Explosives Management Plan

4.7.1 Acquisition

This Explosives Management Plan (EMP) provides details of the plan for management of explosives to support the project. The design of the project field effort specifies that explosives will be received on an as-needed basis. The quantity of delivered explosives will be adequate to complete the identified task without resulting in an unused portion. This plan was developed in accordance with MMRP MCX DID OE-005-03, local and state laws and regulations, Bureau of Alcohol, Tobacco, and Firearms (BATF) P 5400.7, DoD 6055.9-STD, Department of Transportation (DOT) regulations, and OPNAVINST 5530.13C.

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 MRS work area as needed and will be immediately prepared and used to perform detonation of recovered MEC. The contractor and MEC subcontractor will coordinate with, and obtain approval from the CH2M HILL PM and SUXOS, prior to bringing explosives onto the site. Explosives vendors cannot supply explosives without the required valid dealer BATF license. A copy of this vendor license will be maintained at the project site, and upon request, will be made available to any local, state, or federal authority.

The following explosives may be used during disposal of military munitions:

- Main charge HE such as TNT, Octahydro-1,3,5,7-tetramitro-1,3,5,7-tetrazine (HMX), C-4 (M112 blocks), or binary explosives that detonate at high velocities will be used to detonate military munitions.
- Jet perforators or similar prepackaged shaped charges will be used to explosively vent hard-cased munitions.
- Detonating cord will be used to construct mainline-branch line shots, to link multiple shots together, or to transmit the explosive train to the main charge explosive when the main charge is buried (tamped), underwater, or otherwise inaccessible.
- Electric and/or non-electric blasting caps will be used as initiators.
- NONEL tubing will be used to transmit the explosive train from the igniter to the demolition devices. Shock tube priming of explosives offers the instantaneous action of electric detonation without the risk of accidental initiation of the blasting cap (and the charge) by radio transmitters in the area, or by static electricity discharge. The explosion of the shock tube is totally contained within the plastic tubing.

4.7.2 Receipt

When commercial explosives are received, the explosives will be transported to the site by a commercial explosives carrier who is licensed and permitted. Explosives in unsealed boxes containing partial lots will be opened, and the contents of the box will be counted. Any discrepancies between the actual type and quantity of explosives received and the shipping documentation will be noted on the shipping documentation with the signatures of both the

delivery driver and the individual authorized to receive the explosives. A legible copy will be filed on site. The authorized individual receiving the explosives will immediately inform the SUXOS of the discrepancy, who will in turn notify the CH2M HILL PM. In addition, the following apply:

- Explosives must be accounted for from initial delivery to the site until the item is expended or the contractor is relieved from accountability by the Contracting Officer.
- Individuals authorized to receive, issue, transport, and use explosives by contract position title and those individuals will assume accountability by signing the receipt documents.
- The SUXOS as the end user of explosives will certify in writing that the explosives were used for their intended purpose.

4.7.3 Transportation

Onsite Transportation Procedures

MEC items that are required to be moved onsite (to the temporary Type II HE storage magazine or from the storage magazine to the demolition site) will primarily be moved by hand; however, MEC items may be moved by vehicle across the open areas within the MRS. The terrain within the MRS is flat and vegetation is either mowed or will be removed as part of site preparation activities. All vehicle movements of MEC within the MRS 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 MRS work area as needed and will be immediately prepared and used to perform detonation of recovered MEC.

Vehicle Requirements

Vehicles transporting explosives on the project site must comply with NAVSEA SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar, 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.
- A vehicle used to transport explosives must have a non-sparking bed liner, and all explosive loads must be covered prior to departure.

- Vehicles transporting explosives must be operated by a qualified driver with a Commercial Drivers License (CDL) that includes an explosives certification.

4.7.4 Lost, Stolen, or Unauthorized Use of Explosives

If explosives are discovered to be lost, stolen, or used without authorization, the incident will be immediately reported to the SUXOS, who in turn, will then inform the CH2M HILL PM and MR Market Segment Director.

The license holder is required by law (27 CFR 55.30) to report the theft or loss of explosives to the BATF within 24 hours. In the event of such an occurrence, the following procedures will be followed:

- The magazine (if one is used onsite) will be secured, and the area will be sealed until the appropriate authorities complete their investigation.
- The license holder will make the appropriate notifications as per 27 CFR 55.30. These include calling BATF (800-424-9555) and the local law enforcement authorities.
- The license holder is responsible for completing and forwarding BATF Form 5400.5 (provided in Appendix F). This form will be completed by the SUXOS, and a copy will be provided to the UXOSO.

4.8 Explosives Siting Plan

The ESP is provided in Appendix D.

4.9 Site Safety and Health Plan

The HSP is provided in Appendix B.

5.0 Chemical Warfare Materiel

There is no history or evidence of CWM ever being used at the former NAS Cecil Field. However, in the event that suspected CWM is encountered, the following procedures will be followed:

- The discoverer will immediately notify the UXO Technician III.
- The UXO Technician III will immediately direct the work team to stop work and evacuate the site in an upwind direction. The initial EZ for CWM is 450 feet upwind in accordance with FM-9-15.
- The UXO Technician III will note the location of the suspected CWM to help with its identification and relocation.
- The UXO Technician III will designate a minimum of two UXO-qualified individuals to position themselves upwind as far as possible to prevent unauthorized personnel from accidental exposure.
- The UXO Technician III will immediately notify the SUXOS, who will in turn immediately notify the CH2M HILL PM. The PM will ensure the NAVFAC EFD SOUTH RPM and CH2M HILL MR Market Segment Director are notified as soon as possible.
- The NAVFAC EFD SOUTH RPM will coordinate notification of local and federal government agencies and request technical support from the U.S. Army.

  Note: Request for technical support for CWM may be initiated through the U.S. Army's 52nd Ordnance Group at Fort Gillem, GA (404) 469-3333.
- The SUXOS will account for all field personnel and notify the CH2M HILL PM.
- The SUXOS will ensure the area is secured until properly relieved by active duty EOD personnel, TEU, or local authority. The SUXOS will direct personnel to support such personnel as appropriate.
- Before work can resume, the site plans will be reviewed for adequacy in consideration of this newly discovered hazard.

6.0 Quality Management Program

The Quality Management Program details the QC procedures to be employed during project activities. The requirements and systems established herein are relevant and applicable to project work performed by CH2M HILL and its subcontractors. This site- and task-specific QC Plan supplements the general QC provisions provided in the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998).

6.1 Project QC Personnel and Responsibilities

The Project QC Manager is responsible for the execution of the project's construction QC system and communicates the onsite QA program policies, objectives, and procedures to the project personnel and Subcontractors during project meetings and informal discussions. The SUXOS will assist the Project QC Manager in monitoring, controlling, and documenting the quality of the onsite construction, survey, and remedial activities. All documentation related to the control of the quality of the project including analytical test results, inspections, material test results, and audits will be reviewed or prepared by the Project QC Manager. The Project QC Manager's duties include the following:

- Three phases of control inspections
- Control testing
- Document control
- Review of Submittals
- Completion inspection
- Records
- Audits and surveillance

The Project QC Manager will also coordinate with and assist the Navy representatives in the performance of QA audits and inspections.

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 (for example, geophysical sensors and two-way radios) for functioning and appropriate response prior to use. CH2M HILL will have a Project QC Manager assigned to the project having overall QC responsibility. The CH2M HILL SUXOS will have daily on site QC responsibilities. The Project QC Manager and SUXOS have yet to be determined; however, Project QC Manager appointment letters will be submitted for each prior to the commencement of field work.

The following outlines the specific QC responsibilities of the SUXOS and the Project QC Manager.

The SUXOS will be responsible for ensuring that:

- Safety briefings have been performed for all personnel each day prior to commencing site activities and documenting the activity.

- Communications equipment has been checked for operability at the start of each workday.
- Geophysical instruments are checked at the start of each day on standard items of the approximate size, shape and weight of the DMM and MPPEH found previously at the site to ensure proper functioning.
- All site personnel are adhering to the project HSP (Appendix B).
- Vegetation removal has been performed according to this Work Plan Addendum to ensure appropriate site conditions for mag & dig operations.
- UXO Technicians are outfitted with appropriate personal protective equipment (PPE) and low-metal content boots, and that all metallic items (belts, keys, cellular phones, etc.) are removed from their clothing prior to operating geophysical instruments.
- All equipment needing charging prior to use is properly connected to chargers and a charge is being applied.
- Documentation of on site activities is performed on a daily basis and copies provided to the CH2M HILL PM each day.
- Demolition activities strictly adhere to this Work Plan Addendum and the HSP.

The Project QC Manager will be responsible for the following:

- Review and verification of UXO personnel qualifications.
- At least one audit per week of each activity being performed that week.
- Auditing daily site documentation for completeness.
- Documentation of all audit results.
- Ensuring appropriate filing and storage of records.
- Documentation of QC issues.
- Providing written recommendations to the CH2M HILL PM for corrective actions within one workday of identifying any QC issue.

6.2 Project Records Maintenance

The Project QC Manager is responsible for overall management and control of project submittals.

The Project QC Manager is to establish and maintain an onsite project file for document control. The Project QC Manager is responsible for controlling access to the project file to ensure that records are not lost or misplaced. The purpose of this file is to maintain a complete set of all documents, reports, certifications, and other records that provide information on project plans, contract agreements and project activities.

The Project QC Manager will complete a Submittal Register, provided in Appendix H, to document submittals in accordance with Appendix B of CH2M HILL's Contract Management Plan (CH2M HILL, 2003). CH2M HILL, the Navy, or others will approve submittals as identified in the Submittal Register. All approved submittals will be distributed by CH2M HILL to the appropriate Navy personnel (Contracting Officer [CO], Resident Officer in Charge of Construction [ROICC] [in duplicate], etc.), the project site, and the project file.

6.3 Surveying

This section describes survey control requirements to be followed during completion of the scope of work.

As stated in Section 3.1.3, site surveys will be performed using a RTK GPS and the surveyed horizontal geographic position and state plane coordinates will be referenced to permanent or semi-permanent control points existing on the site and will be accurate to 0.25 meter, plus or minus. Horizontal control of Class one, third order or better will be established for all new semi-permanent and tertiary control points. Horizontal controls for graphic and non-graphic information are Mercator Projection, GRS 80, State Plane Coordinate System, North American Datum 1983, Lambert Zones 1 through 6 (or appropriate zone for region to be mapped). Vertical controls are Mean Sea Level, North American Vertical Datum, 1988. Data conversions from the metric system to the English system will use 1 meter = 39.37 inches exactly.

The NAS Cecil Field EGIS (ArcView format) will be used as the basis for a site plan and the locations of buildings, utilities, land features, roadways, any planimetric features, and fence lines. A boundary and location survey of MEC, Historic Properties, infrastructure improvements, utilities, and roadways will be performed to the maximum extent possible. The clearance boundaries will be surveyed and the perimeter corners of clearance areas defined with visible markers. The location of confirmed MEC items found during the clearance operations, any planimetric features, fence lines, other significant land features not shown on existing maps, and Historic Properties identified during the project will be surveyed.

Existing verified Geodetic Control points, updated to the World Geodetic System of 1984 Geocentric Reference System will be utilized for all horizontal and vertical controls used for surveying the project site.

The final survey map of the work area will be completed with 1-meter contours and spot elevations surveyed every 30 meters. All spot elevations will have a horizontal accuracy of 0.25 meters with a vertical accuracy of 0.1 meters.

All location surveys of MEC will have a horizontal accuracy of one meter and a vertical accuracy (depth of MEC) of 0.25 meters.

6.4 Testing Requirements

This section describes equipment and construction testing; environmental analysis laboratories and their certifications; environmental sampling and analysis, and test control. The Testing Plan and Log is provided in Appendix H.

6.4.1 Equipment

Testing and maintenance of geophysical instruments, two-way radios and other equipment will be performed in accordance with manufacturer's specifications. Geophysical instruments will be checked in an ECA prior to use each day. Three items, one inert 20-mm projectile (or surrogate), an empty CAI (or surrogate), and an empty CAD (or surrogate) will be buried at approximately 1 foot below the ground surface to ensure that these items can be detected to that depth each day prior to beginning operations. Because the only MEC found or anticipated to be found at the site consist of DMM, it is not anticipated that individual MEC items will be found below 1 foot. Records of these activities will be generated by the SUXOS and kept in the project files.

6.4.2 Identification and Certification of Testing Laboratories

The environmental testing laboratories utilized for this CTO project will function as a subcontractor, and have not yet been identified.

6.4.3 Construction

Construction testing is not planned for this CTO.

6.4.4 Environmental

Laboratories performing testing of environmental samples requiring definitive analysis will be approved by the National Voluntary Laboratory Accreditation Program (NVLAP), U.S. Army Corps of Engineers (USACE), or Air Force Center for Environmental Excellence (AFCEE), and certified by the State of Florida.

6.4.5 Testing and Sampling

Soil, water, and solids will be sampled under the direction of CH2M HILL. Geophysical or geotechnical soil testing (grain size, standard proctor and compaction) is not and will not be performed. A Navy-, USACE-, or AFCEE- and FDEP-approved laboratory will be used for all chemical sample analyses.

6.4.6 Test Control

Environmental samples will be collected in accordance with EPA methods and procedures. Other controls will include, but are not limited to, maintaining a chain of custody; proper handling, packing, and shipping; and the use of qualified laboratories. The Project QC Manager will verify the following:

- Facilities and testing equipment are available and comply with testing standards.
- The field instruments are calibrated in accordance with manufacturers' recommendations.

- Recording forms, including all of the test documentation requirements, have been prepared and are accurate and complete.

6.4.7 Completion Inspection

Near the completion of all tasks associated with the scope of work, the Project QC Manager will conduct a punch-out inspection of the work items to determine completion status and conformance. A punch list of items will be generated that also includes target dates for resolving any deficiencies. This punch list of items will be attached to the QC report on the day(s) of performing the inspections. The status of the items will be tracked via follow-up inspections.

The PM will notify the Navy that the project is ready for a pre-final inspection. The Navy will perform this inspection to determine whether the project is complete and ready for acceptance. Should any items be identified, a punch list of items will be generated and tracked by the Project QC Manager. Upon satisfactory completion of the punch list, the PM will notify the Navy that the project is ready for the final inspection.

Advanced notice of at least 14 days will be given to the Navy CO of the plan for conducting the final inspection. The status of the punch list items from the pre-final inspection will be reported, and a statement that pending items will be completed prior to the date of the final inspection. The PM, Project QC Manager, SUXOS, essential Subcontractor representatives, Navy representative(s) and others as determined by the Navy will attend the final inspection.

7.0 Sampling and Analysis Plan

This SAP describes the tasks and responsibilities of CH2M HILL with respect to the sampling and analysis associated with the work effort described in this Work Plan Addendum. CH2M HILL intends this document to be a site-specific guide for use by the field team while performing the project-required sampling and analysis. Any changes to the activities described in this SAP must be documented as a revision to this SAP and approved by the PM and Project Chemist.

Samples will be collected in accordance with EPA Region IV Environmental Investigative Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), November 2001 and FDEP SOPs for Field Activities, DEP-SOP-001/01, February 1, 2004. Where the two documents conflict, the more stringent will apply.

The sampling team will be qualified under the Navy Installation Restoration Chemical Data Quality Manual (IRCDQM), 1999 sampling requirements.

A Navy, USACE-, or AFCEE- and FDEP-approved laboratory will be used for all sample analyses.

7.1 Data Quality Levels for Measurement Data

The data quality levels for each sampling task are listed in Table 7-1. The sampling events, sampling and analytical requirements, and the required level of quality and data packages are listed in Table 7-2. The quantitation, project action, accuracy, precision, and completeness limits by which the data will be evaluated will be provided by the selected laboratory and approved by CH2M HILL's Project Chemist.

TABLE 7-1
Data Quality Levels

Sampling Activity	Data Quality Level Category
Clean Fill Certification (offsite laboratory analyses)	Definitive
Liquid Waste Characterization (offsite laboratory analyses)	Definitive
Solid Waste Characterization (offsite laboratory analyses)	Definitive

7.2 Sampling Objectives

The sampling objectives for this project will be as follows:

- Collect samples for solid waste characterization, as necessary.
- Collect samples for liquid waste characterization, as necessary.
- Collect samples for verification of backfill materials, as necessary.

TABLE 7-2
Sampling and Analytical Summary

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT	Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservtn	Containers
Soil/Solids Characterization Sampling													
Soil/Solids Characterization Sampling	Drums	Soil/ Solids	As necessary	1	Composite 5 random grabs into 1 sample	SS spoon, SS bowl	14 day	CCI Level B	TCLP Volatiles	1311/8260B	14 day TCLP extr; 14 day analysis	Cool to 4°C	(1) 4 oz amber glass
									TCLP Semi-Volatiles	1311/8270C	14 day TCLP extr; 7 day extr; 40 day analysis		(4) 8 oz amber glass
									TCLP Metals	1311/6010A/7470	6 month TCLP extr; 6 month analysis Hg: 28 day TCLP extr; 28 day analysis		
									TCLP Pesticides	1311/8081A	14 day TCLP extr; 7 day extr; 40 day analysis		
									TCLP Herbicides	1311/8151A	14 day TCLP extr; 7 day extr; 40 day analysis		
									PCBs	8082	14 day extr; 40 day analysis		
									Corrosivity	9045a	ASAP		
									Ignitability	1010/1020	ASAP		
Liquid Characterization Sampling													
Liquid Characterization Sampling	Drums	Water	As necessary	1	Grab	Drum thief or dip jar	14 day	CCI Level B	TCL Volatiles	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 ml vial
									TCL Semi-volatiles	8270C	7 days ext; 40 days analysis	Cool to 4°C	(3) 1L amber glass
									TCL Pesticides	8081A	7 days ext; 40 days analysis		
									TCL Herbicides	8151A	7 day extr; 40 day analysis		
									PCBs	8082	7 day extr; 40 day analysis		(1) L amber glass
									TAL Metals	6010B/7470A	180 days; Hg=28 days	HNO3 pH< 2; Cool to 4°C	(1) 500ml HDPE
									Ignitability	1010	ASAP	Cool to 4°C	(1) 250 mL amber glass
									Corrosivity	9040B	ASAP		(1) 250 mL amber glass

Notes:
1. Calendar days

TABLE 7-2
Sampling and Analytical Summary

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT	Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservtn	Containers
	Backfill Characterization Sampling												
Characterization of Backfill Material	Once per Off-Site Source	Soil	As necessary	1	Composite 5 random grabs into 1 sample (Do not composite VOCs)	SS spoon, SS bowl, TerraCore samplers, (3) Prepared 40 ml vials (4 or 8 oz jar for stone)	7 days	CCI Level C	TCL Volatiles	5035/8260B	14 day	Methanol; Sodium Bisulfite; H2O; Cool to 4°C	TerraCore samplers, (3) Prepared 40 ml vials and 4 oz jar for stone
									TCL Semi-Volatiles	8270C	14 day extr; 40 day analysis	Cool to 4°C	(4) 8 oz glass
									PAHs (including 1- and 2-Methylnaphthalene)	8270C (low-level)	14 day extr; 40 day analysis		
									TCL Pesticides	8081A	14 day extr; 40 day analysis		
									TCL Herbicides	8151A	14 day extr; 40 day analysis		
									PCBs	8082	14 day extr; 40 day analysis		
									TRPH	FL-PRO	14 day extr; 40 day analysis		
									TAL Metals	6010B/7471	6 month; Hg 28 days		
									pH	9045B	ASAP		
	Trip Blank	Water	1 Per cooler containing volatile samples	1	Prepared by Lab	(2) 40 mL vials	7 days	CCI Level C	TCL Volatiles	8260B	14 day	HCl pH< 2; Cool to 4°C	(2) 40 mL vials

Notes:
1. Calendar days

Additional sampling objectives may be required based on actual encountered site conditions. Additional sampling objectives may include MEC impact to soil determination to determine if recovered MEC has caused an adverse impact to the surrounding soil and pre- and post-MEC detonation site impact determination from the detonation site(s) (before and after MEC detonations) to ensure soil impacted by MEC detonations has been sufficiently removed.

Any required additional sampling objectives will be outline in Work Plan Addendum Revision format and submitted for review and approval.

7.3 Waste Characterization Sampling

In the event that wastes are generated by MEC disposal or decontamination activities, the wastes will be sampled in the following manner and analyzed in accordance with Table 7-2. One sample will be collected per like waste stream (same matrix, contamination, and source) to perform characterization of the waste.

7.3.1 Solid Waste Sampling

It is estimated that one sample will be needed to perform characterization of the solid waste. Additional samples may be necessary pending the types of waste streams generated. The sample will be collected in the following manner and analyzed in accordance with Table 7-2.

1. From five randomly selected sample locations, use an auger, split spoon, or other similar device to collect several spoonfuls of the soil into a stainless steel bowl.
2. Homogenize the five samples by the quartering techniques using the stainless steel spoon.
3. Fill the appropriate sample jars completely full with the homogenized sample.
4. Close the jar, label, and package the sample for shipment to the laboratory.

7.3.2 Liquid Waste Sampling

It is estimated that one sample will be needed to perform characterization of the liquid waste. Additional samples may be necessary pending the types of waste streams generated. The sample will be collected in the following manner and analyzed in accordance with Table 7-2.

1. Using a bailer or dip jar, collect a water sample from its containment.
2. The sample containers for volatile analyses will be filled first. The 40-ml vials will be filled so that there is no headspace in each vial.
3. The sample containers for the remaining analyses will then be filled.
4. Label and package the samples for shipment to the laboratory.

A CH2M HILL Level B data package will be required. All analytical data will be submitted by both hard copy and electronic files.

7.4 Backfill Certification

In the event backfill materials are necessary and in order to certify the backfill source materials as uncontaminated or equal to site conditions, one sample for backfill certification will be collected from each site and source used to provide backfill materials. Backfill material must meet FDEP Soil Cleanup Target Levels (SCTLs) for Direct Exposure – Residential or Leachability based on Groundwater Criteria, whichever is lower, as specified in FAC Chapter 62-777.

The samples will be collected in the following manner and analyzed in accordance with Table 7-2.

Procedure for Collecting Volatile Fractions

1. Using an auger, split spoon, or other device, retrieve a core from the stockpile or borrow source area to be tested.
2. Remove the core from the auger, split spoon, or other device.
3. Using a TerraCore sampler, take an approximate 5-gram sample from the core.
4. Place the 5-gram sample into a pre-preserved volatile organic analyzer (VOA) vial and seal the cap tightly. Do this for all vials provided by the laboratory (Note: ideally the entire operation; filling the TerraCore sampler, pushing it into the vial, and capping the vial; should not take more than one minute).
5. After filling the required VOA vials, fill a 4-ounce jar completely full with the remaining core sample. This will be used by the laboratory to determine percent moisture.
6. Label the vials.
7. Place in cooler for shipment to the laboratory.

Procedure for Collecting Non-Volatile Samples

1. From five randomly selected sample locations, collect several spoonfuls of the soil into a stainless steel bowl.
2. Homogenize the five grab samples by the quartering techniques using the stainless steel spoon.
3. Fill the appropriate sample jars full with the homogenized sample.
4. Close the jar, label, and package the sample for shipment to the laboratory.

A CH2M HILL Level C data package will be required along with appropriate QC samples for required analyses. All analytical data will be submitted by both hard copy and electronic files.

7.5 Equipment Decontamination

Sampling methods and equipment have been selected to minimize decontamination requirements and the possibility of cross-contamination. The following procedures will be

used for all sampling equipment used to collect routine samples undergoing trace organic or inorganic analyses.

Reusable sampling equipment will be decontaminated before the initial sample is collected and between sampling locations using the following procedure:

- Clean with potable water and Alconox® or equivalent laboratory grade detergent using a brush, if necessary, to remove particulate matter and surface films.
- Rinse thoroughly with potable water.
- Rinse thoroughly with analyte-free water.
- Rinse thoroughly with isopropanol (pesticide-grade). Do not rinse PVC or plastic items with isopropanol.
- Rinse thoroughly with organic/analyte-free water.
- Allow equipment to air dry completely.

7.6 Sample Documentation

Sampling documentation will include the following:

- Numbered Chain-of-Custody Reports
- Sample Log Book which includes the following information:
  - Name of laboratories and contacts to which the samples were sent, turnaround time (TAT) requested, and data results, when possible
  - Termination of a sample point or parameter and reasons
  - Unusual appearance or odor of a sample
  - Measurements, volume of flow, temperature, and weather conditions
  - Additional samples and reasons for obtaining them
  - Levels of protection used (with justification)
  - Meetings and telephone conversations held with the NAVFAC EFD SOUTH, NTR, regulatory agencies, project manager, or supervisor
  - Details of QC samples obtained
  - Sample collection equipment and containers, including their serial or lot numbers
  - Field analytical equipment, and equipment utilized to make physical measurements will be identified
  - Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment
  - Property numbers of any sampling equipment used, if available

- Sampling station identification
- Date and Time of sample collection
- Description of the sample location
- Description of the sample
- Sampler(s)' name(s) and company
- How the sample was collected
- Diagrams of processes
- Maps/sketches of sampling locations
- Weather conditions that may affect the sample (e.g., rain, extreme heat or cold, wind, etc.)

- Sample Labels
- Custody Seals (minimum of two on each shipping container)

7.7 Field Quality Control

For backfill material certification, one trip blank sample will be provided at a frequency of one per sample cooler containing volatile samples.

Field QC samples are not required for disposal characterization samples.

7.8 Analytical Methods

Samples will be collected for analytical methods summarized in Table 7-2.

Preliminary analytical results will be faxed to Bethany Garvey at the following fax number per the TAT listed in Table 7-2 from day of sample receipt. The final hardcopy data and electronic file will be delivered to Kama White within 14 days of sample receipt.

Bethany Garvey
Laboratory Coordinator
CH2M HILL
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346
770-604-9182 ext 263
EFax: 678-579-8176
Bgarvey@ch2m.com

Kama White
CH2M HILL
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346
(770) 604-9182 ext 564
Efax: (678) 604-9282
Kama.white@ch2m.com

8.0 Waste Management Plan

This Waste Management Plan addresses the characterization, onsite management, and T&D of waste generated during the MR in the vicinity of Hangar 860 at the former NAS Cecil Field, Jacksonville, Florida. It is anticipated the following wastes will be generated during these activities:

- Aqueous waste (decontamination water)
- Treatment/detonation residuals and/or soil impacted by MEC treatment/detonation
- MPPEH
- Spent or contaminated sampling equipment
- PPE
- Uncontaminated general construction debris (such as caution tapes, barricades, signs, packing materials).

Drums are the preferred method for storage of wastes generated during project activities.

8.1 Waste Characterization

Wastes generated from MEC treatment/detonation and decontamination will be characterized according to the SAP in Section 7.0 of this Work Plan Addendum. Waste characterization information will be documented on a waste profile form provided by the offsite treatment or disposal facility as part of the waste acceptance process.

All MPPEH will be inspected, demilitarized if necessary, certified and verified as free of explosive hazards and suitable for recycling. Handling and disposal procedures for MPPEH are provided in Appendix G.

Typically, uncontaminated wastes such as general construction debris will be characterized using process knowledge and generally will be classified as municipal solid waste.

8.2 Waste Profile

Waste characterization information will be documented on a waste profile form provided by the offsite treatment or disposal facility as part of the waste acceptance process. CH2M HILL will provide analytical data from waste characterization sampling to the designated offsite facilities for review. The profile will be reviewed and approved by the CH2M HILL Waste Coordinator prior to submission to the Navy for generator signature. Where generator certification and/or signature are required, Navy personnel shall provide. The signed profile will then be submitted to the disposal facility for review and approval.

The profile typically requires the following information including but not limited to:

- Generator (Navy) information including name, address, contact, and phone number
- Site name including street/mailing address
- Process generating waste (for example, MEC disposal)

- Source of contamination (for example, MEC detonation)
- Historical use for area
- Waste composition (for example, 95 percent soil, 5 percent debris)
- Physical state of waste (solid, liquid, etc.)
- Applicable hazardous waste codes

A facility-approved copy of the waste profile will be received prior to scheduling of offsite transportation of the waste.

8.3 Waste Management

8.3.1 Waste Storage Time Limit

Hazardous wastes will be removed from the site within 90 days from the date of generation. Waste, debris, and wastewater that are characterized as non-hazardous will be removed from the site as soon as possible.

8.3.2 Labels

The labeling of waste containers will be in accordance with 49 CFR 172, 173, and 178. All containers/drums, tanks, and roll-off boxes will have clearly visible labels. Labels will include the type of waste, the location from which the waste was generated, and accumulation start date.

If analytical results indicate that the container contents are hazardous, the tank (or other container if the contents are transferred) will be labeled with a pre-printed "**Hazardous Waste**" label, which includes:

- Accumulation start date
- Generator Name: U.S. Navy
- EPA ID number for site
- Waste codes

For containers of less than 110 gallons, the manifest number must be on the label before transporting.

If analytical results indicate that the container contents are non-hazardous, the tank (or other container if the contents are transferred) will have pre-printed "**Non-Hazardous Waste**" labels that include the following information:

- Accumulation start date
- Generator Name: U.S. Navy
- Site EPA ID Number
- Waste-specific information (for example, impacted soil from MEC detonation)

Until the container contents have been characterized and classified, the pre-printed "**Analysis Pending**" label or "**Waste Material**" (or an equivalent label) will be used. This waste label will contain the equivalent information provided on a Hazardous Waste label, including:

- Accumulation start date
- Generator Name: U.S. Navy
- Site EPA ID Number
- Waste-specific information (e.g., impacted soil from MEC detonation)

8.3.3 Waste Management Area Requirements

Hazardous wastes will be segregated from non-hazardous wastes. Additionally, incompatible wastes (for example, reactive and corrosive wastes) will be segregated. Wastes of the same matrix, contamination, and the same source may be aggregated to facilitate storage and disposal.

Wastes will be accumulated in an area identified and approved by the Navy. If an accumulation area is not designated, CH2M HILL will accumulate hazardous wastes in an area that is not accessible to the general public, and that can be secured.

Waste accumulation areas will contain appropriate emergency response equipment. The HSP identifies the specific emergency response procedures and equipment. Hazardous waste accumulation areas will include fire extinguishers (in areas where wastes are known or suspected to be flammable or ignitable), decontamination equipment, and an alarm system (if radio equipment is not available to all staff working in accumulation area). **Spill control equipment (e.g., sorbent pads) will be available in the waste accumulation areas, and where liquids are transferred from one vessel to another**.

All containers, drums, and tanks will be inspected upon arrival at the site for disrepair and any residual contamination or contents. If container contains waste upon arrival or is in disrepair, it will be immediately rejected and documented.

All wastes will be contained in a manner that prevents the spread of contamination. Unless the Navy has designated a specific waste storage area, wastes will be accumulated (and stored) near the project site. These waste storage areas are under CH2M HILL control.

Security/Contingency Planning

A barrier, such as barricade tape or temporary fencing, will be provided for hazardous waste accumulation areas, and for other waste storage areas that are accessible to the general public. All hazardous waste storage areas will also have signs to identify the areas and provide 24-hour emergency contacts and telephone numbers.

Drums (or other small containers)

The following guidelines relate to drums and small containers:

- Drums and small containers will be transported to the temporary accumulation areas on wood pallets and will be secured together with non-metallic banding.
- Drums will be inspected and inventoried upon arrival onsite for signs of contamination and/or deterioration.
- Adequate aisle space (for example, 30 inches) will be provided for containers such as 55-gallon drums to allow the unobstructed movement of personnel and equipment. A row of drums should be no more than two drums wide.

- Each drum will be provided with its own label, and labels will be visible.
- Drums will remain covered except when removing or adding waste to the drum. Covers will be properly secured at the end of each workday.
- Drums will be disposed of with the contents. If the contents are removed from the drums for offsite transportation and treatment or disposal, the drums will be decontaminated prior to re-use or before leaving the site.
- Drums containing liquids or hazardous waste will be provided with secondary containment.

Portable Tanks

The following procedures will be followed when using portable tanks:

- Tanks will be inspected upon arrival onsite for signs of deterioration and contamination. Any tank arriving onsite with contents or in poor condition will be rejected.
- Tanks will be provided with covers and secondary containment.
- Only non-stationary tanks (such as a cargo tank or other wheeled tank) will be used to accumulate hazardous waste.
- Each tank will be labeled as discussed above.

Roll-off Boxes

The following procedures will be followed when using roll-off boxes:

- Roll-off boxes shall be inspected upon arrival onsite. Any roll-off container arriving with contents or in poor condition will be rejected.
- Roll-off boxes for hazardous or "excessively contaminated" soil will be provided with covers and disposable liners. Liners will be disposed of as contaminated debris along with the soil.
- When not in use, securely fastened covers will be installed on all roll-off boxes.
- Old labels will be removed and a new, appropriate label applies as discussed above.
- Roll-off containers will be inspected by the transporter after removal of the liner and decontaminated in the event of evidence of liner failure.

Soil Stockpiles

The following procedures will be followed when using soil stockpiles:

- Stockpiles of contaminated soil will be located near the excavation areas and within an area of existing contamination.
- Stockpiles will be provided with liner, cover, and perimeter berm to prevent release or infiltration of liquids.
  - Minimum 10- and 6-mil polyethylene sheeting will be used for liners and covers, respectively.

  - The perimeter berm will be constructed of clean materials (e.g., hay bales under the liner) and allow for collection of any free liquids draining from the stockpile.
  - Accumulated free liquids will be pumped-out to a container or tank.
- Covers and perimeter berms will be secured in-place when not in use and at the end of each workday, or as necessary to prevent wind dispersion or run-off from major precipitation events.
- Construction materials for the stockpiles that contact contaminated soil will be disposed of as contaminated debris.
- Accumulation start dates will be recorded on a log or a sign located at the stockpile.

Storage Piles

Where appropriate, construction debris and waste, or intact equipment may be accumulated in storage piles. All storage piles will be managed in such a manner as to maintain good housekeeping, and to prevent the spread of contamination.

- For contaminated materials, the storage piles will be provided with secondary containment as indicated for soil stockpiles. Damaged or leaking electrical or hydraulic equipment may not be stored in storage piles.
- For uncontaminated or decontaminated debris and waste, or intact equipment, the storage piles should be placed on a liner. These piles will be covered as necessary to prevent stormwater run-on and run-off.

Inspection of Waste Storage Areas

Waste accumulation areas will be inspected for malfunctions, deterioration, discharges, and leaks that could result in a release. The following inspection schedule will be followed:

- At least weekly inspection of containers, tanks and roll-off containers (for leaks, signs of corrosion, or signs of general deterioration).
- At least weekly inspection of stockpiles (for liner and berm integrity).

If operations will suspended for more than 7 days, contact the regulatory compliance manager and alternate inspection arrangements will be made. Prior to demobilization, all hazardous wastes will be removed from the site.

Inspections will be recorded in the daily QCR and include any deficiencies and how issue was rectified. Copies of the report will be maintained onsite, and available for review.

Any deficiencies observed or noted during inspection will be rectified immediately. Appropriate measures may include transfer of waste from leaking container to new container, replacement of liner or cover, or repair of containment berm.

8.4 Shipping Documentation

Prior to offsite disposal of any waste, CH2M HILL will provide the Navy with a waste approval package for each waste stream. This package will include a waste profile naming

the U.S. Navy as the generator of the waste, analytical summary table(s) applicable to the waste, letter of approval from the proposed waste disposal facility to accept the waste, Land Disposal Restriction (LDR) notification for any hazardous wastes, a completed waste manifest, and any other applicable information necessary for the Navy to complete its review of the disposal package and signature as the generator.

The signed profile will then be submitted to the disposal facility for acceptance approval. Once the approval letter is received from the disposal facility, transportation can be scheduled.

Each load of waste material will be manifested prior to leaving the site. At a minimum, the manifest form will include the following information:

- Generator information including name, address, contact, and phone number, EPA ID number
- Transporter information including name, address, contact and phone number, EPA ID number (if available/applicable)
- Facility information including name, address, phone number, EPA ID number
- Site name including street address at a minimum, mailing address if available
- For all Hazardous Materials (including hazardous wastes) as defined at 49 CFR 171.8, the DOT Proper Shipping Name (for example, Hazardous Waste Solid, n.o.s., 9, UN 3077, PG III (D008))
- Type and number of container(s)
- Quantity of waste (volumetric estimate)
- CTO or job number
- Profile number
- 24-hour Emergency phone number

Additional documentation required for each shipment of waste includes the following:

- Haul (weight) ticket
- LDR Notification/Certification (required for **hazardous wastes)**. This form also requires the generator signature and submission to the disposal facility.
- Finally, a copy of the relevant portion of the DOT Emergency Response Guide (ERG) that applies to the hazardous material/waste being shipped should be included, if possible.

The generator (Navy) and the transporter must sign the manifest (and LDR, if applicable) prior to the load of waste leaving the site. A copy of the manifest will be retained onsite and included with the daily Quality Control Report (QCR). The original signed manifest will be returned to the address of the generator. The facility will provide a copy of this signed manifest to CH2M HILL for the final report. The final report will include copies of the

facility signed manifest, haul ticket, LDR (if applicable), and the Certificate of Disposal/Destruction/Recycle.

If the signed hazardous waste manifest from the designated offsite facility is not received within 35 days, CH2M HILL will contact the transporter or the designated facility to determine the status of the waste. If the signed hazardous waste manifest has not been received within 45 days, CH2M HILL, in coordination with the Navy, will issue an "Exception Report" to the state of Florida, as required under 40 CFR 262.42.

8.5 Transportation

Trucks and containers used to transport contaminated waste offsite will be inspected *prior* to loading for signs of deterioration and contamination. Any truck or container with contents/residues or in poor condition will be rejected.

Each transportation vehicle and load of waste will be inspected before leaving the site and documented. The quantities of waste leaving the site will be recorded, and at a minimum, documented on the T&D Log. A contractor licensed for commercial transportation will transport non-hazardous wastes. In the event that wastes are hazardous, the transporter must have a EPA Identification number, and will comply with transportation requirements outlined in 49 CFR 171-179 (Department of Transportation) and 40 CFR 263.11 and 263.31 (Hazardous Waste Transportation). A copy of the documentation indicating that the selected transporter has the appropriate licenses will be received and approved by CH2M HILL prior to transport of any waste.

8.5.1 Transporter Responsibilities

The transporter will be responsible for weighing loads at a certified scale. For each load of material, weight measurements will be obtained for each full and empty container, dump truck, or tanker truck. For shipment of bulk solids, disposal quantities will be based on the difference of weight measurements (tare vs. gross) between the full and empty container, dump truck, or tanker truck. For liquids, disposal quantities will be based on gallons. For containerized (drummed) wastes, quantities may be based on gallons for liquids and/or drum weights. Weights and/or volumes will be recorded on the waste manifest. The transporter will provide copies of weight tickets to CH2M HILL.

The transporter will observe the following practices when hauling and transporting wastes offsite:

- Minimize impacts to general public traffic.
- Repair road damage caused by construction and/or hauling traffic.
- Clean up waste spilled in transit.
- Line and cover trucks/trailers used for hauling contaminated waste to prevent releases and contamination.
- Decontaminate vehicles prior to re-use, other than hauling contaminated waste.
- Seal trucks transporting liquids.

All personnel involved in offsite disposal activities will follow safety and spill response procedures outlined in the HSP.

No materials from other projects will be combined with materials from former NAS Cecil Field.

8.5.2 Transportation and Disposal Log

The T&D Log is used to track waste from generation to final disposition. Wastes will be logged into the T&D Log the day waste is generated and placed into containers. Transportation of wastes will be inventoried the day of transportation from the site using the T&D Log. Final disposal will be documented on the T&D Log using the Certificate of Disposal. The blank T&D Log is attached in Appendix H.

8.6 Waste Disposal

Offsite treatment or disposal facilities will use the waste profile and supporting documentation (e.g., analytical results) to determine if they will accept a waste. The treatment or disposal facility will be responsible for providing a copy of the final waste manifest and for a certificate of treatment or disposal for each load of waste received. Wastes will be disposed as follows:

- Hazardous wastes (including environmental media) will be sent to a permitted, Resource Conservation and Recovery Act (RCRA) Subtitle C treatment, storage, or disposal facility.
- Non-hazardous wastes will be disposed in a facility permitted to accept the types and quantities of contamination (for example, Subtitle D landfills).
- Uncontaminated, or decontaminated, construction and demolition debris may be sent to municipal landfills, or landfills designated for construction/demolition debris.

8.7 Records/Reporting

The following records and documents will be maintained:

- Transportation and offsite disposal records, including:
  - Profiles and associated characterization data
  - Manifests, LDR notifications/certifications, weight tickets, and other shipping records
  - Offsite facility waste receipts, certificates of disposal/destruction
- Inspection records

9.0 Environmental Protection Plan

The Environmental Protection Plan provided in the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) provides general information on the appropriate requirements to be adhered to during the performance of the work at the former NAS Cecil Field. The following information is supplemental and specific to the MR.

9.1 Regulatory Drivers

- CERCLA
- RCRA
- FAC Chapter 62-730, Hazardous Waste

9.2 Spill Prevention and Control

The provisions for spill prevention and control establishes minimum site requirements. All spills will be reported by CH2M HILL. Refer to the HSP for emergency response procedures and further reporting requirements.

9.3 Spill Prevention

All fuel, chemical, and waste storage areas will be properly protected from on- and offsite vehicle traffic. All tanks (including fuel storage and waste storage) must be equipped with secondary containment. These tanks must be inspected daily for signs of leaks. Accumulated water must be inspected for signs of contamination (for example, product sheen, discoloration, and odor) before being discarded. Fire protection provisions outlined in the HSP must be adhered to.

Chemical products must be properly stored, transferred, and used. Should chemical product use occur outside areas equipped with spill control materials, adequate spill control materials must be maintained at the local work area.

9.4 Spill Containment and Control

Spill control materials will be maintained in the support zone, at fuel storage and dispensing locations, and at waste storage areas. Incidental spills will be contained with sorbent and disposed of properly. Spilled materials must be immediately contained and controlled. Spill response procedures include:

- Immediately warn any nearby workers and notify supervisor.
- Assess the spill area to ensure that it is safe to respond.
- Evacuate area if spill presents an emergency.
- Ensure any nearby ignition sources are immediately eliminated.
- Stop source of spill.
- Establish site control for spill area.

- Use proper personal protective equipment in responding to spills.
- Contain and control spilled material through use of sorbent booms, pads, or other material.

9.5 Spill Cleanup and Removal

All spilled material, contaminated sorbent, and contaminated media will be cleaned up and removed as soon as possible. Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated spill material will be managed as waste (see Waste Management Plan) and disposed of according to applicable, federal, state, and local requirements.

9.6 Additional Environmental Considerations

Additional environmental considerations are outlined in Section 9 of the ESS provided in Appendix C.

10.0 References

CH2M HILL Constructors, Inc. 1998. *Basewide Work Plan, Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 01*. November.

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

DoD. October 21, 1991. DoD 4160.21-M-1. *Defense Demilitarization Manual*.

DoD. August 1997. DoD 4165.26-M. *DOD Contractors Safety Manual for Ammunition and Explosives*.

DoD. January 5, 2004. DoD 6055.9-STD. Ammunition and Explosives Safety Standards, Rewrite Version, Revision 4.

DDESB. December 1, 2003. Technical Paper 16, Revision 1, *Methodologies for Calculating Primary Fragment Distances*.

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

NAVSEA. June 1, 2004. Ordnance Publication 5 Volume 1, *Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Seventh Revision, Change 3*.

NAVSEA, 2001, SWO20-AF-ABK-010, *Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials*

NAVSEA. Revised May 1994. Publication SW060-AA-MMA-010, Volumes I and II. *Technical Manual Explosive Ordnance Disposal Procedures*, Naval Explosive Ordnance Disposal Technology Center.

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

NOSSA. 2004 (2004a). Instruction 8020.15, *Military Munitions Response Oversight Program*.

Tetra Tech NUS, Inc. August 1999. *Environmental Baseline Survey for Transfer, Jacksonville Port Authority Parcel, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC EFD SOUTH.

U.S. Army Corps of Engineers. October 2002. Data Item Description OE-005.03, "Explosives Management Plan."

U.S. Bureau of Alcohool, Tobacco, and Firearms (ATF) and U.S. Department of the Treasury. 1990. ATF P 5400.7, *ATF Explosives Laws and Regulations*.

U.S. Department of the Navy, Chief of Naval Operations. 2004. OPNAVINST 3500.39B. 2004. *Operational Risk Management (ORM)*.

U.S. Department of the Navy, Chief of Naval Operations. 2003. OPNAVINST 5530.13C. 2003. *Department of the Navy Physical Security Instruction for Sensitive Conventional Arms, Ammunitions, and Explosives (AA&E)*.

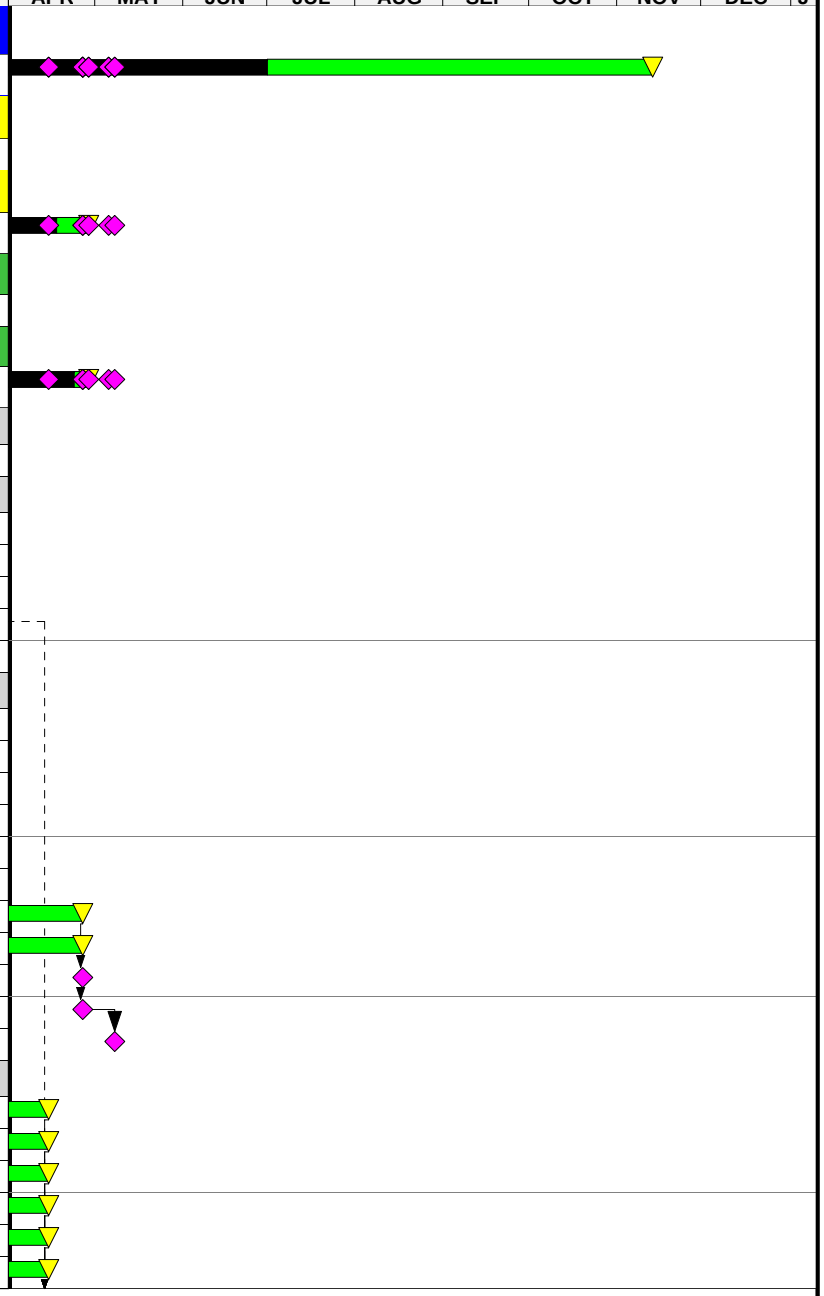
U.S. Department of the Navy, Chief of Naval Operations. 1999. OPNAVINST 8020.14. 1999. *Department of the Navy Explosives Safety Policy*.

.

Appendix A

Project Schedule

Activity ID	WBS	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
CTO #0029 - Former NAS Cecil Field							
Total		83		550	158	15SEP04A	13NOV06
+ PHASE 1							
		100		5	0	15SEP04A	21SEP04A
PHASE 2							
Subtotal		98		417	25	15SEP04A	05MAY06
+ PHASE 2, TASK 1							
		100		56	0	15SEP04A	05DEC04A
PHASE 2, TASK 2							
Subtotal		98		181	25	19AUG05A	05MAY06
PROJECT MANAGEMENT							
A221001039	21.01.03.99	100	Project Management (Phase 2)	5,921*	0*		29SEP05A
COST PROPOSAL PREPARATION							
A221010326	21.01.03.26	100	Develop Cost Estimate/Schedule	25	0	19AUG05A	15SEP05A
A220187		100	Negotiate CTO with Client	2	0	16SEP05A	16SEP05A
A220199		100	Submit Final/Negotiated Estimate/Schedule	5	0	19SEP05A	21SEP05A
A221010327		100	Submit Cost Proposal to Client	0	0		21SEP05A
A22000001		100	Phase 3 Award	0	0		29SEP05A
BID PACKAGE PREP/AWARD							
A221010391	21.01.03.91	100	Prepare Bid Packages	10	0	28OCT05A	09JAN06A
A221010393	21.01.03.93	100	Subcontractor Pre-Bid Meeting/Site Visit	1	0	12JAN06A	17JAN06A
A220150		100	Issue RFB to Subcontractors	0	0		12JAN06A
A220165		100	Subcontractor Bids Due	0	0		27JAN06A
A221010392	21.01.03.92	100	Evaluate Bid Packages	10	0	30JAN06A	24FEB06A
A220188		100	Issue Letter of Intent to Award	0	0		24FEB06A
A220181		0	Submit Subcontractor Plans & Submittals	18	18	08MAR06A	26APR06
A220189		0	Review Subcontractor Plans & Submittals	18	18	08MAR06A	26APR06
A220180		0	Subcontractor Plans Due	0	0		26APR06
A220210		0	Award Subcontracts	0	0		26APR06
A220211		0	Project Mobilization	0	0	08MAY06	
WORK PLANS PREPARATION							
A221010301	21.01.03.01	50	Sampling and Analysis Plan	20	10	28NOV05A	14APR06
A221010304	21.01.03.04	50	Environmental Protection Plan	20	10	28NOV05A	14APR06
A221010306	21.01.03.06	50	Pollution Control Plan	20	10	28NOV05A	14APR06
A221010308	21.01.03.08	50	Site - Specific H&S Plan	20	10	28NOV05A	14APR06
A221010313	21.01.03.13	50	General Site Work Plan	20	10	28NOV05A	14APR06
A221010314	21.01.03.14	50	Quality Control Plan	20	10	28NOV05A	14APR06



Start Date 14SEP04
Finish Date 13NOV06
Data Date 01APR06
Run Date 05APR06 09:26

Early Bar
Progress Bar
Critical Activity

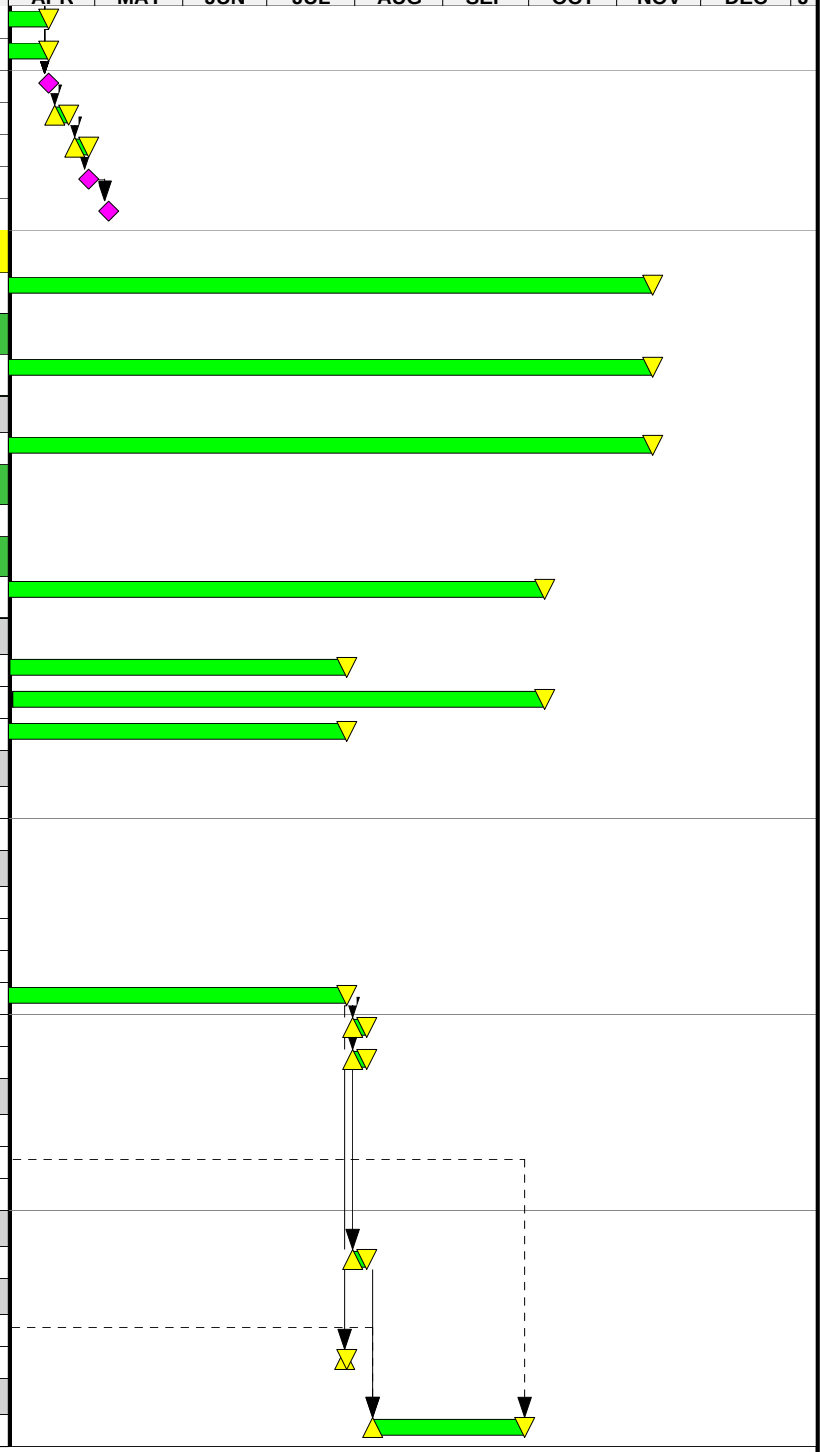
© Primavera Systems, Inc.

RAC4 - CO29

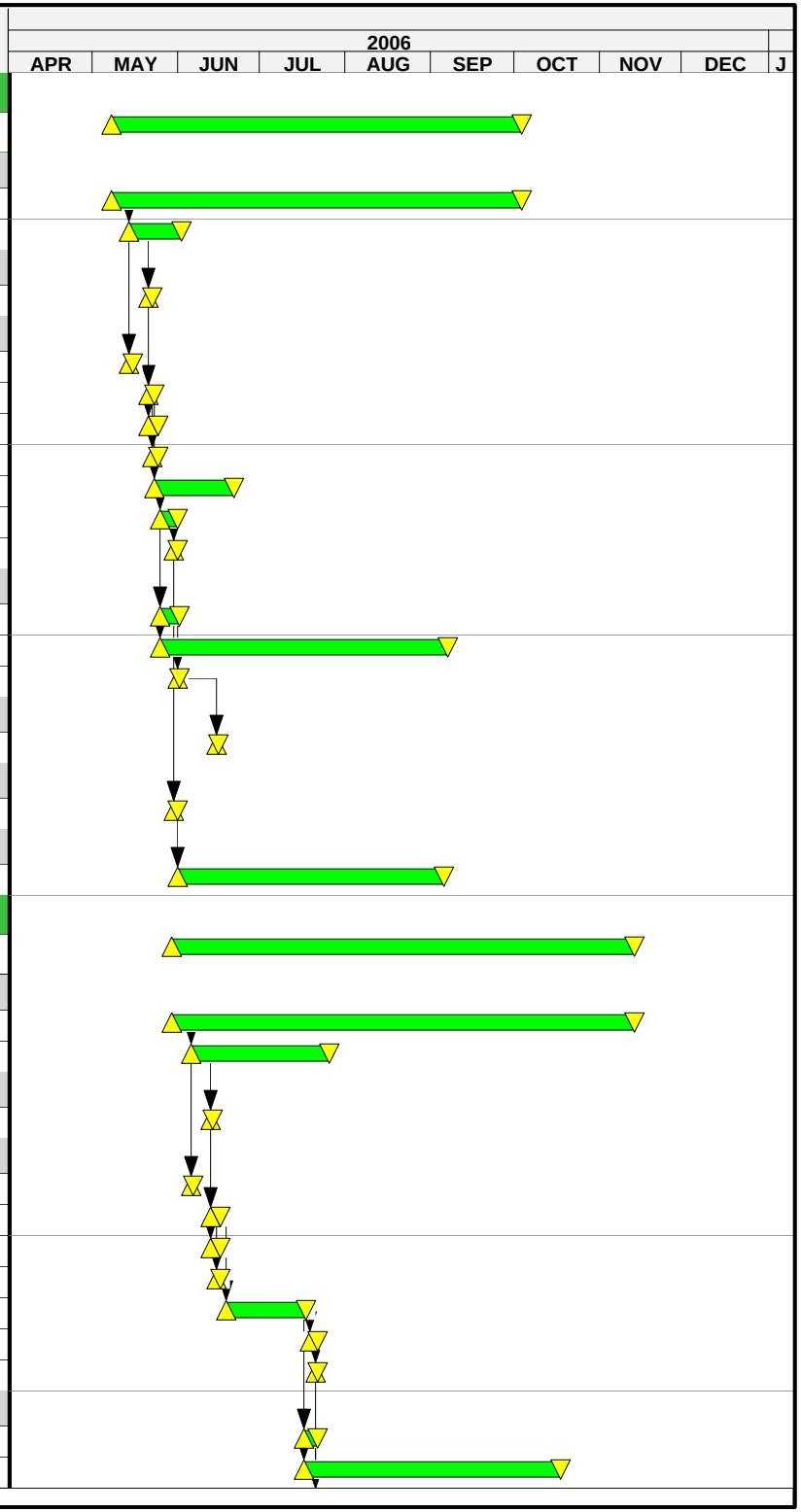
CTO #0029 - Former NAS Cecil Field
CTO COMPLETION SCHEDULE
NAVY RAC SOUTHERN DIVISION

CH2MHILL

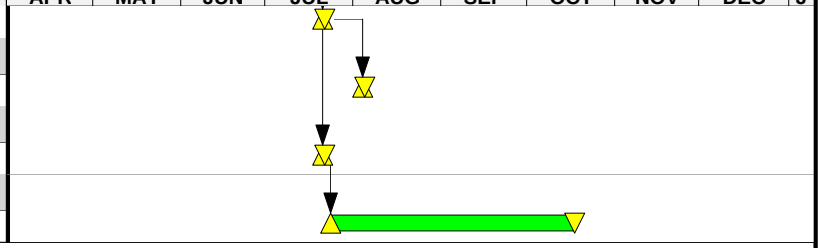
Activity ID	WBS	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
A221010315	21.01.03.15	50	Transportation & Disposal Plan	20	10	28NOV05A	14APR06
A221010390	21.01.03.90	50	Hazardous Waste Mgmt Plan	20	10	28NOV05A	14APR06
A220290		0	Submit Draft Work Plans	0	0		14APR06
A220185		0	Southern Division WP Comment Period	5	5	17APR06	21APR06
A220190		0	Incorporate WP Comments	5	5	24APR06	28APR06
A220191		0	Submit Final WP to Southern Division	0	0		28APR06
A22095		0	Work Plan Approval Received	0	0		05MAY06
PHASE 3							
Subtotal		2		550	158	15SEP04A	13NOV06
PROJECT MANAGEMENT							
Subtotal	PM.AL.01.01	52		179	158	15SEP04A	13NOV06
PROJECT MANAGEMENT							
A2PMAL0101	PM.AL.01.01	52	PMO	179	158	15SEP04A	13NOV06
+ ON CALL SUPPORT - DISCARDED MILITARY MUNITIONS							
		100		63	0	06DEC04A	04MAR05A
MUNITIONS RESPONSE SITE EXPANSION							
Subtotal		1		410	132	28FEB05A	06OCT06
PROJECT MANAGEMENT							
A299220103	99.22.01.03	77	CCI On-Site Field Management	75	83	28FEB05A	28JUL06
A299220104	99.22.01.04	68	CCI Off-Site Project Management	108	132	28FEB05A	06OCT06
A29922AG01	99.22.AG.01	76	Agviq Tech Support	65	83	14MAR05A	28JUL06
MOBILIZATION & PREPARATORY WORK							
A232010292	32.01.02.92	100	Subcontractor Mobilization	6	0	28FEB05A	07MAR05A
A232010293	32.01.02.92	100	On-Site Construction Support Mobilization	1	0	06APR05A	06APR05A
ORDNANCE REMOVAL AND DESTRUCTION							
A232040102	32.04.01.02	100	Vegetation Removal With OE	3	0	03MAR05A	07MAR05A
A232040107	32.04.01.07	100	Surface Sweep (MAG & DIG)	10	0	03MAR05A	16MAR05A
A232040112	32.04.01.12	100	OE On-Site Destruction - Surface Sweep	3	0	16MAR05A	18MAR05A
A232040190	32.04.01.90	75	OE On-Site Construction Support	57	83	06APR05A	28JUL06
A232040113	32.04.01.12	0	OE On-Site Destruction - On-Site Constr.	5	5	31JUL06	04AUG06
A232040191	32.04.01.91	0	MPPEH/MEC Related Scrap Disposal	5	5	31JUL06	04AUG06
SAMPLING & ANALYSIS							
A232020907	32.02.09.07	100	MEC Soil Lab Analyses	24	0	01MAR05A	01APR05A
A232021492	32.02.14.92	100	Data Management & Evaluation	24	0	01MAR05A	14APR05A
A232020905	32.02.09.05	100	Waste Disposal Characterization	10	0	21MAR05A	14APR05A
TRANSPORTATION AND DISPOSAL							
A232192101	32.19.21.01	0	T&D Soil	5	5	31JUL06	04AUG06
DEMOBILIZATION							
A232210592	32.21.05.92	100	Surface Sweep Subcontractor	1	0	18MAR05A	18MAR05A
A232210593	32.21.05.92	0	On-Site Construction Support Sub	1	1	28JUL06	28JUL06
REPORTING							
A232210605	32.21.06.05	0	Post Con Submital - After Action Report	39	39	07AUG06	29SEP06



Activity ID	WBS	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
BUILDING 365 - MUNITIONS RESPONSE SITE EXPANSION							
Subtotal		0		104	104	08MAY06	03OCT06
PROJECT MANAGEMENT							
A299220106	99.22.01.06	0	Off-Site Project Management	104	104	08MAY06*	03OCT06
A299220105	99.22.01.05	0	On-Site Field Management	14	14	15MAY06	02JUN06
MOBILIZATION & PREPARATORY WORK							
A233010292	33.01.02.92	0	UXO Sub Mobilization	1	1	22MAY06	22MAY06
MUNITIONS RESPONSE OPERATION							
A233040191	33.04.01.91	0	Mosquito Control	1	1	15MAY06	15MAY06
A233040102	33.04.01.02	0	Vegetation Removal w/ MEC Suppport	2	2	22MAY06	23MAY06
A233040114	33.04.01.14	0	Temporary MEC Storage	3	3	22MAY06	24MAY06
A233040190	33.04.01.90	0	Grid Emplacement by Surveyor	2	2	23MAY06	24MAY06
A233040107	33.04.01.07	0	Munitions Response by Mag & Dig	20	20	24MAY06	21JUN06
A233040112	33.04.01.12	0	MEC On-Site Destruction and Disposal	3	3	26MAY06	31MAY06
A233040192	33.04.01.92	0	Residue Inspection, Certification & Disposal	1	1	31MAY06	31MAY06
MONITORING, SAMPLING, TEST & ANALYSIS							
A233020907	33.02.09.07	0	Soil Sampling	4	4	26MAY06	01JUN06
A233021492	33.02.14.92	0	Data Evaluation & Management	71	71	26MAY06	06SEP06
A233020905	33.02.09.05	0	Waste Characterization	1	1	01JUN06	01JUN06
TRANSPORTATION AND DISPOSAL							
A233192101	33.19.21.01	0	T&D Post-Detonation Soils	1	1	15JUN06	15JUN06
DEMOBILIZATION							
A233210592	33.21.05.92	0	Subcontractor Demobilization	1	1	31MAY06	31MAY06
REPORTING							
A233210605	33.21.06.05	0	After Action Report	67	67	01JUN06	05SEP06
HANGAR 860 - MUNITIONS RESPONSE SITE EXPANSION							
Subtotal		0		118	118	30MAY06	13NOV06
PROJECT MANAGEMENT							
A299220108	99.22.01.08	0	Off-Site Project Management	118	118	30MAY06*	13NOV06
A299220107	99.22.01.07	0	On-Site Field Management	35	35	06JUN06	25JUL06
MOBILIZATION & PREPARATORY WORK							
A234010292	34.01.02.92	0	UXO Sub Mobilization	1	1	13JUN06	13JUN06
MUNITIONS RESPONSE OPERATION							
A234040191	34.04.01.91	0	Mosquito Control	1	1	06JUN06	06JUN06
A234040102	34.04.01.02	0	Vegetation Removal w/ MEC Suppport	4	4	13JUN06	16JUN06
A234040114	34.04.01.14	0	Temporary MEC Storage	4	4	13JUN06	16JUN06
A234040190	34.04.01.90	0	Grid Emplacement by Surveyor	2	2	15JUN06	16JUN06
A234040107	34.04.01.07	0	Munitions Response by Mag & Dig	20	20	19JUN06	17JUL06
A234040112	34.04.01.12	0	MEC On-Site Destruction and Disposal	3	3	19JUL06	21JUL06
A234040192	34.04.01.92	0	Residue Inspection, Certification & Disposal	1	1	21JUL06	21JUL06
MONITORING, SAMPLING, TEST & ANALYSIS							
A234020907	34.02.09.07	0	Soil Sampling	5	5	17JUL06	21JUL06
A234021492	34.02.14.92	0	Data Evaluation & Management	66	66	17JUL06	17OCT06



Activity ID	WBS	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
A234020905	34.02.09.05	0	Waste Characterization	1	1	21JUL06	21JUL06
TRANSPORTATION AND DISPOSAL							
A234192101	34.19.21.01	0	T&D Post-Detonation Soils	1	1	04AUG06	04AUG06
DEMOBILIZATION							
A234210592	34.21.05.92	0	Subcontractor Demobilization	1	1	21JUL06	21JUL06
REPORTING							
A234210605	34.21.06.05	0	After Action Report	61	61	24JUL06	17OCT06



Appendix B

Site Specific Health and Safety Plan

Site Safety and Health Plan

Munitions Response for Discarded Military Munitions at Hangar 860

Former Naval Air Station Cecil Field Jacksonville, Florida

Revision No. 00

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

Submitted to:

U.S. Naval Facilities
Engineering Command
Engineering Field Division South

Prepared by:

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, N.E.
Suite 700
Atlanta, GA 30346

April 2006

Contents

1.0 Introduction 1-1
1.1 Site History and Project Description 1-1
1.2 Project Objectives 1-1
2.0 Staff Organization, Qualifications, and Responsibilities 2-1
2.1 Project Manager 2-1
2.2 Senior UXO Supervisor (SUXOS) 2-1
2.3 UXO Technician II 2-1
2.4 Project Field Personnel Responsibilities 2-2
2.4.1 General Responsibilities 2-2
2.4.2 SUXOS Responsibilities 2-2
2.5 Contacts 2-3
2.6 Subcontractor Responsibilities 2-3
3.0 Hazard Analysis and Risk Assessment 3-1
3.1 MEC 3-1
3.2 Other Physical Hazards 3-1
3.2.1 Slips, Trips, and Falls 3-2
3.2.2 Noise 3-2
3.2.3 Working Around Heavy Equipment 3-2
3.2.4 Traffic Control and Safety 3-2
3.2.5 Sunburn 3-3
3.2.6 Heat Stress 3-3
3.2.7 Sanitation 3-3
3.3 Biological Hazards and Controls 3-3
3.3.1 Insect Bites 3-3
3.3.2 Spiders and Other Insects 3-4
3.3.3 Snakes 3-5
3.3.4 Lyme Disease Prevention 3-5
3.3.5 Poisonous Plants 3-6
4.0 Training Requirements 4-1
4.1 OSHA Training for General Site Workers 4-1
4.2 OSHA HAZWOPER Manager and Supervisor Training 4-1
4.3 MEC Training 4-1
4.4 UXO Personnel Training 4-2
4.5 MEC Awareness Training 4-2
4.6 Daily Site Operations Briefing 4-2
4.7 Periodic Site Training 4-2
4.8 Visitors 4-3
4.9 Training Documentation 4-3
5.0 Personal Protective Equipment 5-1
6.0 Medical Surveillance Requirements 6-1
6.1 Emergencies and Non-Emergency Medical Treatment 6-1
6.2 Record Keeping 6-2

7.0 Site Control Measures 7-1
7.1 General Site Control Information 7-1
7.2 Communications 7-1
7.3 Work Practices 7-1
8.0 Emergency Response and Contingency Procedures 8-1
General Information 8-1
8.2 Hospital Route 8-1
9.0 Accident Prevention 9-1
9.1 Pre-Emergency Planning 9-1
10.0 Emergency Equipment and First Aid Requirements 10-1
10.1 Emergency Equipment and Supplies 10-1
10.2 Incident Response 10-1
10.3 Emergency Medical Treatment 10-1
10.4 Evacuation 10-2
10.5 Evacuation Signals 10-2
10.6 Incident Notification and Reporting 10-2
10.7 Emergency Contacts 10-4
11.0 Logs, Reports, And Record Keeping 11-1
12.0 Behavior Based Loss Prevention 12-1
12.1 Activity Hazard Analysis 12-1
12.2 Pre-Task Safety Plans 12-3
12.3 Loss Prevention Observations 12-3
12.4 Loss/Near Loss Investigations 12-3
13.0 Approval 13-1
13.1 Original Plan 13-1
13.2 Revisions 13-1

Tables

2-1 Project Personnel Directory 2-3
4-1 UXO Personnel Training and Experience Hierarchy 4-2
10-1 Sample Supply List and Locations 10-1
10-2 Evacuation Signals 10-2
12-1 Task Hazard Analysis 12-2

Attachments

1 Employee Signoff Form
2 Hazard Communication Program Forms
3 Self-Assessment Checklists
4 Behavior Based Loss Prevention Forms

Acronyms

ACO	Administrative Contracting Officer
AFCEE	Air Force Center for Environmental Excellence
AHA	Activity Hazard Analysis
AMP	Air Monitoring Plan
ATF	Alcohol, Tobacco, and Firearms
BATF	Bureau of Alcohol, Tobacco, and Firearms
BBLPS	Behavior Based Loss Prevention System
BIP	Blow-in-Place
BRAC	Base Realignment and Closure
CAD	Cartridge Actuated Device
CAI	Cartridge Actuated Initiator
CDL	Commercial Drivers License
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH2M HILL	CH2M HILL Constructors, Inc.
CIH	Certified Industrial Hygienist
CO	Contracting Officer
CPR	Cardiopulmonary Resuscitation
CTO	Contract Task Order
DDESB	Department of Defense Explosive Safety Board
DID	Data Item Description
DMM	Discarded Military Munitions
DoD	Department of Defense
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
FAC	Florida Administrative Code
FANG	Florida Air National Guard
FDEP	Florida Department of Environmental Protection
FLARNG	Florida Army Reserve National Guard
GPS	Global Positioning System
HSP	Health and Safety Plan
JAA	Jacksonville Airport Authority
lb	pound(s)
LPO	Loss Prevention Observations
MEC	Munitions and Explosives of Concern
mm	millimeter(s)
MPPEH	Material Potentially Presenting an Explosive Hazard
MR	Munitions Response
MRQCM	Munitions Response Quality Control Manager
MRS	Munitions Response Site

MRSO	Munitions Response Safety Officer
NAS	Naval Air Station
NAVFAC EFD SOUTH	U.S. Naval Facilities Engineering Command, Southern Division
NAVSEA	Naval Sea Systems Command
NEW	net explosive weight
NIOSH	National Institute for Occupational Safety and Health
NLI	Loss and Near Loss Investigations
NOSSA	Naval Ordnance Safety and Security Activity
NPL	National Priorities List
NTR	Navy Technical Representative
NVLAP	National Voluntary Laboratory Accreditation Program
OP	Ordnance Publication
OSHA	Occupational Safety and Health Act
PM	Project Manager
PPE	personal protective equipment
PTSP	Pre-Task Safety Plans
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
QCR	Quality Control Report
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RTK	Real-Time Kinematic
SHSS	Site Health and Safety Specialist
SOPs	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
T&D	Transportation and Disposal
TAT	turnaround time
TCRA	Time Critical Removal Action
TtNUS	Tetra Tech NUS, Inc.
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer

1.0 Introduction

1.1 Site History and Project Description

The work area covered by this Site Safety and Health Plan (SSHP) was designated a munitions response site (MRS) by NOSSA after receipt of a MRS Identification and Notification Report submitted by NAVFAC EFD SOUTH on February 11, 2005.

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 class/division explosives. It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response.

FLARNG notified the Jacksonville Airport Authority (JAA) of the discovery by e-mail on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC EFD SOUTH. Based on a request from NAVFAC EFD SOUTH, 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 remainder of the CAIs were located in the bottom of the ditch, visible through standing water. EOD Mayport responded on Tuesday, February 22, 2005, at the request of NAVFAC EFD SOUTH to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified the CAIs as expended.

The future FLARNG construction project is planned to consist of converting the open stormwater ditch to underground pipe drainage; filling in the ditch with soil; expanding the aircraft taxiway; and constructing climate controlled hangars for helicopters. The construction project is currently in the preliminary design phase.

1.2 Project Objectives

The project objective is to provide munitions response as a cautionary action to ensure that the presence of the discovered DMM items was unique to the area they were found and to protect human health and safety during completion of the construction project.

2.0 Staff Organization, Qualifications, and Responsibilities

All project personnel are responsible to the Senior UXO Supervisor (SUXOS) during fieldwork and will review, and become familiar with, the content of this project-specific SSHP. Project team personnel will comply with the hazard-specific instruction provided by the SUXOS. Any deviations from the procedures identified in the SSHP must be based on field conditions encountered and documented.

2.1 Project Manager

Michael Halil, P.E. is the project manager (PM). The PM is responsible for ensuring all activities performed at Cecil Field are conducted in accordance with contractual specifications and the approved Work Plan Addendum (WPA), and will also coordinate with Navy representatives. The PM is responsible for management of all operations conducted for the project, and will ensure that all personnel assigned to the project, including subcontractors, have reviewed appropriate sections of the WPA before any task associated with the project begins. The PM will monitor the budget and schedule to ensure availability of necessary personnel, equipment, subcontractors, and services, and will also participate in the development of the field program, evaluation of data, and reporting.

2.2 Senior UXO Supervisor (SUXOS)

The SUXOS will be the most senior UXO Technician onsite and will also serve as the UXO Quality Control Specialist (UXOQCS). The SUXOS will directly control the operations of all personnel performing MEC activities. The SUXOS reports directly to the PM concerning technical MEC and operational issues but will report to the program level on all matters related to site safety and quality control. The SUXOS will implement the approved plans in the field and supervise all personnel on the project. The SUXOS has the authority to temporarily stop work to correct an unsafe condition or procedure. The SUXOS will meet the minimum requirements of Department of Defense Explosives Safety Board (DDESB) Technical Publication (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel Standards for the SUXOS, UXOSO and UXOQCS positions; NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program; and terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel.

2.3 UXO Technician II

UXO Technician II personnel will report directly to the SUXOS and are responsible for the safe and efficient performance of specific field tasks as assigned by the SUXOS. They are also responsible for complete familiarity with the WPA and for adherence to the procedures

described in the WPA. A UXO Technician II has the authority to temporarily stop work in order to bring an unsafe condition or procedure to the attention of the SUXOS. Each UXO Technician II will meet the minimum requirements of DDESB TP 18, NAVSEAINST 8020.9B, and U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel.

2.4 Project Field Personnel Responsibilities

2.4.1 General Responsibilities

All CH2M HILL project team field personnel are responsible to the SUXOS and will review, and become familiar with, the content of this SSHP. All project team personnel will comply with the hazard-specific instruction provided by the SUXOS. Any deviations from this SSHP must be based on field conditions encountered and must be well documented in the field notes.

2.4.2 SUXOS Responsibilities

The SUXOS has the specific responsibility for ensuring that all project team members, including subcontractors, comply with the SSHP. It is the SUXOS' responsibility to inform the subcontractors and other field personnel of any hazards as he/she becomes aware of them. Deviations from the SSHP must be based on field conditions encountered and thoroughly documented in the field logbook or notes. The SUXOS has the authority to monitor and correct CH2M HILL health and safety problems as noticed onsite. Additional SUXOS responsibilities include:

1. Following the SSHP.
2. Reporting to the PM any unsafe conditions or practices.
3. Reporting to the PM all facts pertaining to incidents that result in injury or exposure to toxic materials.
4. Reporting to the PM equipment malfunctions or deficiencies.
5. Providing site safety briefing for project team members.
6. Assisting the PM in documenting compliance with the SSHP.
7. Enforcing the "buddy system" as appropriate for site activities.
8. Posting location and route to the nearest medical facility, and arranging for emergency transportation to the nearest medical facility.
9. Posting the telephone numbers of local public emergency services (i.e., police and fire departments).
10. Stopping operations that threaten the health and safety of the project team or surrounding populace.
11. Observing project team members for signs of exposure, stress, or other conditions related to pre-existing physical conditions or site work activities.

2.5 Contacts

Table 2-1 contains the contact information for project personnel.

TABLE 2-1
Project Personnel Directory

Contact	Company
Scott Smith, Program Manager Joe Giandonato, Contracts Administration Manager Richard Rathnow, Health and Safety Manager Theresa Rojas, QA/QC Manager	CH2M HILL Constructors, Inc 115 Perimeter Center Place, N.E. Suite 700 Atlanta, GA 30346-1278 770/604-9095
Michael Halil, Project Manager	CH2M HILL Constructors, Inc 6219 Authority Avenue Jacksonville, FL 32221 904/777-4812 X. 233
Eva Clement, CO	NAVFAC EFD SOUTH P.O. Box 190010 North Charleston, SC 29419-9010 843/820-5518
Richard Stanley, ACO	As above 843/820-5939
Dorothy Okamoto, COTR	As above 843/820-5940
Mark Davidson, RPM	As above 843/820-5526
Larry Blackburn, NTR/ROICC	Engineering Field Activity Southeast Environmental Programs Coordinator/Resident Officer in Charge of Construction P. O. BOX 139, Building 13 NAS Jacksonville, FL 32212-0139 904/542-8745 ext.1116

2.6 Subcontractor Responsibilities

All subcontractors are responsible for their own health and safety programs and the health and safety of their own employees. This requirement is based on OSHA regulations, which recognize the employer-to-employee responsibility for health and safety. A copy of their written program must be submitted to CH2M HILL for review. In an effort to assist the subcontractors, and to comply with hazard communication requirements, CH2M HILL will provide a copy of this SSHP to each subcontractor for implementation by the subcontractor's employees.

3.0 Hazard Analysis and Risk Assessment

Reasonably anticipated potential hazards to personnel at the site include: MEC, other physical hazards (slips and trips [working on uneven surface], noise, working around heavy equipment, traffic, heat/cold, and sunburn); and infectious biological agents (snakes, spiders, insects, rodents, and plants). Each potential hazard and the potential for exposure are discussed below.

3.1 MEC

MEC are known to be present onsite and appropriate safety measures will be used during all fieldwork. The primary hazard associated with MEC is the possibility of injury as a result of an explosion. When an MEC item is identified at the site, the SUXOS will secure the site and notify the CH2M HILL PM, who in turn will notify the NAVFAC EFD SOUTH Remedial Project Manager (RPM). The site will remain secured until disposal operations can be performed. Determination of appropriate safety distances will be in accordance with the approved Explosives Siting Plan in the project WPA.

The safest and most expeditious methods of disposal will be utilized in every case. All demolition operations will be in compliance with NAVSEA SW060-AA-MMA-010 Volumes I and II, NAVSEA OP 5 Volume 1, all applicable DoD regulations, and the procedures outlined in the project WPA.

3.2 Uneven walking surfaces

- Employees walking in ditches, swales and other drainage structures adjacent to roads or across undeveloped land must use caution to prevent slips and falls which can result in twisted or sprained ankles, knees, and backs.
- Whenever possible operate from a flat surface and do not enter a steep ditch or hillside.
- If steep terrain must be negotiated, sturdy leather safety shoes or boots with that provide a high degree of traction and ankle support should be used. The need for ladders or ropes to provide stability should be evaluated.
- Avoid extremely tall grass/vegetation areas where the ground surface level can not readily be anticipated or directly observed.
- Clear and grub heavily covered areas where possible prior to conducting regular activities in the work area.

3.3 Excavation Activities

- CH2M HILL personnel must notify and be granted authorization from the excavation competent person prior to entering any excavation. CH2M HILL personnel must follow all excavation requirements established by the competent person.

- The competent person must inspect the trench and/or excavation everyday and after everyday hazard increasing event. Documentation of this inspection must be maintained onsite at al times.
- Excavations must be protected from cave-ins by adequate protective systems unless the excavation is less than 5 feet in depth and a competent person determines there is no indication of cave-in or the excavation is made entirely in stable rock that is not fractured.
- Prior to excavating at a location, buried utilities in the area must be identified; refer to Section 2.2.8 "Procedures for locating buried utilities".
- CH2M HILL personnel must not enter any excavation where protective systems are deficient at any time, for any reason. The competent person must be notified of such conditions.
- Refer to CH2M HILL SOP HS-32 "Excavations and Trenching" for more specific details on excavation requirements.

3.4 Other Physical Hazards

Slips, trips (working on uneven surface), noise, working around heavy equipment, traffic, heat/cold, and sunburn generally constitute the physical hazards that may be encountered.

3.4.1 Slips, Trips, and Falls

Slipping hazards may exist due to uneven terrain or wet surfaces. Tripping hazards may be present from elevation changes, debris, poor housekeeping, or equipment. Collectively, these types of injuries account for nearly 50 percent of all occupational injuries and accepted disabling claims. Prevention requires alertness, following and enforcing proper procedures, and appropriate protective equipment.

3.4.2 Noise

Heavy construction equipment may generate hazardous levels of noise. Hearing protection with the appropriate noise reduction ratio (NRR) shall be worn in areas with high noise. A good rule of thumb to determine if hearing protection is needed is the inability to have a conversation at arm's length without raising voice levels.

3.4.3 Working Around Heavy Equipment

Vehicles, dump trucks, concrete trucks, cranes, backhoes, carts, and other construction equipment may be present at the site. When working near this equipment, stay alert to what the equipment is doing, especially when a backup alarm is sounding. Maintain eye contact with operator at all times and wear an orange vest to increase visibility. Never enter the swing radius of articulating equipment and be aware of pinch points.

3.4.4 Traffic Control and Safety

Vehicular traffic, in the form of large trucks and other heavy equipment, may be present. It is important to be conscious of all vehicular traffic that may be present during conduct of field operations. If necessary, use caution tape, barricades, or safety cones to denote the boundaries of the work area and to alert vehicle operators to the presence of operations that are non-routine

to them. Be careful when exiting the work area and especially when walking out from between parked vehicles to avoid vehicular traffic.

3.4.5 Sunburn

Working outdoors with the skin unprotected for extended periods of time can cause sunburn to the skin. Excessive exposure to sunlight is associated with the development of skin cancer. Project team members should take precautions to prevent sunburn by using sunscreen lotion and/or wearing hats and long-sleeved garments.

3.4.6 Heat Stress

The potential for heat stress is a concern when field activities are performed on warm, sunny days. Although the field work for this project is to be performed during some of the cooler months of the year, the project is located in Florida so site workers should be monitored for signs of heat stress on warmer days.

3.4.7 Sanitation

Sanitation has to do with promoting personal hygiene, protecting general public health, preserving the cleanliness of drinking water, and controlling sewage.

Adequate sanitation facilities will be located at the site.

Portable containers of drinking water will be provided and located at the site. The containers will be capable of being tightly closed and equipped with a tap. Drinking water will not be dipped from containers. The drinking water dispenser will be clearly marked as to the nature of the contents and will not be used for any other purpose.

For single service cups, there will be a sanitary container to hold the unused cups and a trash container for disposing of the used cups. Sanitary trash that is generated will be double-bagged and transported from the installation for disposal as solid waste.

3.5 Biological Hazards and Controls

Various insects, reptiles, and poison ivy/oak could potentially be encountered during the course of completing the work covered by this SSHP. Precautions will be taken by all on-site personnel to avoid prime snake and insect habitats, to protect one's self, and assist other personnel from attack or encounter.

WARNING
AN ENCOUNTER WITH A POISONOUS SNAKE REQUIRES IMMEDIATE PROFESSIONAL MEDICAL ATTENTION.

3.5.1 Insect Bites

Mosquitoes, ants, bees, and wasps are considered to be the most common insects that may be encountered. Although their bite/sting is not considered life threatening, an allergic reaction to these bites/stings could occur. Avoid insect habitats whenever possible. If bitten/stung by insects, remove the stinger by gently scraping it out by using a credit card or driver license (do not use tweezers). Apply ice to the affected area. Instant ice packs are to be kept in the work

area. If an insect bites/stings the worker, immediately apply an ice pack to the affected area, wash area with soap, and apply antiseptic. If an allergic reaction occurs, transport worker to the closest medical facility for treatment. Also, use protection against bacteria and other microbiota that could be present in the water and sediment. Be aware that mosquitoes are a common vector for human diseases.

3.5.2 Spiders and Other Insects

Almost all spiders produce toxic venoms, but their fangs are too small and weak to penetrate the skin, the venom is too weak, or the volume of venom is too small to pose a significant threat to humans. The black widow is the only spider found in the United States (U.S.) that is capable of routinely producing serious illness by its bite.

The female black widow typically is coal black and has a prominent, spherical abdomen that may be as large as 0.5 inch in diameter. A red or orange marking resembling an hourglass shape is present on the underside of the abdomen. The black widow weaves a coarse, crudely constructed web in dark corners, both indoors and out. They exist in secluded areas beneath objects, under toilet seats, in dark corners of buildings, windowsills, etc.

The black widow bite may feel like a pinprick, may produce a mild burning, or may not be noticed at all. Small puncture wounds, slight redness, or no visible marks may be found at the site of the bite. Within about 15 minutes painful muscle cramps develop at the point of the bite and rapidly spread to involve the entire body. Weakness and tremors may also be present.

Treatment for black widows consists of efforts to relieve the painful muscle spasms and antivenin for small children. No treatment at all should be directed to the site of the bite, with the possible exception of applying an ice cube to relieve pain. Incision and suction is damaging and useless, and should not be performed. Essentially, nothing can be done outside of a hospital. This applies to other types of spider bites too.

The brown recluse spider is one of six poisonous kinds of spiders in the U.S. It has long, skinny legs and is about 0.5 inch long overall. Its entire body is brown, except for a dark mark in the shape of a violin on its head.

When they are outside, they are typically found in piles of rocks, wood, or leaves. If they come inside, brown recluse spiders will go to dark closets, attics, or basements. They are non-aggressive and bite only when disturbed.

A person who gets bitten by a brown recluse spider may not notice anything at first or only feel a little sting at first. After about 4 to 8 hours, the sting will start to hurt a little more. It might look like a bruise or might form a blister surrounded by a bluish-purple area that turns black or brown and becomes crusty after a few days.

If you ever think that you have been bitten by a brown recluse spider, **notify the SUXOS, immediately**. Brown recluse spider bites rarely kill people, but it is important to get medical attention as soon as possible. Wash the bite well with soap and water. You can also apply ice to the area, elevate it, and keep it still. If it is possible, catch and bring the spider to the medical center with you; this is important because it can sometimes be hard to diagnose a spider bite correctly. The spider may be killed before bringing it in, but be sure not to damage it beyond recognition.

3.5.3 Snakes

The most common poisonous snake is the rattlesnake (pit viper). Any snake that inflicts a bite should be precisely identified if possible. Many people are injured by unnecessary treatment for bites of nonpoisonous snakes. More significantly, a bite by a rattlesnake may produce very little reaction in the hours immediately after it occurs, when treatment is most effective. Only if the species of snake is known can optimal therapy be started without delay. Preferably, the snake should be killed and brought to a medical center with the person who was bitten so that the exact species can be determined.

Pit vipers are so named because they have a small pit located between the eye and the nostril, a feature found only in these poisonous species. The pit is an infrared sensing organ instrumental in detecting the small, warm-blooded animals these snakes eat. They have a characteristic triangle head and heavy body. Rattlesnakes belong to the pit viper family. If fangs are present, the snake is undoubtedly poisonous; however, searching for fangs is hazardous. If they have rattles, they are obviously rattlesnakes and poisonous. However, the absence of rattles is not a good indicator because the rattles can get broken off, or even shed with the skin.

The reaction following the bite (envenomation) from a pit viper is one of the best indications that the snake was poisonous and is the only indication that envenomation has occurred and treatment may be needed. This reaction begins within minutes after the bite, but is usually less marked after other pit viper bites. The severity of the reaction varies depending on the species of snake. The earliest symptom is pain or burning at the site of the bite, although some people experience relatively little pain. Shortly afterward the area begins to swell as fluid pours into the tissues. Bleeding usually produces a purple or green discoloration, but this change may take several hours to appear.

Following moderate envenomation, the swelling and discoloration extends farther from the site of the bite, large blisters containing clear or bloody fluid appear, and the regional lymph nodes (particularly in the armpit or the inguinal crease) become enlarged and tender. Severe envenomation is indicated by the development of a systemic reaction. The individual becomes weak and dizzy and develops signs of shock, particularly cold, clammy skin and a weak pulse.

When the individual can be hospitalized within 2 hours time, the only treatment needed is limiting the spread of the venom and immobilizing the extremity. No other measures, particularly incision and suction, should be attempted. Tourniquets are not recommended to help reduce the spread of the venom because they are rarely applied correctly and commonly do more harm than good. The immobilized extremity should be kept at the same level as the heart, and the individual must be transported to a hospital with as little effort on his or her part as possible. No other treatment should be attempted. Wrapping should not be applied to the wound unless envenomation is known to be moderate or severe.

3.5.4 Lyme Disease Prevention

The prevention of Lyme disease is important during spring, summer, and fall months. Lyme disease is a bacterial infection transmitted by the bite of a deer tick. About 50 percent of deer ticks carry the Lyme disease bacteria.

To prevent the bite of a deer tick, avoid grassy areas when possible. Wear protective clothing (light colored) with long sleeves, and tuck pant cuffs inside socks. Apply repellent containing

"Peamethrin" or "Deet" to clothing but **not directly on skin**. Make a habit of self-inspection after exposure to an area that may contain deer ticks.

- **Symptoms**: Headache, flu-like symptoms, a spreading ring-like rash, and swelling and joint pain
- **Tick removal**: Remove attached tick immediately. Use tweezers to grasp the tick's head near the skin and slowly pull straight out. If possible, save the tick for laboratory analysis.

Report any incident involving deer tick bites to the SUXOS.

3.5.5 Poisonous Plants

Contact with poisonous plants such as poison oak, poison ivy, and poison sumac can cause irritation with symptoms such as itching and inflammation, skin rash, swelling, and weeping sores. Contamination can occur through direct or indirect contact with any part of the plant or by exposure to smoke from burning plants. Contact with clothes that have been contaminated can also cause an allergic reaction.

3.5.5.1 Plant Identification

Poison ivy is a trailing or climbing woody vine or a shrub-like plant with leaves that are each divided into three broad, pointed leaflets. The leaflets are commonly dark glossy green on top and slightly hairy underneath. They produce small yellowish or greenish flowers followed by berry-like drupes.

Poison oak is a member of the same family as poison ivy and has very similar appearances. Poison oak has leaves divided into three leaflets and generally has three to seven distinct lobes. Typically, they are a shrubby-type plant that can grow to 8 feet in height, or sometimes can be a climbing plant.

3.5.5.2 Exposure Prevention

The best way to prevent exposure is the ability to recognize these plants, conduct an initial survey of the area to determine if the plants are present in the work area, and avoid contact with them.

If plants are located and work must be conducted in that area, have the plants removed if possible. If this is not possible, wear long-sleeved shirts, gloves, and a heavy material type pants. Remember not to touch contaminated clothing. There are products available on the market that can be applied to exposed skin (similar to sunscreen products) prior to working around the plants.

3.5.5.3 Symptoms and Treatment

The first symptoms are reddening skin and itching. This usually occurs several hours after contact. Small watery blisters soon appear and itching becomes intense. In severe cases, large watery swellings appear and coalesce.

To care for poison plant contact, immediately wash the affected area thoroughly with soap and water. If a rash or weeping sore has already begun to develop, you may apply a boric acid

solution, a paste of sodium bicarbonate (baking soda), and calamine or Caladryl lotion to help soothe the area. Antihistamines, such as Benadryl®, may also help dry up the sores.

A physician should be consulted in severe cases, if sensitive parts of the body, such as eyelids and face, or if the condition gets worse and effects large parts of the body.

4.0 Training Requirements

Prior to commencement of site activities, the PM will ensure that all employees engaged in site operations are informed of the nature and degree of exposure to hazards that are likely to result from participation in site operations. The SUXOS will accomplish this by ensuring that all site workers have received the appropriate OSHA and site-specific training prior to participating in site activities.

Employee Name	Office	Responsibility	SSC/FA-CPR
Mike Halil	JAX	Project Manager	SC-C; FA-CPR
Jeffrey Marks	JAX	Construction Manager	HW- FA-CPR
Linda Cox	SAN	SUXO	HW- FA-CPR
Rich Rathnow	ORO	Health and Safety Manager	SC-C, SC-HW; FA-CPR
Eric Burrell	ATL	Quality Control Manager	SC-C, SC-HW; FA-CPR
Greg Ramey	ATL	Project Superintendant	

4.1 OSHA Training for General Site Workers

All employees involved in hazardous waste site activities receive 40 hours of OSHA 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.

4.2 OSHA HAZWOPER Manager and Supervisor Training

The on-site manager/supervisor, the SUXOS, will receive the same training as the general site workers for whom he/she is responsible. He/she will also receive an additional 8 hours of OSHA required supervisory training to enhance the ability to provide guidance and make informed decisions.

This additional training includes the following:

- Review of the SSHP
- Review of the Corporate Safety and Health Program
- Management of hazardous waste site cleanup operations
- Management of site work zones
- How to communicate with the media and the public
- PPE selection and limitations
- Spill containment
- Monitoring site hazards
- MEC

4.3 UXO Personnel Training

Subcontractor UXO personnel assigned to positions UXOSO, UXO Technician I, UXO Technician II, or UXO Technician III will meet the minimum requirements of Department of Defense Explosives Safety Board (DDESB) Technical Publication (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel.

All MEC operations personnel will be qualified and certified in accordance with NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program; terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel; and DDESB TP-18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and personnel."

4.4 MEC Awareness Training

Initial MEC awareness training is an appropriate safety precaution for all subcontractor personnel working on this project. MEC awareness consists of training in basic MEC characteristics, identification and reporting procedures.

4.5 Daily Site Operations Briefing

The daily site operations briefings consist of providing a short overview of the daily operations to be performed, and who is responsible for their completion. This will be completed by the SUXOS prior to commencing operations each day. This briefing will include such items as:

- Expected weather conditions
- General site hazards
- MEC hazards
- PPE required
- Emergency evacuation procedures
- Heat stress precautions
- Buddy system procedures
- A review of any safety violations from the previous day
- Any other significant events involving safety

Additional briefings will be provided as needed concerning the use of safety equipment, emergency medical procedures, emergency assistance notification procedures, accident prevention, the work plan, and site orientation to ensure that accomplishment of the project can be carried out in a safe and effective manner. Daily site safety briefings will be recorded daily in the field notes.

4.6 Periodic Site Training

On the first workday of each work week/period, or more frequently if needed, a pertinent topic will be selected and elaborated upon by the SUXOS during the Tailgate Safety Briefing. These safety meetings will help ensure the safety and health of field personnel in the performance of regular work activities and in emergency situations. Safety meetings will be documented.

4.7 Visitors

Visitors to the site may include representatives from the Navy or JAA. These personnel, even if escorted, must receive, as a minimum, a briefing on site conditions, hazards, and emergency response procedures. Visitors must possess the appropriate level of OSHA training. The SUXOS will provide the visitor briefing. All visitors to the site will be escorted at all times. Visitors not complying with the above requirements will not enter the site.

4.8 Training Documentation

Copies of all project team training certifications and medical screening will be kept on file at the site field office for the duration of the project.

5.0 Personal Protective Equipment

The minimum required level of personal protection on the site at all times is modified Level D.

Level D PPE is a work uniform affording minimal protection, used for nuisance contamination only. Excluding the wearing of steel-toed shoes for magnetometer operators, personnel will wear Level D. The following Level D PPE will be required on the site:

- Leather-palmed gloves
- Safety glasses with side shields. Protective eye and face devices purchased after July 5, 1994, shall comply with American National Standards Institute (ANSI) Z87.1-1989, *American National Standard Practice for Occupational and Educational Eye and Face Protection*, which is incorporated by reference as specified in 29 CFR 1910.6.
- Hard hat, where head injury hazards are present. Protective helmets purchased after July 5, 1994, shall comply with ANSI Z89.1-1986, *American National Standard for Personnel Protection-Protective Headwear for Industrial Workers-Requirements*, which is incorporated by reference as specified in 29 CFR 1910.6, or shall be demonstrated to be equally effective.
- Hearing protection, where required by high noise levels (when operating in areas where normal conversation cannot be heard at a distance of 3 feet).
- Sturdy leather work boots. Leather work boots consist of leather uppers that extend up past the ankle.
- Cotton work clothes.

6.0 Medical Surveillance Requirements

Medical surveillance of employees will be conducted in accordance with the requirements of OSHA 29 CFR 1910.120(f), 29 CFR 1910.134(b)(10), and other established guidelines. Personnel to be included in the Medical Surveillance Program will be those who perform hazardous waste operations that may potentially expose the worker to hazardous substances or other significant safety and health threats. All personnel on the project site, excluding visitors, and those not actually engaged in production on the project or performing hazardous waste operations that may potentially expose the worker to hazardous substances or other significant safety and health threats, will be part of the Medical Surveillance Program.

The purposes of the Medical Surveillance Program are to:

- Assess the individual's health status prior to participation in hazardous waste operations; determine the individual's ability to perform work assignments requiring the use of PPE and clothing.
- Establish baseline data for comparison to future medical data in order to provide a means of monitoring a worker's health status.
- Establish facilities and procedures for emergency and non-emergency medical treatment.
- Establish procedures for maintenance and storage of medical and exposure records.

Baseline and annual health assessments have been conducted for all workers participating in site operations to determine the worker's ability to perform hazardous waste operations in a safe and healthful manner. The PM, in conjunction with the SUXOS, will ensure that all health assessments are current and documented. Copies of health assessment records for all site workers will be maintained in the project trailer in accordance with OSHA 29 CFR 1910.120(d).

6.1 Emergencies and Non-Emergency Medical Treatment

The medical treatment facility for use at this site will be:

Baptist Medical Center
800 Prudential Dr. Jacksonville, FL
(904) 202-2000

For emergencies: The employee first recognizing the need for emergency medical treatment will immediately notify the SUXOS by the fastest means available. By no means should the injured person be left alone. The SUXOS will follow the established emergency procedures for acquiring emergency medical assistance.

For Non-Emergency Medical Treatment, contact the SUXOS. The SUXOS will evaluate the problem, provide minor first aid, and monitor for any changes. The SUXOS will document non-emergency incidents.

6.2 Record Keeping

Physician statements, exposure records, and associated information for employees involved in MEC operations at the site will be maintained in the site field office for the duration of site operations. When the site work is complete, the records will be retained by CH2M HILL. In accordance with OSHA 29 CFR 1910.20(d), all records, whether maintained by the employer or by the examining physician, will be kept on file for a period of 30 years beyond an employee's termination.

7.0 Site Control Measures

7.1 General Site Control Information

The CH2M HILL Project Team will adhere to and comply with security and other project control measures with respect to safety concerns during the conduct of all field activities. CH2M HILL will comply with all obligations and constraints routinely expected at DoD installations. As the contractor, it is CH2M HILL's responsibility to ensure that fire extinguishers are in each vehicle and that **at no time** will persons, including subcontractor personnel working in the limited area, possess fire-/flame-producing items or articles such as matches, torches, or lighters. No weapons will be carried at any time by contractor team members.

7.2 Communications

Communication between project team members will consist of verbal communications, hand signals, and communication with portable radios.

7.3 Work Practices

Safe work practices are part of ensuring a safe and healthful working environment. These practices are standardized for all field activities, and it is the responsibility of CH2M HILL and subcontractor employees to follow safe work practices when conducting field activities. Safe work practices to be employed during the entire progress of fieldwork are as follows:

1. The "**BUDDY SYSTEM"** will be used and enforced at all times while working onsite.
2. All fieldwork in the site will be conducted under UXO escort.
3. Set up, assemble, and check out all equipment for integrity and proper function before starting work activities.
4. Do not use faulty or suspect equipment.
5. Check in and out with the SUXOS upon arrival and departure from the site.
6. Notify the SUXOS immediately if there is an accident that causes an injury or illness.

8.0 Emergency Response and Contingency Procedures

8.1 General Information

In the event of an emergency onsite, the SUXOS will direct the necessary course of action. It may be necessary for the SUXOS to depend on the other on-site personnel for assistance.

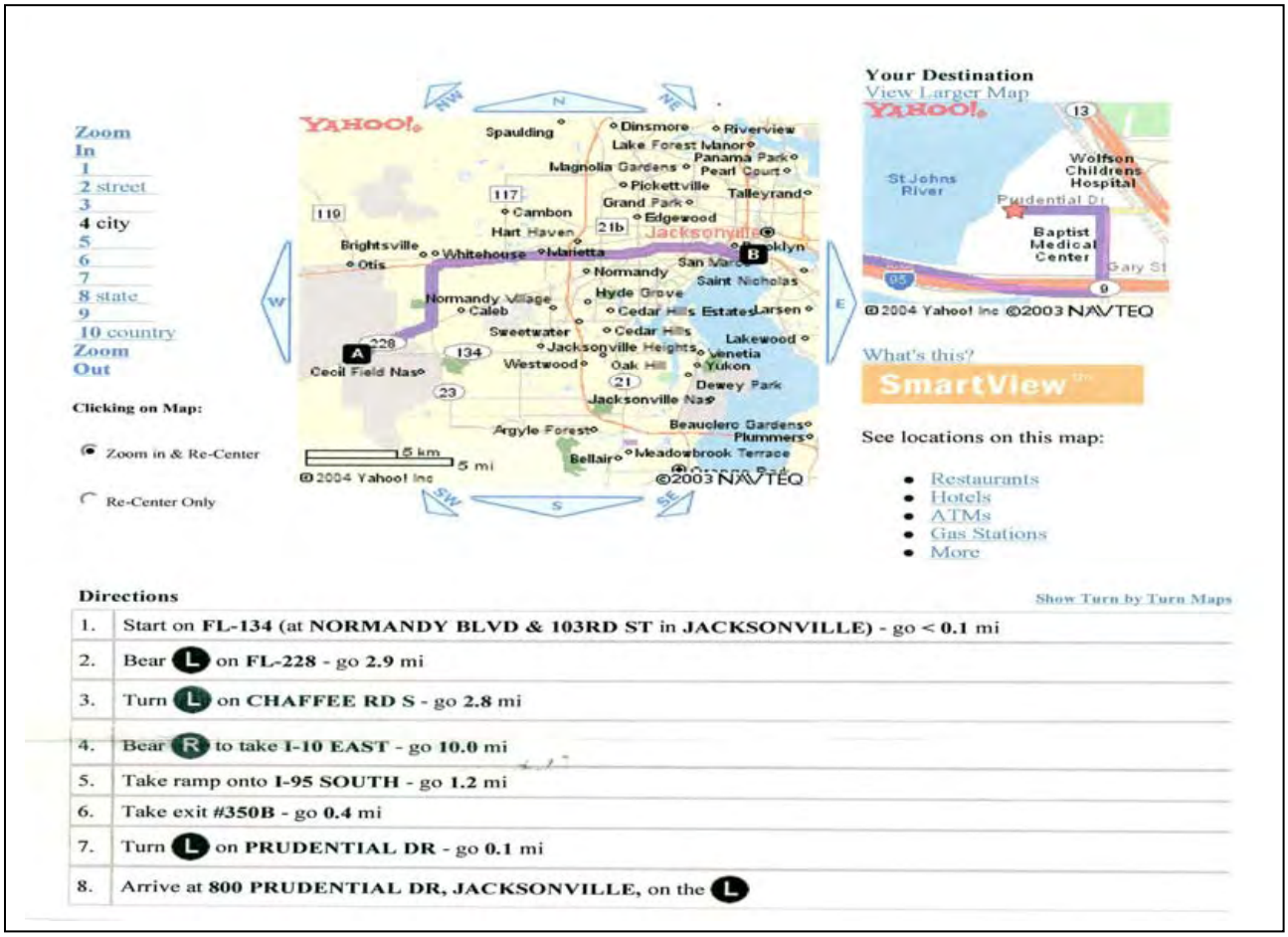
The nearest medical assistance center is the Baptist Medical Center. A map showing the route to the hospital is included in the following section.

The SUXOS is trained in first aid and cardiopulmonary resuscitation (CPR). A first-aid kit and fire extinguisher are located in his/her support vehicle.

The emergency shut-off switch for heavy equipment, will be identified, and all field personnel working in the area will be informed of its location and function during the site safety briefing.

8.2 Hospital Route

Driving directions from Cecil Field to Baptist Medical Center are as follows:



9.0 Accident Prevention

9.1 Pre-Emergency Planning

The SUXOS will perform the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with on-site parties, the facility, and local emergency service providers as appropriate. These tasks include:

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn, etc.).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cellular phone, etc.).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to on-site personnel.
- Review changed site conditions, on-site operations, and personnel availability in relation to emergency response procedures.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures to the project team.
- Rehearse the emergency response plan before site activities begin, including driving route to the medical center.
- Brief new workers on the emergency response plan.
- The SUXOS will evaluate emergency response actions and initiate appropriate follow-up actions.

10.0 Emergency Equipment and First Aid Requirements

10.1 Emergency Equipment and Supplies

The SUXOS should mark the locations of emergency equipment on the site map and post the map, as illustrated in Table 10-1.

TABLE 10 –1
Sample Supply List and Locations

Emergency Equipment and Supplies	Location
20-lb (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye wash	Support & Decontamination Zone/Field Vehicle
Potable water	Support & Decontamination Zone/Field Vehicle
Blood borne pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify)	N/A

10.2 Incident Response

In case of emergency, actions to be taken include the following:

- Shut down operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.
- Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

10.3 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses must be reported to the Project Manager and Project Health & Safety Manager within 4 hours of occurrence. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the medical consultant. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 10.7 (e.g., 911).
- The SUXOS will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.

- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 10.6.

10.4 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SUXOS before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SUXOS and a "buddy" will remain onsite after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SUXOS will account for all personnel in the on-site assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SUXOS will write up the incident as soon as possible after it occurs and submit a report to the Project Manager.

10.5 Evacuation Signals

Table 10-2 provides some samples of possible evacuation signals.

TABLE 10-2
Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me
Thumbs up	OK; understood
Grasping buddy's wrist	Leave area now
Continuous sounding of horn	Emergency; leave site now

10.6 Incident Notification and Reporting

For any accident meeting the definition of **Recordable Occupational Injuries or Illnesses or Significant Accidents**, the Southern Division, NAVFAC Contracting Officer and Navy

Technical Representative (NTR) shall be notified by the HSM or Program Manager soon as practical, **but not later than four hours after occurrence.** All other incidents must be reported to Southern Division, NAVFAC within 24 hours of incident occurrence.

Therefore in order for the incident to be assessed for reportability purposes it is imperative that according to CCI requirements, **all personal injuries, near-misses, or property damage incidents involving CCI or subcontractor project personnel be reported IMMEDIATELY to the HSM** Rich Rathnow/ORO, Program Manager Scott Newman/ATL, or CCI Corporate HSM Angelo Liberatore/ATL at the numbers identified in the emergency contact attachment contained in this plan.

The Site Manager or designee must **report the following incident information to the HSM immediately** after incident occurrence:

- Date and time of mishap
- Project name and project number
- Name and worker classification
- Extent of known injuries
- Level of medical attention
- Injury cause

A written incident investigation shall be performed and submitted to the HSM within 24 hours of incident occurrence by the completing the Incident Report, Near Loss Investigation and Root Cause Analysis provided in the HSP Attachments.

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CCI operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

10.7 Emergency Contacts

24-hour CH2M HILL Emergency Beeper – 888/444-1226	
Medical Emergency – 911 Facility Medical Response #: Local Ambulance #:	**CH2M HILL- Medical Consultant** Dr. Jerry H. Berke, M.D., M.P.H. Health Resources 600 West Cummings Park, Suite 3400 Woburn, MA 01801-6350 781/938-4653 800/350-4511 (After hours calls will be returned within 20 minutes)
Fire/Spill Emergency -- 911 Facility Fire Response #: Local Fire Dept #:	**Local Occupational Physician**
Security & Police – 911 Facility Security #: Local Police #:	**Navy RAC Program Manager** Name: Scott Smith/ATL Phone: 770/604-9095
Utilities Emergency Water: Gas: Electric:	**Navy RAC Health and Safety Manager (HSM)** Name: Rich Rathnow/ORO Phone: 865/483-9005 (Office); 865/607-6734 (Cell) 865/531-2933 (Home)
Site Health and Safety Specialist (SHSS) Name: Phone:	**CH2M HILL Human Resources Department** Name: Nancy Orr/COR Phone: 303/771-0952
Project Manager Name: Michael Halil Phone: (904) 777-4812 ext. 233 (office); (904) 219-6277 (Cell)	**Corporate Human Resources Department** Name: John Monark/COR Phone: 303/771-0900
Federal Express Dangerous Goods Shipping Phone: 800/238-5355 **Emergency Number for Shipping Dangerous Goods** Phone: 800/255-3924	**CH2M HILL Worker's Compensation and Auto Claims** Sterling Administration Services Phone: 800/420-8926 After hours: 800/497-4566 Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.
Contact the Project Manager. Generally, the Project Manager will contact relevant government agencies.	
Facility Alarms:	**Evacuation Assembly Area(s):**
Facility/Site Evacuation Route(s):	
Hospital Name/Address: **Baptist Medical Center**	**Hospital Phone #: Hospital Phone #:** (904) 202-2000
Directions to Hospital	
See map in section 8.2	

11.0 Logs, Reports, and Record Keeping

The implementation of the SSHP will be documented to ensure employee participation and protection. In addition, the regulatory requirements will be met for record keeping on training, medical surveillance, injuries and illnesses, exposure monitoring, health risk information, and respirator fit-tests.

12.0 Behavior Based Loss Prevention

A Behavior Based Loss Prevention System (BBLPS) is a system to prevent or reduce losses using behavior-based tools and proven management techniques to focus on behaviors or acts that could lead to losses.

The four basic Loss Prevention tools that will be used on CH2M HILL projects to implement the BBLPS include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Loss Prevention Observations (LPO)
- Loss and Near Loss Investigations (NLI)

The Site Supervisor serves as the Site Health and Safety Specialist (SHSS) and is responsible for implementing the BBLPS on the project site. When a separate individual is assigned as the SHSS, the SHSS is delegated authority from the Site Supervisor to implement the BBLPS on the project site, but the Site Supervisor remains accountable for its implementation. The Site Supervisor/Safety Coordinator shall only oversee the subcontractor's implementation of their AHAs and PTSPs processes on the project.

12.1 Activity Hazard Analysis

An Activity Hazard Analysis (AHA) defines the activity being performed, the hazards posed and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work and their input is solicited prior, during and after the performance of work to further identify the hazards posed and control measures required.

Activity Hazard Analysis will be prepared before beginning each project activity posing H&S hazards to project personnel using the AHA form provided in Attachment 4. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CH2M HILL and subcontractor during the course of the project by the Site Supervisor/SHSS. The Project-Specific and General Hazards of the SSHP, the Hazard Analysis Table (Table 12-1), and applicable CH2M HILL Standards of Practice (SOPs) should be used as a basis for preparing CH2M HILL AHAs.

CH2M HILL subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by CH2M HILL. Each subcontractor shall submit AHAs for their field activities, as defined in their Work Plan/scope of work, along with their SSHP. Additions or changes in CH2M HILL or subcontractor field activities, equipment, tools or material to perform work or additional/different hazard encountered that require additional/different hazard control measures requires either a new AHA to be prepared or an existing AHA to be revised.

TABLE 12-1
Task Hazard Analysis

(Refer to Section 2 of HSP for hazard controls)

	Task Breakdown								
Potential Hazards	**Survey**	**Vegetation Removal**	**Anomaly Detection and Intrusive Investigation**	**Draining of Standing Water in Drainage Ditch**	**Disposal of Recovered MEC**	**Disposition of MPPEH**	**Waste Characterization Sampling**	**Decontamination**	**T&D of Generated Wastes**
Ordnance Explosives (HS-109)	X	X	X	X	X	X	X	X	X
Manual Lifting (HS-112)	X	X	X	X	X	X	X	X	X
Fire Prevention (HS-208)			X						X
Electrical Safety (HS-206)									
Lockout /Tagout (HS-310)									
Ladders & Stairs(HS-214)									X
Compressed Gas Cylinders			X						
Buried Utilities		X	X	X					
Excavations (HS-307)		X	X	X					
Fall Protection (HS-308)									X
Heavy Equipment (HS-306)			X	X					X
Confined Space Entry (HS-203)									
Concrete & Masonry Work (HS-302)									
Cranes and Hoisting (HS-303)		X	X						X
Demolition (HS-305)									
Scaffolding(HS-311)									
Steel erection (HS-312)									
Welding and cutting (HS-314)									
Aerial Lifts (HS-301)									
Hand & Power Tools (HS-210)	X	X	X	X	X	X	X	X	X
Forklifts (HS-309)									X
Drilling (HS-204)			X						
Noise (HS-108)	X	X	X						X
Pressurized Lines/Equipment			X						
Pressure Washing/Equip Decon								X	
Vacuum Truck/Pumping Operations				X					
Suspended Loads									X
Vehicle Traffic									X
Haul Truck Operations				X					
Visible Lighting	X	X	X	X	X	X	X	X	X
Mechanical Guarding Hazards									
Asbestos Hazard									
Lead Hazard			X						
Chemical Hazard-Dermal/Inhalation			X				X	X	X
Dust Hazard (Silica/Metals)		X	X	X					
Fire/Explosion Hazards			X	X					

12.2 Pre-Task Safety Plans

Daily safety meetings are held with all project personnel in attendance to review the hazards posed and required H&S procedures/AHAs, that apply for each day's project activities. The PTSPs serve the same purpose as these general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews. At the start of each day's activities, the crew supervisor completes the PTSP, provided in Attachment 4, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required H&S procedures, as identified in the AHA. The use of PTSPs, better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required H&S procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

12.3 Loss Prevention Observations

Loss Prevention Observations (LPOs) shall be conducted by Site Supervisor/SHSS for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific SSHP and AHAs. LPOs are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. Site Supervisor/SHSS shall perform at least one LPO each week for a tasks/operations addressed in the project-specific SSHP or AHA. The Site Supervisor/SHSS shall complete the LPO form in Attachment 6 for the task/operation being observed.

12.4 Loss/Near Loss Investigations

Loss/Near Loss Investigations shall be performed for the all CH2M HILL and subcontractor incidents involving:

- Person injuries/illnesses and near miss injuries
- Equipment/property damage
- Spills, leaks, regulatory violations
- Motor vehicle accidents

The cause of loss and near loss incidents are similar, so by identifying and correcting the causes of near loss causes, future loss incidents may be prevented. The following is the Loss/Near Loss Investigation Process:

- Gather all relevant facts, focusing on fact-finding, not fault-finding, while answering the who, what, when, where and how questions.
- Draw conclusions, pitting facts together into a probable scenario.
- Determine incident root cause(s), which are basic causes on why an unsafe act/condition existed.
- Develop and implement solutions, matching all identified root causes with solutions.

- Communicate incident as a Lesson Learned to all project personnel.
- Filed follow-up on implemented corrective active action to confirm solution is appropriate.

Site Supervisors/SHSS shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all Loss and Near Loss Incidents that occur on the project. Loss and Near Loss incident investigations shall be performed using the following incident investigation forms provided in Attachment 4:

- Incident Report Form (IRF)
- Incident Investigation Form
- Root Cause Analysis Form

All Loss and Near Loss incident involving personal injury, property damage in excess of $1,000 or near loss incidents that could have resulted in serious consequences shall be investigated by completing the incident investigation forms and submitting them to the PM and HSM within 24 hours of incident occurrence. A preliminary Incident Investigation and Root Cause Analysis shall be submitted to the Project Manager and HSM within 24 hours of incident occurs. The final Incident Investigation and Root Cause Analysis shall be submitted after completing a comprehensive investigation of the incident.

13.0 Approval

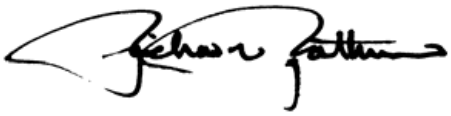
This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

13.1 Original Plan

Written By: **Date: April 2006**

Mike Halil

Approved By: **Rich Rathnow** **Date: April 2006**



13.2 Revisions

Revisions Made By: **Date:**

Revisions to Plan:

Revisions Approved By: **Date:**

Attachment 1

Employee Signoff Form

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this SSHP, have read and understood it, and agree to abide by its provisions.

Project Name: **Project Number:**

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

Attachment 2

Hazard Communication Program Forms

Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SHSS shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: **Project Number:**

MSDSs will be maintained at the following location(s):

Hazardous Chemical Products Inventory

Chemical	*Quantity*	Location	MSDS Available	*Container labels* Identity	Hazard
Methane	1 liter, compressed	Support Zone			
tylene	1 liter, compressed	Support Zone			
Pentane	1 liter, compressed	Support Zone			
Hydrochloric acid	< 500 ml	Support Zone / sample bottles			
Nitric acid	< 500 ml	Support Zone / sample bottles			
Sulfuric Acid	< 500 ml	Support Zone / sample bottles			
Sodium hydroxide	< 500 ml	Support Zone / sample bottles			
Methanol	< 1 Gallon	Support/Decon Zones			
Hexane	< 1 Gallon	Support/Decon Zones			
pH buffers	< 500 ml	Support Zone			
MSA Sanitizer	< 1 liter	Support/Decon Zones			
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Refer to SOP HS-05 *Hazard Communication* for more detailed information.

CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # :
SHSS:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Attachment 3

Project Activity Self-Assessment Checklists/Permits

Hand and Power Tools

Earth Moving Equipment

H&S Self-Assessment Checklist – HAND AND POWER TOOLS

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's SSHP.

This checklist is to be used at locations where: 1) CH2M HILL employees are exposed to hand and power tool hazards and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to hand and power tool hazards.

SHSS may consult with subcontractors when completing this checklist, but shall not direct the means and methods of hand and power tool use nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposure to hand and power tool hazards.
☐ Evaluate a CH2M HILL subcontractor's compliance with hand and power tool requirements.
Subcontractors Name: _____

Check "Yes" if an assessment item is complete/correct.

Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked "No."

Check "N/A" if an item is not applicable.

Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-50.

SECTION 1

SAFE WORK PRACTICES (3.1)

	Yes	No	N/A	N/O
1. All tools operated according to manufacturer's instructions and design limitations.	☐	☐	☐	☐
2. All hand and power tools maintained in a safe condition and inspected and tested before use.	☐	☐	☐	☐
3. Defective tools are tagged and removed from service until repaired.	☐	☐	☐	☐
4. PPE is selected and used according to tool-specific hazards anticipated.	☐	☐	☐	☐
5. Power tools are not carried or lowered by their cord or hose.	☐	☐	☐	☐
6. Tools are disconnected from energy sources when not in use, servicing, cleaning, etc.	☐	☐	☐	☐
7. Safety guards remain installed or are promptly replaced after repair.	☐	☐	☐	☐
8. Tools are stored properly.	☐	☐	☐	☐
Cordless tools and recharging units both conform to electrical standards and specifications.	☐	☐	☐	☐
10. Tools used in explosive environments are rated for such use.	☐	☐	☐	☐
11. Knife or blade hand tools are used with the proper precautions.	☐	☐	☐	☐
12. Consider controls to avoid muscular skeletal, repetitive motion, and cumulative trauma stressors.	☐	☐	☐	☐

SECTION 2	Yes	No	N/A	N/O
GENERAL (3.2.1)				
13. PPE is selected and used according to tool-specific hazards anticipated.	☐	☐	☐	☐
14. Tools are tested daily to assure safety devices are operating properly.	☐	☐	☐	☐
15. Damaged tools are removed from service until repaired.	☐	☐	☐	☐
16. Power operated tools designed to accommodate guards have guards installed.	☐	☐	☐	☐
17. Rotating or moving parts on tools are properly guarded.	☐	☐	☐	☐
18. Machines designed for fixed locations are secured or anchored.	☐	☐	☐	☐
19. Floor and bench-mounted grinders are provided with properly positioned work rests.	☐	☐	☐	☐
20. Guards are provided at point of operation, nip points, rotating parts, etc.	☐	☐	☐	☐
21. Fluid used in hydraulic-powered tools is approved fire-resistant fluid.	☐	☐	☐	☐
ELECTRIC-POWERED TOOLS (3.2.2)				
22. Electric tools are approved double insulated or grounded and used according to SOP HS-23.	☐	☐	☐	☐
23. Electric cords are not used for hoisting or lowering tools.	☐	☐	☐	☐
24. Electric tools are used in damp/ wet locations are approved for such locations or GFCI installed.	☐	☐	☐	☐
25. Hand-held tools are equipped with appropriate on/off controls appropriate for the tool.	☐	☐	☐	☐
26. Portable, power-driven circular saws are equipped with proper guards.	☐	☐	☐	☐
ABRASIVE WHEEL TOOLS (3.2.3)				
27. All employees using abrasive wheel tools are wearing eye protection.	☐	☐	☐	☐
28. All grinding machines are supplied with sufficient power to maintain spindle speed.	☐	☐	☐	☐
29. Abrasive wheels are closely inspected and ring-tested before use.	☐	☐	☐	☐
30. Grinding wheels are properly installed.	☐	☐	☐	☐
31. Cup-type wheels for external grinding are protected by the proper guard or flanges.	☐	☐	☐	☐
32. Portable abrasive wheels used for internal grinding are protected by safety flanges.	☐	☐	☐	☐
33. Safety flanges are used only with wheels designed to fit the flanges.	☐	☐	☐	☐
34. Safety guards on abrasive wheel tools are mounted properly and of sufficient strength.	☐	☐	☐	☐
PNEUMATIC-POWERED TOOLS (3.2.4)				
35. Tools are secured to hoses or whip by positive means to prevent disconnection.	☐	☐	☐	☐
36. Safety clips or retainers are installed to prevent attachments being expelled.	☐	☐	☐	☐
37. Safety devices are installed on automatic fastener feed tools as required.	☐	☐	☐	☐
38. Compressed air is not used for cleaning unless reduced to < 30 psi, with PPE, and guarded.	☐	☐	☐	☐
39. Manufacturer's safe operating pressure for hoses, pipes, valves, etc. are not exceeded.	☐	☐	☐	☐
40. Hoses are not used for hoisting or lowering tools.	☐	☐	☐	☐
41. All hoses >1/2-inch diameter have safety device at source to reduce pressure upon hose failure.	☐	☐	☐	☐
42. Airless spray guns have required safety devices installed.	☐	☐	☐	☐
43. Blast cleaning nozzles are equipped with operating valves, which are held open manually.	☐	☐	☐	☐
44. Supports are provided for mounting nozzles when not in use.	☐	☐	☐	☐
45. Air receiver drains, handholes, and manholes are easily accessible.	☐	☐	☐	☐
46. Air receivers are equipped with drainpipes and valves for removal of accumulated oil and water.	☐	☐	☐	☐
47. Air receivers are completely drained at required intervals.	☐	☐	☐	☐
48. Air receivers are equipped with indicating pressure gauges.	☐	☐	☐	☐
49. Safety, indicating, and controlling devices are installed as required.	☐	☐	☐	☐
50. Safety valves are tested frequently and at regular intervals to assure good operating condition.	☐	☐	☐	☐

SECTION 2 (continued)

	Yes	No	N/A	N/O
LIQUID FUEL-POWERED TOOLS (3.2.5)				
51. Liquid fuel-powered tools are stopped when refueling, servicing, or maintaining.	☐	☐	☐	☐
52. Liquid fuels are stored, handled, and transported in accordance with SOP HS-21	☐	☐	☐	☐
53. Liquid fuel-powered tools are used in confined spaces in accordance with SOP HS-17.	☐	☐	☐	☐
54. Safe operating pressures of hoses, valves, pipes, filters, and other fittings are not exceeded.	☐	☐	☐	☐
POWDER-ACTUATED TOOLS (3.2.6)				
55. Only trained employee operates powder-actuated tools.	☐	☐	☐	☐
56. Powder-actuated tools are not loaded until just prior to intended firing time.	☐	☐	☐	☐
57. Tools are not pointed at any employee at any time.	☐	☐	☐	☐
58. Hands are kept clear of open barrel end.	☐	☐	☐	☐
59. Loaded tools are not left unattended.	☐	☐	☐	☐
60. Fasteners are not driven into very hard or brittle materials.	☐	☐	☐	☐
61. Fasteners are not driven into easily penetrated materials unless suitable backing is provided.	☐	☐	☐	☐
62. Fasteners are not driven into spalled areas.	☐	☐	☐	☐
63. Powder-actuated tools are not used in an explosive or flammable atmosphere.	☐	☐	☐	☐
64. All tools are used with correct shields, guards, or attachments recommended by manufacturer.	☐	☐	☐	☐
JACKING TOOLS (3.2.7)				
65. Rated capacities are legibly marked on jacks and not exceeded.	☐	☐	☐	☐
66. Jacks have a positive stop to prevent over-travel.	☐	☐	☐	☐
67. The base of jacks are blocked or cribbed to provide a firm foundation, when required.	☐	☐	☐	☐
68. Wood blocks are place between the cap and load to prevent slippage, when required.	☐	☐	☐	☐
69. After load is raised, it is cribbed, blocked, or otherwise secured immediately.	☐	☐	☐	☐
70 Antifreeze is used when hydraulic jacks are exposed to freezing temperatures.	☐	☐	☐	☐
71 All jacks are properly lubricated.	☐	☐	☐	☐
72 Jacks are inspected as required.	☐	☐	☐	☐
73 Repair or replacement parts are examined for possible defects.	☐	☐	☐	☐
74 Jacks not working properly are removed from service and repaired or replaced.	☐	☐	☐	☐
HAND TOOLS (3.2.8)				
75. Wrenches are not used when jaws are sprung to the point of slippage.	☐	☐	☐	☐
76. Impact tools are kept free of mushroomed heads.	☐	☐	☐	☐
77. Wooden handles of tools are kept free of splinters or cracks and are tightly fitted in tool.	☐	☐	☐	☐

CH2MHILL

SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Auditor:_______________________________ProjectManager:______________________________

CH2MHILL

HS&E Self-Assessment Checklist - EARTHMOVING EQUIPMENT

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's SSHP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to the hazards of earthmoving equipment operations, 2) CH2M HILL employees are operating earthmoving equipment, and/or 3) CH2M HILL provides oversight of a subcontractor operating earthmoving equipment.

The CH2M HILL Safety Coordinator may consult with subcontractors operating earthmoving equipment when completing this checklist, but shall not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposures to earthmoving equipment hazards (complete Section 1).
☐ Evaluate CH2M HILL employees operating earthmoving equipment (complete entire checklist).
☐ Evaluate CH2M HILL subcontractor's compliance with earthmoving equipment safety requirements (complete entire checklist).
Subcontractors Name: _____

Check "Yes" if an assessment item is complete/correct.

Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked "No."

Check "N/A" if an item is not applicable.

Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-27.

SAFE WORK PRACTICES (3.1)	**SECTION 1**	**Yes**	**No**	**N/A**	**N/O**
1.	Personnel maintaining safe distance from operating equipment	☐	☐	☐	☐
2.	Positioning personnel in close proximity to operating equipment is avoided	☐	☐	☐	☐
3.	Personnel wearing high-visibility and/or reflective vests when close to operating equipment	☐	☐	☐	☐
4.	Personnel approach operating equipment safely	☐	☐	☐	☐
5.	Personnel riding only in seats of equipment cab and using seat belts	☐	☐	☐	☐
6.	Personnel not positioned under elevated portions of equipment	☐	☐	☐	☐
7.	Personnel not positioned under hoisted loads	☐	☐	☐	☐
8.	Personnel not hoisted by equipment	☐	☐	☐	☐
9.	Personnel do not to approach equipment that has become electrically energized	☐	☐	☐	☐
10.	Personnel wearing appropriate PPE, per SSHP/FSI	☐	☐	☐	☐

EQUIPMENT SAFETY REQUIREMENTS PRIOR TO OPERATING EQUIPMENT (3.2.1) SECTION 2	Yes	No	N/A	N/O
11. Only qualified and authorized personnel operating equipment	☐	☐	☐	☐
12. Daily safety briefing/meeting conducted with equipment operators	☐	☐	☐	☐
13. Daily inspection of equipment conducted and documented	☐	☐	☐	☐
14. Modifications and attachments used approved by equipment manufacturer	☐	☐	☐	☐
15. Backup alarm or spotter used when backing equipment	☐	☐	☐	☐
16. Operational horn provided on bi-directional equipment	☐	☐	☐	☐
17. Seat belts are provided and used	☐	☐	☐	☐
18. Rollover protective structures (ROPS) provided	☐	☐	☐	☐
19. Braking system capable of stopping full payload	☐	☐	☐	☐
20. Headlights and taillights operable when additional light required	☐	☐	☐	☐
21. Brake lights in operable condition	☐	☐	☐	☐
22. Cab glass provides no visible distortion to the operator	☐	☐	☐	☐
23. All machine guards are in place	☐	☐	☐	☐
24. Hauling equipment (dump trucks) provided with cab shield or canopy	☐	☐	☐	☐
25. Dump truck beds provided with positive means of support during maintenance or inspection	☐	☐	☐	☐
26. Dump truck operating levers provided with latch to prevent accidental dumping	☐	☐	☐	☐
27. Air monitoring conducted per SSHP/FSI for hazardous atmospheres	☐	☐	☐	☐
EQUIPMENT PLACEMENT (3.2.2)				
28. Equipment position on firm/level surface, outriggers used	☐	☐	☐	☐
29. Location of underground utilities identified	☐	☐	☐	☐
30. Safe clearance distance maintained while working under overhead power lines	☐	☐	☐	☐
31. Safe distance is maintained while traveling under power lines	☐	☐	☐	☐
32. Warning system used to remind operator of excavation edge	☐	☐	☐	☐
33. Unattended equipment visibly marked at night	☐	☐	☐	☐
34. Tools lowered/parking brake set when not in use, wheels chocked when parked on incline	☐	☐	☐	☐
EQUIPMENT OPERATION (3.2.3)				
35. Equipment operated on safe roadways and grades	☐	☐	☐	☐
36. Equipment operated at safe speed	☐	☐	☐	☐
37. Operators maintain unobstructed view of travel path	☐	☐	☐	☐
38. Equipment not operated during inclement weather, lightning storms	☐	☐	☐	☐
39. Equipment started and moved safely	☐	☐	☐	☐
40. Operators keep body parts inside cab during operation	☐	☐	☐	☐
41. Vehicle occupants in safe position while loading/unloading	☐	☐	☐	☐
42. Signal person visible to operator when required	☐	☐	☐	☐
43. Equipment used for hoisting done according to equipment manufacturer specifications	☐	☐	☐	☐
44. Lifting and hauling capacities are not exceeded	☐	☐	☐	☐
EQUIPMENT MAINTENANCE (3.2.4)				
45. Defective components repaired immediately	☐	☐	☐	☐
46. Suspended equipment or attachments supported prior to work under or between	☐	☐	☐	☐
47. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
48. Tires on split rims removed using safety tire rack or cage	☐	☐	☐	☐
49. Good housekeeping maintained on and around equipment	☐	☐	☐	☐
EXCAVATING AT HAZARDOUS WASTE SITES (3.2.5)				
50. Waste disposed of according to SSHP/FSI	☐	☐	☐	☐
51. Appropriate decontamination procedures being followed, per SSHP/FSI	☐	☐	☐	☐

SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Auditor: ______________________________ Project Manager: ________________________________

Attachment 4

Behavior Based Loss Prevention System Forms

Activity Hazard Analysis
Pre-Task Safety Plans
Loss Prevention Observation
Incident Report and Investigation

Activity Hazard Form

Activity:	**Date:**
	Project:
Description of the work:	**Site Supervisor:**
	Site Safety Officer:
	Review for latest use: Before the job is performed.

Work Tasks	Identify & Analyze the Hazards	Identify Hazard Controls

Work Tasks	Identify & Analyze the Hazards	Identify Hazard Controls

Equipment to be used	Inspection Requirements	Training Requirements

PRINT	SIGNATURE		
Supervisor Name:	_____	_____	**Date/Time:**_____
Safety Officer Name:	_____	_____	**Date/Time:**_____
Employee Name(s):	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____
	_____	_____	**Date/Time:**_____

CH2MHILL

PRE-TASK SAFETY PLAN

Project: _____ Location: _____Date:_____

Supervisor: _____Emergency Number(s):_____

Brief Job Descriptions:

1._____
2._____
3._____
4._____
5._____

List Specific Tasks for the Jobs (Match number from above).

1._____
2._____
3._____
4._____
5._____

Tools/Equipment required for Tasks, (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools)match number from above:

1._____
2._____
3._____
4._____
5._____

Potential H&S Hazards, including chemical, physical, safety, biological and environmental **(Check all that apply and review exposures as they will be encountered in the tasks above):**

__ Chemical burns/contact	__ Trench, excavations, cave-ins	__Ergonomics
__ Pressurized lines/equipment	__ Overexertion	__ Chemical splash
__ Thermal burns	__ Pinch points	__ Poisonous plants/insects
__ Electrical	__ Cuts/abrasions	___Eye hazards/flying projectile
__ Weather conditions	__ Spills	__ Inhalation hazard
__Heights/fall> 6'	__ Overhead Electrical hazards	__ Heat/cold stress
__ Noise	__ Elevated loads	__ Water/drowning hazard
__ Explosion/fire	__ Slips, trip and falls	__ Heavy equipment
__Radiation	__ Manual lifting	__ Aerial lifts/platforms
__ Confined space entry	__Welding/cutting	__ Demolition

Other Potential Hazards (Describe):

_____

CH2MHILL

PRE-TASK SAFETY PLAN

Hazard Control Measures (Check all that apply):			
PPE __ Thermal/lined __ Eye __ Dermal/hand __ Hearing __ Respiratory __ Reflective vests __ Flotation device	Protective Systems __ Sloping __ Shoring __ Trench box __ Barricades __ Competent person __ Locate buried utilities __ Daily inspections	Fire Protection __ Fire extinguishers __ Fire watch __ Non-spark tools __ Grounding/bonding __ Intrinsically safe equipment	Electrical __ Lockout/tagout __ Grounded __ Panels covered __ GFCI/extension cords __ Power tools/cord inspected
Fall Protection __ Harness/lanyards __ Adequate anchorage __ Guardrail system __ Covered opening __ Fixed barricades __ Warning system	Air Monitoring __ PID/FID __ Detector tubes __ Radiation __ Personnel sampling __ LEL/O2 __ Other	Proper Equipment __ Aerial lift/ladders/scaffolds __ Forklift/ Heavy equipment __ Backup alarms __ Hand/power tools __ Crane w/current inspection __ Proper rigging __ Operator qualified	Welding & Cutting __ Cylinders secured/capped __ Cylinders separated/upright __ Flash-back arrestors __ No cylinders in CSE __ Flame retardant clothing __ Appropriate goggles
Confined Space Entry __ Isolation __ Air monitoring __ Trained personnel __ Permit completed __ Rescue	Medical/ER __ First-aid kit __ Eye wash __ FA-CPR trained personnel __ Route to hospital	Heat/Cold Stress __ Work/rest regime __ Rest area __ Liquids available __ Monitoring __ Training	Vehicle/Traffic __ Traffic control __ Barricades __ Flags __ Signs
Permits __ Hot work __ Confined space __ Lockout/tagout __ Excavation __ Demolition __ Energized work	Demolition __ Pre-demolition survey __ Structure condition __ Isolate area/utilities __ Competent person __ Hazmat present	Inspections: __ Ladders/aerial lifts __ Lanyards/harness __ Scaffolds __ Heavy equipment __Cranes and rigging	Training: __ Hazwaste __ Construction __ Competent person __ Task-specific (THA) __ Hazcom
FieldNotes:_____ _____ _____			

Supervisor signature:_____ Date:_____

List employees who reviewed hazards identified per the checklist.

Print Name	Badge No.	Signature	SS# (Unbadged Personnel)

CH2MHILL

LOSS PREVENTION OBSERVATION

Project:	Supervisor:	Date:
_____	_____	_____

Task/Operation Observed:	Job Title of Worker Observed:
_____	_____

Background Information/comments:	Task Hazard Analysis completed for task (Y/N):
_____	_____

Positive Observations/Safe Work Procedures

1._____

2._____

3._____

4._____

Questionable Activity/Unsafe Condition Observed

1._____

2._____

3._____

Observed Worker's Comment(s)

1._____

2._____

3._____

4._____

_____
Supervisor's Corrective Actions Taken: 1._____ _____ 2._____ _____ 3._____ _____ 4._____ _____

CH2MHILL

Loss Investigation Report Form

Employer Information

Company Name: _____

Project Name: _____ Project Number: _____

Project Location: _____

CHIL Project? Yes ☐ No ☐

Task Location:

_____

Job Assignment: _____ Business Group: _____

Preparer's Name: _____ Preparer's Employee Number: _____

Near Loss Incident Specific Information

Date of Incident: _____ Time of Incident: _____ a.m./p.m.

Location of incident:

☐Company premises
☐Field
☐In Transit
☐Other:_____

Address where the incident occurred: _____

Equipment Malfunction : Yes ☐ No ☐

Activity was a Routine Task: Yes ☐ No ☐

Describe any property damage: _____

Specific activity the employee was engaged in when the incident occurred:_____

_____

_____

All equipment, materials, or chemicals the employee was using when the incident occurred: _____

_____

_____

Describe the specific incident and how it occurred:

_____
_____
_____
_____

Describe how this incident may have been prevented:

_____
_____
_____

Contributing Factors (Describe in detail why incident occurred):

_____
_____
_____

Date employer notified of incident: _____ To whom reported: _____

Witness Information (First Witness)

Name: _____
Employee Number (for CH2M HILL employees):
_____
Address: _____
City: _____
Zip Code : _____
Phone: _____

Witness Information (Second Witness)

Name: _____
Employee Number (for CH2M HILL employees): _____
Address: _____
City: _____
Zip Code: _____
Phone : _____
Additional information or comments:_____
_____

COMPLETE ROOT CAUSE ANALYSIS FORM

Root Cause Analysis Form

Root Cause Analysis (RCA)

Lack of skill or knowledge
Lack of or inadequate operational procedures or work standards
Inadequate communication of expectations regarding procedures or work standards
Inadequate tools or equipment
Correct way takes more time and/or requires more effort
Short cutting standard procedures is positively reinforced or tolerated
Person thinks there is no personal benefit to always doing the job according to standards
Uncontrollable

RCA #	Solution(s): How to Prevent Loss From Occurring	RC[1]	CF[2]	Corrective Action Lead	Due Date	Completion Date	Date Verified

[1] RC = Root Cause; [2] CF = Contributing Factors (check which applies)

Investigation Team Members

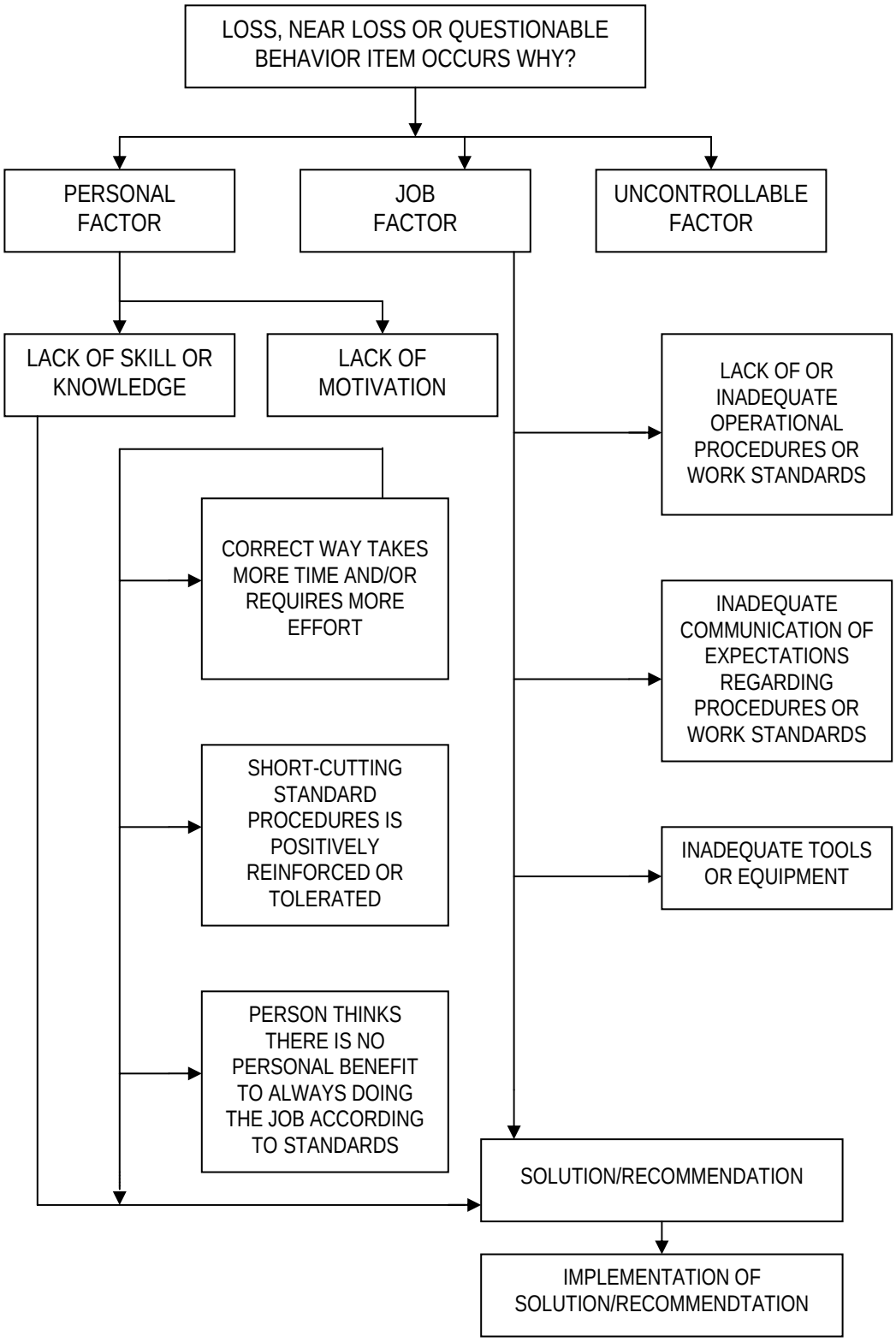
Name	Job Title	Date

Results of Solution Verification and Validation

Reviewed By

Name	Job Title	Date

Root Cause Analysis Flow Chart



Determination of Root Cause(s)

For minor losses or near losses the information may be gathered by the supervisor or other personnel immediately following the loss. Based on the complexity of the situation, this information may be all that is necessary to enable the investigation team to analyze the loss, to determine the root cause, and to develop recommendations. More complex situations may require the investigation team to revisit the loss site or re-interview key witnesses to obtain answers to questions that may arise during the investigation process.

Photographs or videotapes of the scene and damaged equipment should be taken from all sides and from various distances. This point is especially important when the investigation team will not be able to review the loss scene.

The investigation team must use the Root Cause Analysis Flow Chart to assist in identifying the root cause(s) of a loss. Any loss may have one or more "root causes" and "contributing factors". The "root cause" is the primary or immediate cause of the incident, while a "contributing factor" is a condition or event that contributes to the incident happening, but is not the primary cause of the incident. Root causes and contributing factors that relate to the *person* involved in the loss, his or her peers, or the supervisor should be referred to as "personal factors". Causes that pertain to the *system* within which the loss or injury occurred should be referred to as "job factors".

<u>Personal Factors</u>

Lack of skill of knowledge
Correct way takes more time and/or requires more effort
Short-cutting standard procedures is positively reinforced or tolerated
Person thinks that there is no personal benefit to always doing the job according to standards

<u>Job Factors</u>

Lack of or inadequate operational procedures or work standards.
Inadequate communication of expectations regarding procedures or standards
Inadequate tools or equipment

The root cause(s) could be any one or a combination of these seven possibilities or some other "uncontrollable factor". In the vast majority of losses, the root cause is very much related to one or more of these seven factors. Uncontrollable factors should be used rarely and only after a thorough review eliminates "all" seven other factors.

Incident Report Form

Fax completed form to:
425.462.5957
CH2M HILL Seattle Office
Attention: Corporate HS&E Department

Type of Incident (Select at least one)

- ☐ Injury/Illness
- ☐ Environmental/Permit Issue
- ☐ Property Damage
- ☐ Near Miss
- ☐ Spill/Release
- ☐ Other

General Information (Complete for all incident types)

Preparer's Name: _____ Preparer's Employee Number: _____
Date of Report: _____ Date of Incident: _____ Time of Incident: _____ am/pm

Type of Activity (Provide activity being performed that resulted in the incident)

- ☐ Asbestos Work
- ☐ Confined Space Entry
- ☐ Construction Mgmt- Haz Waste
- ☐ Construction Mgmt - Non-Haz Waste
- ☐ Demolition
- ☐ Drilling-Haz Waste
- ☐ Drilling-Non Haz Waste
- ☐ Drum Handling
- ☐ Electrical Work
- ☐ Excavation Trench-Haz Waste
- ☐ Excavation Trench-Non Haz
- ☐ Facility Walk Through
- ☐ General Office Work
- ☐ Keyboard Work
- ☐ Laboratory
- ☐ Lead Abatement
- ☐ Motor Vehicle Operation
- ☐ Moving Heavy Object
- ☐ Other (Specify) _____
- ☐ Process Safety Management
- ☐ Tunneling
- ☐ Welding
- ☐ Wetlands Survey
- ☐ Working from Heights
- ☐ Working in Roadways
- ☐ WWTP Operation

Location of Incident (Select one)

- ☐ Company Premises (CH2M HILL Office: _____)
- ☐ Field (Project #: _____ Project/Site Name: _____ Client: _____)
- ☐ In Transit (Traveling from: _____ Traveling to: _____)
- ☐ At Home

Geographic Location of Incident (Select region where the incident occurred)

- ☐ Northeast
- ☐ Southeast
- ☐ Northwest
- ☐ Southwest
- ☐ Corporate
- ☐ Canadian
- ☐ Asia Pacific
- ☐ Europe Middle East
- ☐ Latin America

If a CH2M HILL subcontractor was involved in the incident, provide their company name and phone number: _____

Describe the Incident (Provide a brief description of the incident): _____

_____

_____

Injured Employee Data (Complete for Injury/Illness incidents only)

If CH2M HILL employee injured

Employee Name: _____ Employee Number: _____

If CH2M HILL Subcontractor employee injured

Employee Name: _____ Company: _____

Injury Type

- ☐ Allergic Reaction
- ☐ Amputation
- ☐ Asphyxia
- ☐ Bruise/Contusion/Abrasion
- ☐ Burn (Chemical)
- ☐ Burn/Scald (Heat)
- ☐ Cancer
- ☐ Carpal Tunnel
- ☐ Concussion
- ☐ Cut/Laceration
- ☐ Dermatitis
- ☐ Dislocation
- ☐ Electric Shock
- ☐ Foreign Body in eye
- ☐ Fracture
- ☐ Freezing/Frost Bite
- ☐ Headache
- ☐ Hearing Loss
- ☐ Heat Exhaustion
- ☐ Hernia
- ☐ Infection
- ☐ Irritation to eye
- ☐ Ligament Damage
- ☐ Multiple (Specify) _____
- ☐ Muscle Spasms
- ☐ Other (Specify) _____
- ☐ Poisoning (Systemic)
- ☐ Puncture
- ☐ Radiation Effects
- ☐ Strain/Sprain
- ☐ Tendonitis
- ☐ Wrist Pain

Part of Body Injured

- ☐ Abdomen
- ☐ Ankle(s)
- ☐ Arms (Multiple)
- ☐ Back
- ☐ Blood
- ☐ Body System
- ☐ Buttocks
- ☐ Chest/Ribs
- ☐ Ear(s)
- ☐ Elbow(s)
- ☐ Eye(s)
- ☐ Face
- ☐ Finger(s)
- ☐ Foot/Feet
- ☐ Hand(s)
- ☐ Head
- ☐ Hip(s)
- ☐ Kidney
- ☐ Knee(s)
- ☐ Leg(s)
- ☐ Liver
- ☐ Lower (arms)
- ☐ Lower (legs)
- ☐ Lung
- ☐ Mind
- ☐ Multiple (Specify) _____
- ☐ Neck
- ☐ Nervous System
- ☐ Nose
- ☐ Other (Specify) _____
- ☐ Reproductive System
- ☐ Shoulder(s)
- ☐ Throat
- ☐ Toe(s)
- ☐ Upper Arm(s)
- ☐ Upper Leg(s)
- ☐ Wrist(s)

Nature of Injury

- ☐ Absorption
- ☐ Bite/Sting/Scratch
- ☐ Cardio-Vascular/Respiratory System Failure
- ☐ Caught In or Between
- ☐ Fall (From Elevation)
- ☐ Fall (Same Level)
- ☐ Ingestion
- ☐ Inhalation
- ☐ Lifting
- ☐ Mental Stress
- ☐ Motor Vehicle Accident
- ☐ Multiple (Specify) _____
- ☐ Other (Specify) _____
- ☐ Overexertion
- ☐ Repeated Motion/Pressure
- ☐ Rubbed/Abraded
- ☐ Shock
- ☐ Struck Against
- ☐ Struck By
- ☐ Work Place Violence

Initial Diagnosis/Treatment Date: _____

Type of Treatment

- ☐ Admission to hospital/medical facility
- ☐ Application of bandages
- ☐ Cold/Heat Compression/Multiple Treatment
- ☐ Cold/Heat Compression/One Treatment
- ☐ First Degree Burn Treatment
- ☐ Heat Therapy/Multiple treatment
- ☐ Multiple (Specify) _____
- ☐ Heat Therapy/One Treatment
- ☐ Non-Prescriptive medicine
- ☐ None
- ☐ Observation
- ☐ Other (Specify) _____
- ☐ Prescription- Multiple dose
- ☐ Prescription- Single dose
- ☐ Removal of foreign bodies
- ☐ Skin Removal
- ☐ Soaking therapy- Multiple Treatment
- ☐ Soaking Therapy- One Treatment
- ☐ Stitches/Sutures
- ☐ Tetanus
- ☐ Treatment for infection
- ☐ Treatment of 2nd /3rd degree burns
- ☐ Use of Antiseptics – multiple treatment
- ☐ Use of Antiseptics – single treatment
- ☐ Whirlpool bath therapy/multiple treatment
- ☐ Whirlpool therapy/single treatment
- ☐ X-rays negative
- ☐ X-rays positive/treatment of fracture

Number of days doctor required employee to be off work: _____
Number of days doctor restricted employee's work activity: _____
Equipment Malfunction : Yes ☐ No ☐ Activity was a Routine Task: Yes ☐ No ☐
Describe how you may have prevented this injury: _____
_____

Physician Information
Name: _____
Address: _____
City: _____
Zip Code: _____
Phone: _____

Hospital Information
Name: _____
Address: _____
City: _____
Zip Code: _____
Phone: _____

Property Damage (Complete for Property Damage incidents only)

Property Damaged: _____ Property Owner: _____
Damage Description: _____
Estimated Amount: $ _____

Spill or Release (Complete for Spill/Release incidents only)

Substance (attach MSDS): _____ Estimated Quantity: _____

Facility Name, Address, Phone No.: _____
Did the spill/release move off the property where work was performed?: _____
Spill/Release From: _____ Spill/Release To: _____

Environmental/Permit Issue (Complete for Environmental/Permit Issue incidents only)

Describe Environmental or Permit Issue: _____
Permit Type: _____
Permitted Level or Criteria (e.g., discharge limit): _____
Permit Name and Number (e.g., NPDES No. ST1234): _____
Substance and Estimated Quantity: _____
Duration of Permit Exceedence: _____

Verbal Notification (Complete for all incident types)(Provide names, dates and times)

CH2M HILL Personnel Notified: _____
Client Notified: _____

Witnesses (Complete for all incident types)

Witness Information (First Witness)
Name: _____
Employee Number (CH2M HILL):_____
Address: _____
City: _____
Zip Code:_____
Phone: _____

Witness Information (Second Witness)
Name: _____
Employee Number (CH2M HILL: _____
Address: _____
City: _____
Zip Code:_____
Phone :_____

Additional Comments:
_____
_____

NEAR LOSS INVESTIGATION FORM

Employer Information

Company Name: _____

Project Name: _____ Project Number: _____

Project Location: _____

CHIL Project? Yes ☐ No ☐

Task Location: _____

Job Assignment: _____ Business Group: _____

Preparer's Name: _____ Preparer's Employee Number: _____

Near Loss Incident Specific Information

Date of Incident: _____ Time of Incident: _____ a.m./p.m.

Location of incident:
☐Company premises ☐Field ☐In Transit ☐Other:_____

Address where the incident occurred: _____

Equipment Malfunction : Yes ☐ No ☐ Activity was a Routine Task: Yes ☐ No ☐

Describe any property damage: _____

Specific activity the employee was engaged in when the incident occurred:

_____

_____

All equipment, materials, or chemicals the employee was using when the incident occurred:

_____

_____

Describe the specific incident and how it occurred:

_____

_____

_____

Describe how this incident may have been prevented:

_____

_____

_____

Contributing Factors (Describe in detail why incident occurred):

_____

_____

_____

Date employer notified of incident: _____ To whom reported: _____

NEAR LOSS INVESTIGATION FORM

Witness Information (First Witness)

Name: _____

Employee Number (for CH2M HILL employees):_____

Address: _____

City: _____

Zip Code : _____

Phone: _____

Witness Information (Second Witness)

Name: _____

Employee Number (for CH2M HILL employees): _____

Address: _____

City: _____

Zip Code: _____

Phone : _____

Additional information or comments:_____

_____

Attachment 5

CH2M HILL Drug Policy and Forms

CH2MHILL

Drug-Free Workplace
Standard of Practice HSE-105

Drug-Free Work Place Program

Subcontractor has certified to CH2M HILL that it implements a drug policy which meets CH2M HILL's minimum standards for a drug-free workplace, which standards are incorporated into the Subcontract by this reference ("Standards"). CH2M HILL may conduct reasonable searches, including random searches, of Subcontractor's employees and employees of its lower tier subcontractors and suppliers and may require and receive the results of a 5-panel drug screen and blood alcohol tests for any employee of Subcontractor or its lower tier subcontractors. Any employee of Subcontractor, its lower tier subcontractors or suppliers found to possess or be under the influence of an article prohibited by the Standards, or refusing to test or to consent to a reasonable search by CH2M HILL may, in CH2M HILL's sole discretion, be immediately removed from the Project site and denied future access. Subcontractor agrees to enforce its drug policy and to bind its lower tier subcontractors to its policy and to the provisions of this paragraph. Any violation of the requirements of this paragraph may be grounds for withholding payment to Subcontractor or for termination for default pursuant to Article 10. Nothing in this paragraph shall require CH2M HILL to undertake testing or searches.

CH2MHILL

Policy Acknowledgement and Consent Form

Policy

CH2M HILL does not tolerate illegal drug use, or any use of drugs, controlled substances or alcohol that impairs an employee's work performance or behavior. CH2M HILL has established a policy whereby its employees and subcontractors shall not be involved in any manner with the unlawful manufacture, distribution, dispensation, possession, sale, or use of illegal drugs in the workplace. The use or possession of alcohol in the workplace is also prohibited except where alcohol on premises is allowed on limited occasions with approval by office managers. Any violation of these prohibitions may result in discipline or immediate discharge.

Additional details on CH2M HILL's drug policy can be found in the Employee Handbook, SOP HSE-105, or from the DFWPA or a Human Resources Manager (HRM).

Testing

The necessity for testing will be determined by the projects the employee works on. Certain clients require drug or alcohol testing as do certain types of projects (such as, CCI owned projects). An applicant or employee may have to submit to pre-employment or pre-assignment, random, or post-incident testing when there is cause or reasonable suspicion of a violation of CH2M HILL's Drug-Free Workplace Program, or when returning to work after participating in a rehabilitation program.

Drug testing may include, but is not limited to, the following compounds. Levels on initially screened urine specimens which are equal to or exceed the following will be considered as presumptively positive and submitted for confirmation testing. Each presumptive positive result must be confirmed by a second analysis using the Gas Chromatography/Mass Spectrometry (GC/MS) method.

	EMIT	GC/MS
Amphetamines	1,000 ng/ml	500 ng/ml
Marijuana (THC)	50 ng/ml	15 ng/ml
Cocaine	300 ng/ml	150 ng/ml
Phencyclidine (PCP)	25 ng/ml	25 ng/ml
Opiates	2000ng/ml	2000ng/ml

An employee is considered to be positive for alcohol if their breath or blood alcohol level is 0.04 or higher. Breath testing will be used unless applicable state licensing or other requirements mandate blood tests or unless testing facilities are not available for breath sampling. When blood testing is used, each presumptive positive result must be confirmed by a second analysis using a GC/MS.

Employees who have a "diluted" sample will be required to submit to an escorted test without prior warning.

Employees who test positive may be disciplined, up to and including dismissal and employees who refuse a test will be treated as if they tested positive and may be disciplined, up to and including dismissal.

Contesting Results

If an employee wishes to contest their results, they are required to notify the MRO, the Drug-Free Work Place Administrator (DFWPA) and the Human Resources Manger (HRM) in writing as soon as possible, but no later than 5 working days after notification of the test results. When notifying CH2M HILL that the results are being contested, the employee must provide, in writing, the reasons why the results are being contested. A portion of the original sample will be tested by an approved laboratory, at the employee's expense. The employee will be reimbursed if the original sample is found to be negative as a result of the retesting.

If the employee is planning on bringing on administrative or civil action against a laboratory, they are required to notify the MRO.

Medications that can interfere with Drug Testing Results

Employees will be required to inform the oversight physician, known as the MRO, of prescription and nonprescription medications which might affect the employee's ability to perform the essential functions of their job, pose a direct threat to the health and safety of the employee or that of others, or interfere with their drug or alcohol test results. They can either fax the information to Dr. Jim Ferguson at 301-571-2186 or call him at 800-275-7051 ex. 4603. Employees can also contact the MRO to discuss how medications they are taking may affect a drug test.

Confidentiality

Information and records associated with the CH2M HILL Drug-Free Workplace Program will be treated confidentiality.

Employee Assistance

CH2M HILL's Employee Assistant Program (EAP) can be contacted by: 1.800.888.2273. Local drug rehabilitation programs will be listed in the site-specific written safety plan.

Employee and Applicant Responsibilities

All employees who fall under the scope of CH2M HILL's Drug-Free Workplace Program are responsible for following its requirements. Each applicant must sign that they have received an overview of CH2M HILL's program and agree to its provisions. Employee responsibilities include, but are not limited to, never reporting to work while under the influence of illegal drugs or alcohol, notifying the CCOP of prescription drug and nonprescription medication use that could affect job performance and safety as noted above, and notifying a supervisor of any work-related drug- or alcohol-related convictions within 5 days following the event using the Drug- and Alcohol-Related Convictions Form. In the event that an employee wants to contest their results, they are responsible for notifying the MRO and laboratory of any administrative or civil actions brought about as the result of contesting their test results.

Employee and Applicant Acknowledgement

By signing below, you are acknowledging that you have been given a copy of the company's drug testing policy, have read and understand the requirements of this policy and program, agree to comply with all of its requirements, and understand that noncompliance with this program can result in dismissal.

You are also authorizing and requesting your prescribing physician(s) to discuss and disclose to CH2M HILL or their representatives any anticipated or normal side effects of medications and prescription drugs that may have an effect on your ability to perform the essential functions of your job or work safely as noted above.

Check One:

☐ New CCI Employee

☐ Other INC, OMI, or IDC Employee

☐ Other (Company Name): _____

_____ Signature

_____ Social Security Number

_____ Printed Name

_____ Date

_____ Witness Signature

Return completed form to the project DFWPA or HRM.
This form is part of CH2M HILL's Drug-Free Workplace Program described in SOP HSE-105.

Appendix C

Explosives Safety Submission

Final

Explosives Safety Submission

Munitions Response for Discarded Military Munitions at Hangar 860 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, Engineering Field Division South

Prepared by

CH2MHILL Constructors, Inc.

115 Perimeter Center Place, N.E.
Suite 700

Atlanta, Georgia 30346

February 2006

Contents

Acronyms and Abbreviations ..... **iv**

1 Project Summary **1-1**
1.1 Munitions and Explosives of Concern 1-1
1.2 Conclusions from Previous Studies and Reports of Ordnance Contamination 1-2
1.3 Suspected Type and Amount of Ordnance Contamination 1-2
1.4 Planned Future Use of Property 1-3
1.5 Remediation Goals 1-3
1.6 Munitions Response Action Planned 1-3
2 Maps **2-1**
2.1 Regional Map 2-1
2.2 Activity Map 2-1
2.3 Quantity Distance (Q-D) Map 2-1
2.4 Soil Sampling Map 2-1
3 Amount and Type of MEC **3-1**
3.1 Munitions Greatest Fragmentation Distance 3-1
3.2 Maximum Credible Event for Explosive Soil 3-2
3.3 Maximum Credible Event for Buildings 3-2
3.3.1 Building 865 3-2
3.3.2 Portable Outdoor Type 2 HE Storage Magazine 3-2
3.3.3 Intermagazine Distances 3-4
3.4 Description and Status of MRS Not Covered 3-4
4 Start Date **4-1**
5 Frostline **5-1**
6 Response Techniques **6-1**
6.1 Type of Geophysical Detection Equipment 6-1
6.2 Methods to Verify Detection Capabilities 6-1
6.3 Anomaly Discrimination 6-2
6.4 Detection Method 6-2
6.4.1 Detection Procedures 6-2
6.4.2 Selection Criteria and Rationale 6-2
6.4.3 Quality Assurance and Quality Control (QA/QC) 6-2
6.4.4 Personnel Qualifications 6-3
6.5 Disposition of MEC and Related Scrap 6-3
7 Explosives Safety Quantity-Distance **7-1**
7.1 Munitions Response Sites 7-1
7.1.1 IBD 7-1
7.1.2 PTR Distance 7-2
7.2 Magazines 7-3
7.2.1 Portable Outdoor Type 2 HE Storage Magazine 7-3
7.3 Planned or Established Treatment Areas 7-3

7.3.1 Planned or Established Demolition Area 7-4
7.3.2 Exclusion Zone 7-4
7.3.3 Calculations for Engineering Controls and ESQD 7-5
8 Offsite Disposal 8-1
9 Environmental Considerations 9-1
9.1 Environmental Regulatory Considerations 9-1
9.2 Ecological and Cultural Environmental Considerations 9-1
10 Technical Support 10-1
11 Land Use Restrictions 11-1
12 Public Involvement 12-1
13 References 13-1

Figures

1-1 Vicinity Map
2-1 Regional Map
2-2 Activity Map
2-3 Quantity-Distance Map for MRS Work Area
2-4 Quantity-Distance Map for Portable Outdoor Type 2 High Explosive Storage Magazine

Tables

7-1 Determining Sizes of Exclusion Zones

Attachments

1 MRS Identification and Notification Report
2 Engineering Controls Calculations and Operational Hazard Analysis

Acronyms and Abbreviations

ARARs	Applicable or Relevant and Appropriate Requirements
ATF	Alcohol, Tobacco, and Firearms
CAD	cartridge actuated device
CAI	cartridge actuated initiator
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M HILL	CH2M HILL Constructors, Inc.
CFR	Code of Federal Regulations
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DMM	Discarded Military Munitions
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
ECA	Equipment Check Area
EO	Executive Order
EOD	Explosive Ordnance Disposal
EODB	EOD Bulletin
ES	Exposed Site
ESQD	Explosives Safety Quantity-Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FAA	Federal Aviation Authority
FANG	Florida Air National Guard
FLARNG	Florida Army Reserve National Guard
HE	High Explosive
HERO	Hazards of Electromagnetic Radiation to Ordnance
IBD	Inhabited Building Distance
JAA	Jacksonville Airport Authority
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
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
MRS	Munitions Response Site
NAS	Naval Air Station
NAVFAC EFD SOUTH	U.S. Naval Facilities Engineering Command, Engineering Field Division South
NAVSEA	Naval Sea Systems Command
NEW	Net Explosives Weight
NOSSA	Naval Ordnance Safety and Security Activity
OP	Ordnance Publication

OSHA	Occupational Safety and Health Act
PES	Potential Explosion Site
psi	pounds per square inch
PTR	Public Transportation Routes
QA	Quality Assurance
QC	Quality Control
Q-D	Quantity-Distance
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SUXOS	Senior UXO Supervisor
TCRA	Time Critical Removal Action
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Corps of Engineers, Huntsville Center
USCG	U.S. Coast Guard
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer

SECTION 1

Project Summary

This Explosives Safety Submission (ESS) is in support of Munitions Response to locate and remove Munitions and Explosives of Concern (MEC) and Material Potentially Presenting an Explosive Hazard (MPPEH) in the vicinity of Hangar 860 at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. The munitions response action for MEC and MPPEH is being implemented by CH2M HILL Constructors, Inc. (CH2M HILL) for the U.S. Naval Facilities Engineering Command, Engineering Field Division, South (NAVFAC EFD SOUTH) under Response Action Contract No. N62467-01-D-0331, Contract Task Order (CTO) No. 0029.

1.1 Munitions and Explosives of Concern

The work area covered by this ESS was designated a munitions response site (MRS) by the Naval Ordnance Safety and Security Activity (NOSSA) after receipt of an MRS Identification and Notification Report (Attachment 1) submitted by NAVFAC EFD SOUTH on February 11, 2005.

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 class/division explosives. It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response.

FLARNG notified the Jacksonville Airport Authority (JAA) of the discovery by e-mail on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC EFD SOUTH. Based on a request from NAVFAC EFD SOUTH, 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 remainder of the CAIs were located in the bottom of the ditch, visible through standing water. EOD Mayport responded on Tuesday, February 22, 2005, at the request of NAVFAC EFD SOUTH to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified the CAIs as expended.

The future FLARNG construction project is planned to consist of converting the open stormwater ditch to underground pipe drainage; filling in the ditch with soil; expanding the aircraft taxiway; and constructing climate controlled hangars for helicopters. The construction project is currently in the preliminary design phase.

The MPPEH discovery has prompted the need for additional MEC support. The additional support is a cautionary action to: 1) ensure that the presence of the discovered MPPEH was unique to the area where the items were found, 2) protect human health and safety for site personnel, and 3) allow the continued land use of the area.

1.2 Conclusions from Previous Studies and Reports of Ordnance Contamination

Buildings 865 and 873 are located approximately 800 feet west-northwest and 450 feet northwest, respectively, of the open stormwater drainage ditch and the location of the discovered CAIs (Figure 1-1). According to the Environmental Baseline Survey (EBS) for Transfer Report, 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 in the EBS for Transfer Report. The MRS work area had been previously found suitable to transfer with property transfer from the Navy to JAA completed in 1999.

There are no previously documented munitions disposal operations known to have taken place in or near the MRS.

1.3 Suspected Type and Amount of Ordnance Contamination

No munitions disposal operations are known to have taken place in or near the MRS. It is likely that the recovered MPPEH (23 expended JAU-22/B CAIs) were discarded by person or persons unknown. Although recovery at this site has been limited to MPPEH, the potential presence of a variety of MEC is considered probable due to the findings at a similar MRS located near Building 365 at the former NAS Cecil Field. The physical settings and features of the two MRSs are similar in that both are collocated in the vicinity of probable arm/de-arm areas and ready service magazines at the end of their respective runways. The assumption of recovering similar MEC/MPPEH types and quantities to the MRS located near Building 365 is used to guide the development of this ESS.

Following is a summary of the items recovered to date at the MRS located near Building 365:

- (173) each 20-millimeter (mm) high explosive (HE) projectiles (combination of unfired/fuzed with cartridge intact and projectile only)
- (416) each cartridge actuated devices (CADs)/impulse cartridges (unfired/MK2, MK14, MK18, MK19, miscellaneous small)
- (49) each small arms blanks (5.56-mm and 7.62-mm)
- (15) each MK4 bomb dummy unit signal cartridges
- (2) each suspect aircraft part suspected to contain (2) each CADs/impulse cartridges (determined to be type of actuator with two ports labeled for CAD use with caps and leads intact)

- Approximately 720 lbs of MPPEH consisting of expended CADs/impulse cartridges, 20-mm cartridges, 20-mm link belts, and (2) each MK76 bomb dummy units with no signal cartridges
- Approximately 3,500 lbs of non-MEC related scrap metal

1.4 Planned Future Use of Property

Future use of the property is industrial. The property has already been transferred from Navy control to JAA.

1.5 Remediation Goals

Based on site-specific information, the remedial goal is to remove MEC to a depth of 1 foot. The MRS has no history of having been used as a range and only DMM have been and are expected to be encountered. No evidence has been discovered that suggests DMM may have been buried on this site. To date, the only DMM discovered have been on the surface or under shallow water in the drainage ditch. CH2M HILL intends to perform a munitions response (mag & dig operation) from the ground surface to a depth of 1 foot to reduce the risk that DMM will be encountered by site personnel and allow the continued land use of the area. If intrusive construction activities are completed in the future, onsite construction support will be required. Onsite construction support will not be completed nor is it anticipated at this time because there are no ongoing or planned intrusive construction activities within the MRS.

1.6 Munitions Response Action Planned

The munitions response action planned for this project is the detection and removal of MEC from the ground surface to a depth of 1 foot (based on site-specific information). Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process, this action would be classified as a Time Critical Removal Action (TCRA).

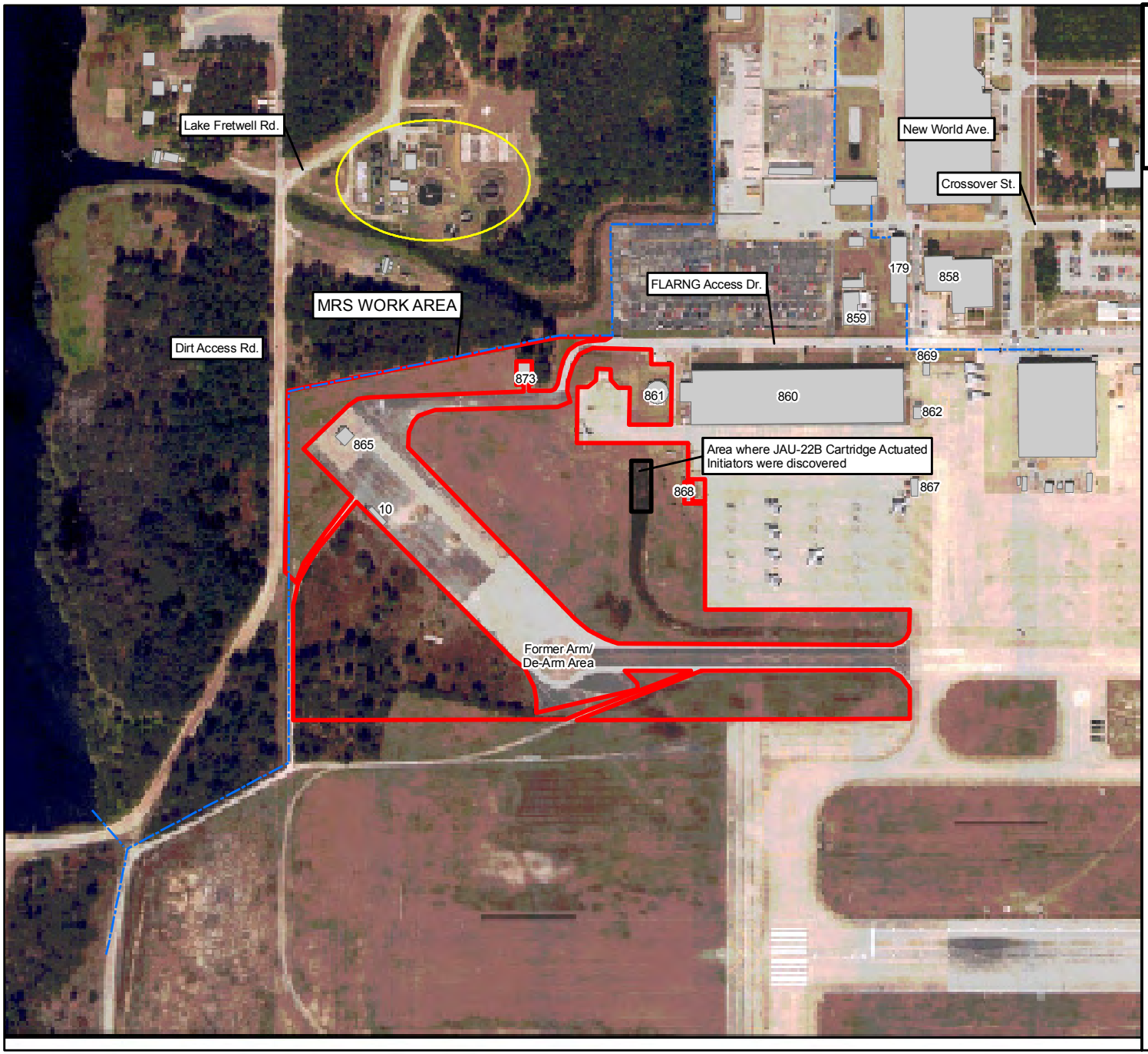


FIGURE 1-1
VICINITY MAP

Legend

MRS Work Area

Structures

DEMOLITION

PERMANENT

JAA and FLARNG Fence Line

Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig1-1_Vicinity_Map.mxd

SECTION 2

Maps

In addition to the map presented as Figure 1-1, the following maps have been provided:

2.1 Regional Map

Figure 2-1 is a regional map showing the State of Florida and the location of the former NAS Cecil Field.

2.2 Activity Map

Figure 2-2 is an activity map showing the MRS covered by this submission within the former NAS Cecil Field.

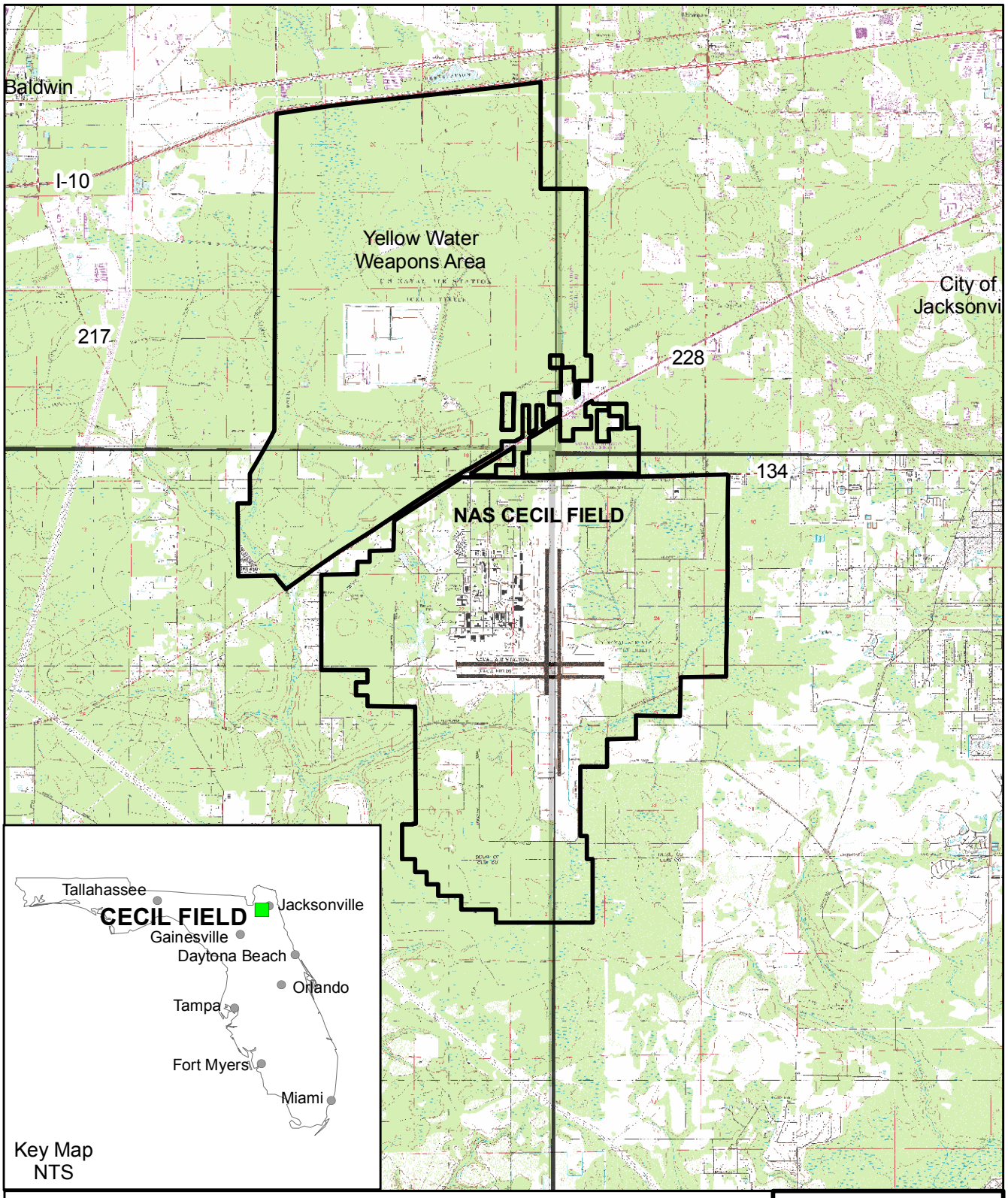
2.3 Quantity Distance (Q-D) Map

Figure 2-3 is a map of the site and depicts the explosive safety quantity distance (ESQD) arcs for MRS work areas. The Inhabited Building Distance (IBD) ESQD/Exclusion Zone (EZ) arcs for MEC removal/unintentional detonations and intentional detonations are shown. The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI initially will be enacted during intrusive work. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered. Figure 2-3 also depicts the location and IBD ESQD/EZ arc for the planned MEC demolition area with the use of engineering controls.

Figure 2-4 is a map of the site and depicts the location and IBD ESQD arcs for the proposed portable outdoor Type 2 HE storage magazine. The IBD ESQD arc for either the 1.4 or 1.1 class/division explosive will be enacted depending on the class/division of explosive placed in temporary storage. In addition, Figure 2-4 depicts the location and IBD/Public Transportation Route (PTR) ESQD arc for Building 865. Located within the MRS, Building 865 is an aboveground, flat-roof, cinderblock ready service magazine currently in use by FLARNG and the U.S. Coast Guard (USCG). Building 865 is discussed further in Section 3.3.1.

2.4 Soil Sampling Map

No soil sampling has been conducted; however, sampling may be required by the Florida Department of Environmental Protection. The extent of any required soil sampling has not been determined at this time.

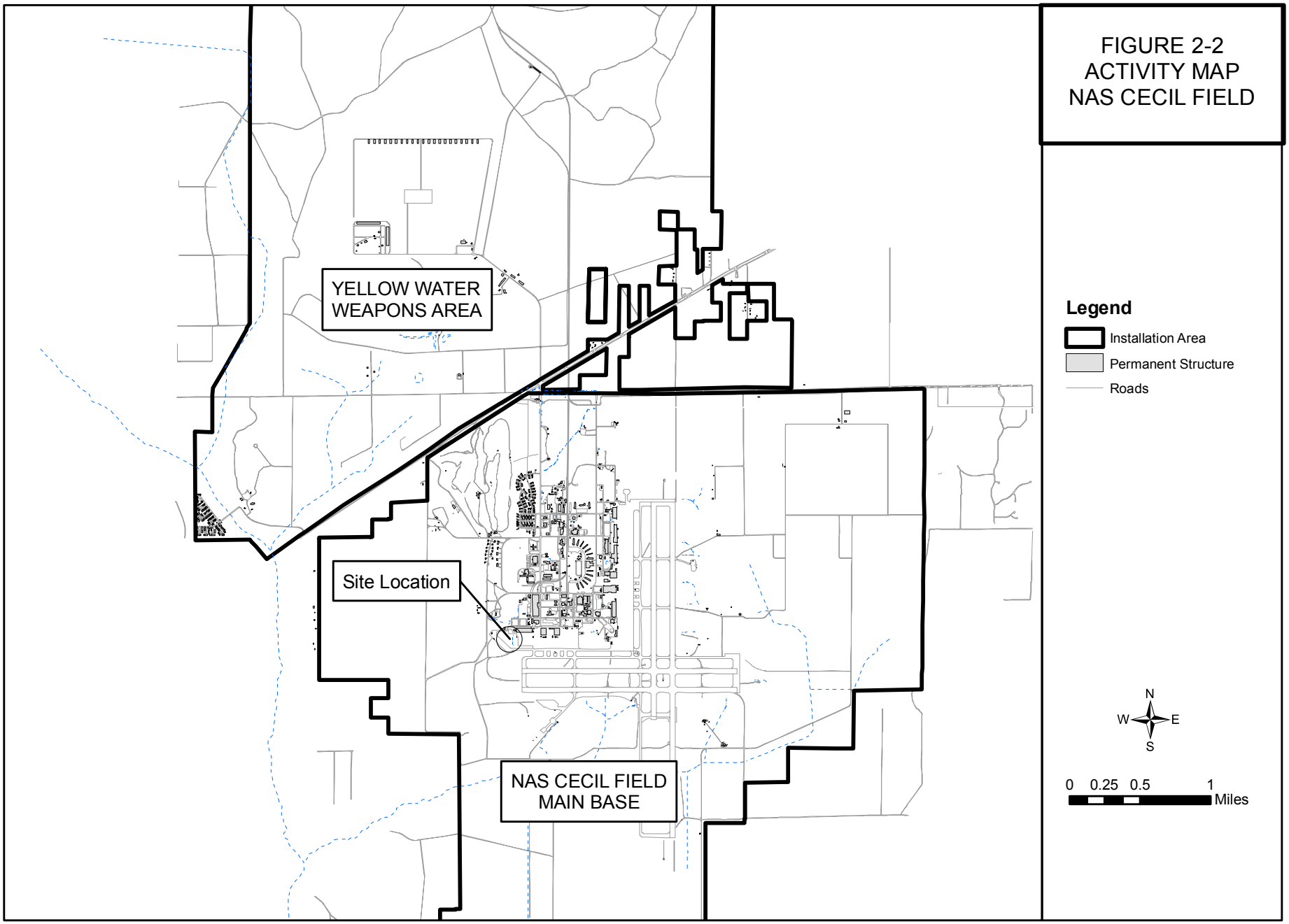


N
W E
S

0 4,000 8,000 16,000
Feet

FIGURE 2-1
REGIONAL MAP
NAS CECIL FIELD

\\volunteer\public\cecil_field\mxd\MRS_Work_Area\Fig2-1_Regional_Map.mxd



\\volunteer\public\cecil_field\mxd\2_Acre_Area\Fig2-2_Activity_Map.mxd

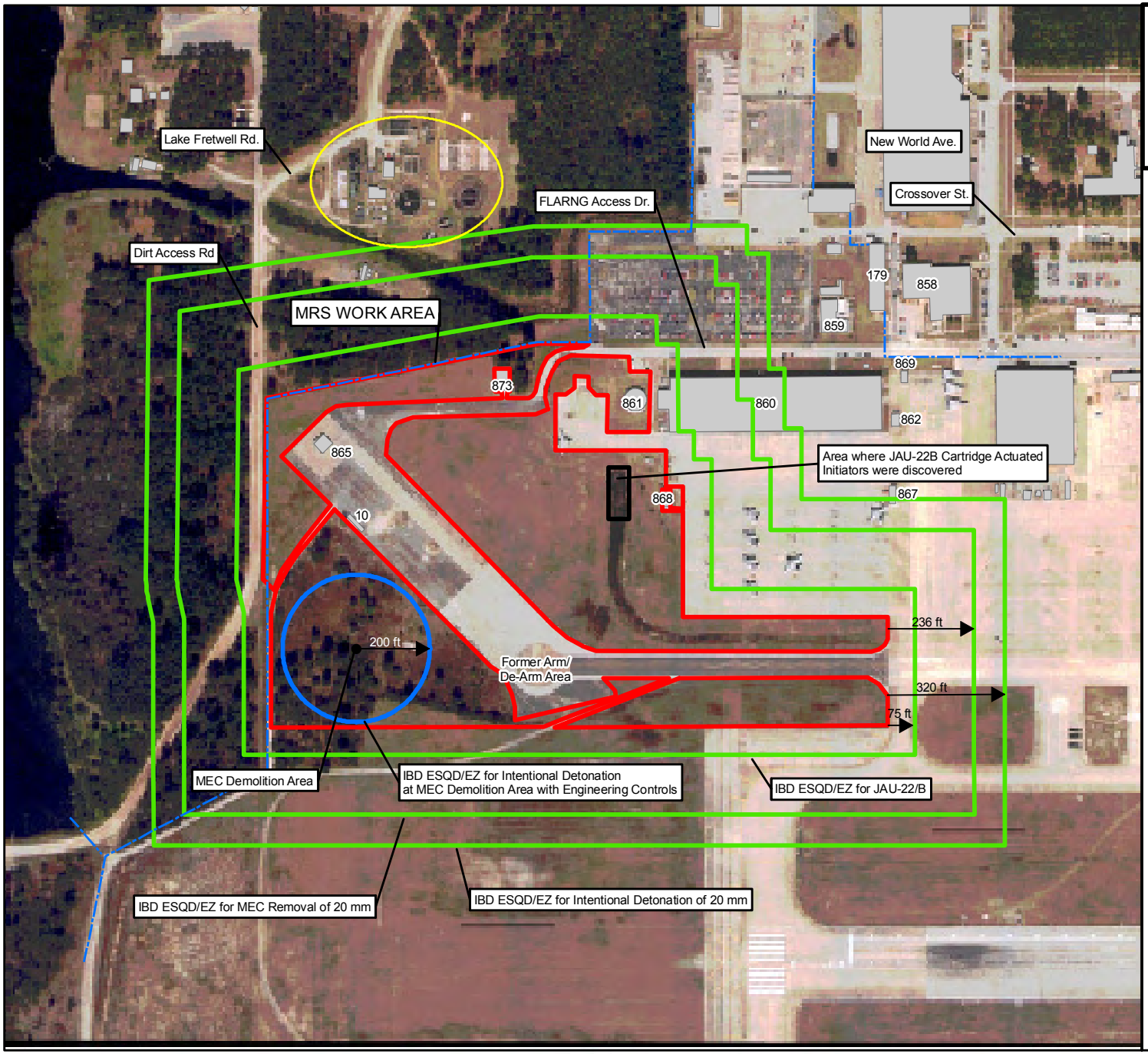


FIGURE 2-3 QUANTITY-DISTANCE MAP FOR MRS WORK AREA AT HANGER 860

Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

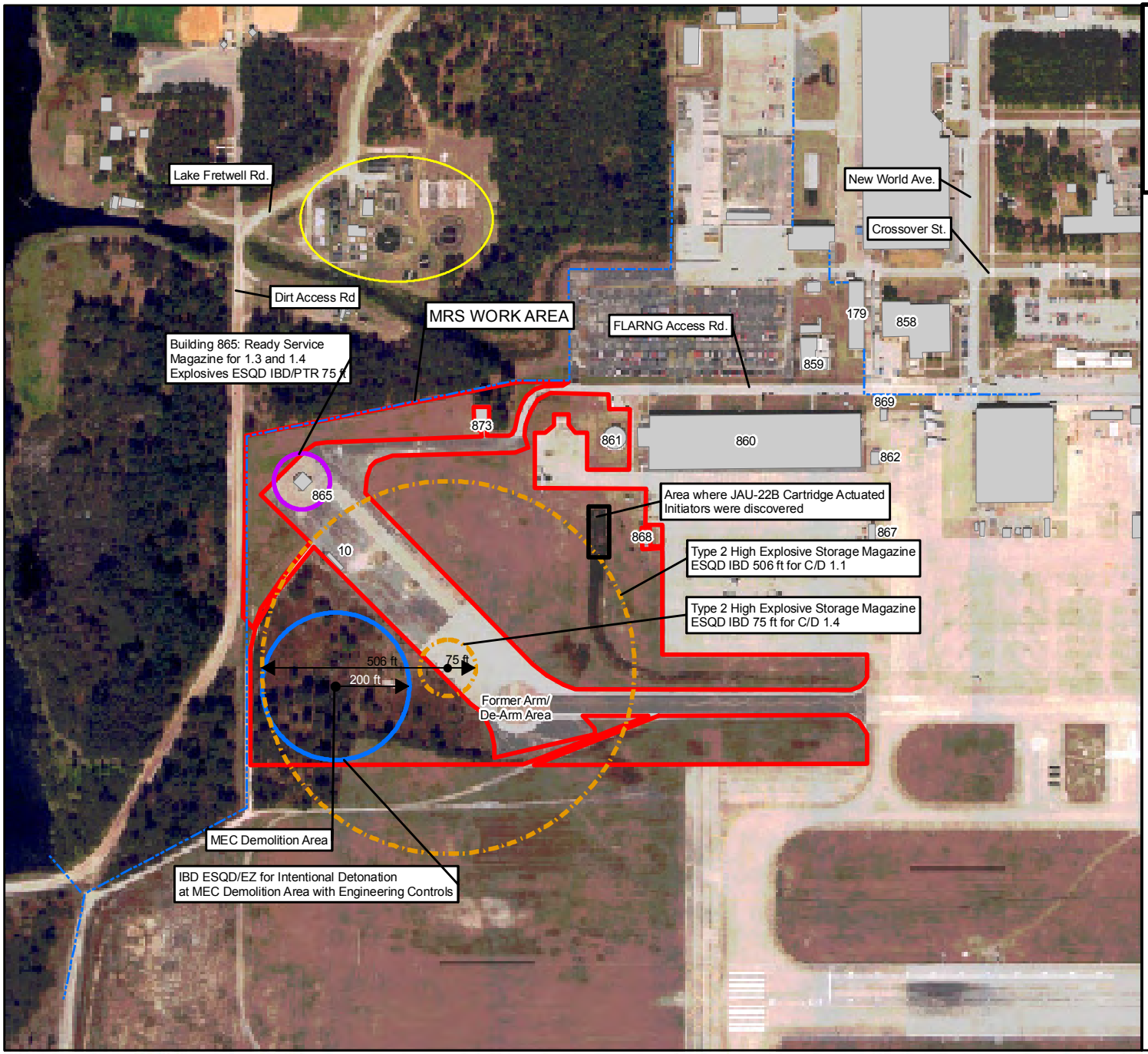
873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-3_20Acre_v2.mxd

FIGURE 2-4 QUANTITY-DISTANCE MAP FOR PORTABLE OUTDOOR TYPE 2 HIGH EXPLOSIVE STORAGE MAGAZINE



Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-4_Type2_Explosive_Storage_v2.mxd

SECTION 3

Amount and Type of MEC

This section presents information about the amount and type of MEC anticipated at the site. In addition, the Munition with the Greatest Fragmentation Distance (MGFD) is identified for the site. The MGFD will be used to establish safe distances for project activities and locations based upon the amount of explosives and the anticipated fragmentation distance for the munition.

As stated in Section 1, the following items have been found at the site:

- MPPEH, to include 23 expended JAU-22/B CAIs

Although recovery at this site has been limited to MPPEH, the potential presence of a variety of MEC is considered probable due to the findings at a similar MRS located near Building 365 at the former NAS Cecil Field. Suspected MEC includes:

- DMM, to include
  - 20-mm HE projectiles (combination of unfired/fuzed with cartridge intact and projectile only)
  - CADs/impulse cartridges (unfired/MK2, MK14, MK18, MK19, miscellaneous small)
  - small arms blanks (5.56-mm and 7.62-mm)
  - MK4 bomb dummy unit signal cartridges
  - suspect aircraft part suspected to contain CADs/impulse cartridges (determined to be type of actuator with two ports labeled for CAD use with caps and leads intact)
- MPPEH consisting of expended CADs/impulse cartridges and 20-mm cartridges

3.1 Munitions Greatest Fragmentation Distance

Based on the work experience at the MRS located near Building 365, the MGFD assumed for this site is a 20-mm HE round. According to Table 13-2 in Naval Sea Systems Command (NAVSEA) Ordnance Publication (OP) 5 Volume 1, the maximum fragment throw range for a 20-mm projectile is 320 feet.

An initial IBD ESQD/EZ arc of 75 feet for the JAU-22/B CAI, based on Table 7-22 in OP 5 Volume 1, will be enacted during MEC removal and intentional detonation operations. The IBD ESQD/EZ arc will be expanded to the 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered. If expanded, an initial EZ of 236 feet, based on Table 7-9 in OP 5 Volume 1, will be used during MEC removal operations with an initial EZ of 320 feet, based on Table 13-2 in OP 5 Volume 1, used for intentional detonations.

If, during the course of this project, a live MEC item with a greater fragmentation range is encountered, the ESQD arcs will be adjusted and an amendment to this ESS will be prepared.

3.2 Maximum Credible Event for Explosive Soil

No explosive soil is suspected or known to be on this MRS.

3.3 Maximum Credible Event for Buildings

3.3.1 Building 865

Building 865 is within this MRS and is an aboveground, flat-roof, cinderblock ready service magazine. The facility contains 12 storage units and is currently being used by the USCG for storage of small arms ammunition (1.4 class/division explosives) and pyrotechnics (1.3 class/division explosives) and FLARNG for storage of flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

The maximum storage according to USCG personnel is less than 1,000 lbs NEW. Based on Tables 7-20 and 7-22 in OP 5 Volume 1, the IBD/PTR ESQD for Building 865 for 1.3 class/division explosives up to 1,000 lbs NEW and for 1.4 class/division explosives up to 3,000 lbs NEW is 75 feet. The ESQD arc is shown on Figure 2-4.

There will be no access to Building 865 while intrusive work is being performed.

3.3.2 Portable Outdoor Type 2 HE Storage Magazine

A portable Type 2 HE storage magazine will be necessary for temporary MEC storage during the munitions response. The Type 2 HE storage magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type 2 magazine as described in Section 55.208(a) of Alcohol, Tobacco, and Firearms (ATF) P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations. The maximum NEW to be stored in the magazine is 15 lbs. This explosives storage area will meet the requirements of:

- ATF P 5400.7 – Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DoD, 2004, 6055.9-STD – DoD Ammunition and Explosives Safety Standards
- NAVSEA, 2004, 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 2

The magazine will be located as shown on Figure 2-4 and secured within a fence.

3.3.2.1 Inspections

The magazine will be inspected at least every 7 days to determine whether there has been unauthorized entry or attempted entry into the magazine, or unauthorized removal of the contents of the magazine.

3.3.2.2 Physical Security

Magazine locks will meet the standards for ATF Type 2 magazines, as specified in Section 55.208(a)(4), ATF P 5400.7. The magazine will have two locks. The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) will hold a key to one of the locks, and the UXO Safety Officer (UXOSO) will hold the key to the other. Access to the explosives will require both individuals.

3.3.2.3 Placards

The magazine will display the placards required by Department of Transportation 49 Code of Federal Regulations (CFR) Part 172, Subpart F, for the appropriate hazard division and class. A hazard identification for fire fighting personnel will also be displayed at the magazine storage area. Signs stating “EXPLOSIVES” and "NO SMOKING" will be posted on the fence surrounding the magazine.

3.3.2.4 Lightning Protection System

The magazine will be grounded for lightening protection.

3.3.2.5 Fire Protection

Fire extinguishers of 10 pounds and type BC will be located in the magazine area. Smoking, matches, open flames, spark-producing devices, and firearms will not be permitted within 50 feet of the magazine. The land surrounding the magazine will be kept clear of all combustible materials for a distance of at least 50 feet.

3.3.2.6 Housekeeping

The area surrounding the magazine will be kept clear of rubbish, dry grass, or trees (except live trees more than 10 feet tall), for not less than 25 feet in all directions.

3.3.2.7 Quantity-Distance

Based on Table 7-22 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.4 class/division explosives up to 3,000 lbs NEW is 75 feet. The maximum NEW to be stored in the magazine is 15 lbs.

Based on Tables 7-7 and 7-9 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.1 class/division explosives is 506 feet/303 feet. The ESQD is based on the hazardous fragment distance for 15 lbs NEW. The PTR distance is 60 percent of the IBD. Additionally, based on Table 7-28 in OP 5 Volume 1, the QD standards for 1.1 class/division explosives over 0 lbs NEW but less than 50 lbs NEW at airfields and helipads is 110 feet. Table 7-29 in OP 5 Volume 1 further describes the application of the safety distances provided in Table 7-28. According to Table 7-29, to determine the distance from an ammunition and explosive storage facility to:

- A combat aircraft parking area or Department of Defense (DoD) component aircraft parking area, apply the value listed in Table 7-28 (110 feet);
- Taxiways and runways used by DoD components only, apply the PTR (303 feet); and,
- Taxiways and runways used jointly by the DoD and non-DoD components, apply the IBD (506 feet).

Therefore, the IBD of 506 feet will be applied to ensure safe distance between the portable Type 2 HE Storage Magazine and aircraft facilities when 1.1 class/division explosives are in temporary storage.

The IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage. The ESQD arcs are shown on Figure 2-4.

3.3.3 Intermagazine Distances

To determine the required intermagazine distance between Building 865 and the portable Type 2 HE Storage Magazine, the hazard factor, K, from Table 7-13 is applied to Table 7-14 in OP 5 Volume 1. According to Table 7-13, where the Potential Explosion Site (PES) is an unbarricaded Aboveground Magazine and the Exposed Site (ES) is also an unbarricaded Aboveground Magazine, the hazard factor K is 11. According to Table 7-14, where K is 11 and the NEW is 100 lbs or less, the intermagazine distance is 51 feet.

Therefore, an intermagazine distance of at least 51 feet will be maintained.

3.4 Description and Status of MRS Not Covered

There are no known or suspected MRSs located in the vicinity covered by this submission.

SECTION 4

Start Date

Mobilization and site work in the MRS work area will be conducted as soon as approval of this ESS is received.

SECTION 5

Frostline

Because of the climatic conditions in Florida, the site does not have a frostline and has not experienced frost heave. Therefore, this section is not applicable.

SECTION 6

Response Techniques

This section describes the techniques used to detect, recover, and dispose of any MEC discovered at the site during the project, and discusses associated elements of the field work.

The proposed work approach is to determine whether additional MEC are present at the site through a mag & dig operation. The following general steps are included:

- Spraying of site for control of heavy mosquito population
- Emplacement of a 100- by 100-foot grid system tied to a permanent site monument
- Removal of vegetation in wooded area of site
- Removal of standing water in drainage ditch to be investigated
- Mag & dig operation to detect and investigate anomalies potentially related to MEC
- Dispose of MEC/MPPEH

If intrusive construction activities are completed in the future, onsite construction support will be required. Onsite construction support will not be completed nor is anticipated at this time because there are no ongoing or planned intrusive construction activities within the MRS.

6.1 Type of Geophysical Detection Equipment

Only handheld geophysical metal detectors will be used at the site. Because MEC is anticipated to be constructed of both ferrous and non-ferrous metals, an all-metals detector, the White's XLT (or equivalent), will be used for the mag & dig operation. The White's XLT metal detector is approved by the U.S. Army Corps of Engineers, Huntsville Center (USAESCH), Military Munitions Response Program Center of Expertise (MMRP-CX) for use on munitions response projects. The MMRP-CX has a program for testing geophysical instruments that meets the substantial requirements of the Navy Hazards of Electromagnetic Radiation to Ordnance (HERO) Program.

6.2 Methods to Verify Detection Capabilities

Geophysical instruments will be checked in an Equipment Check Area (ECA) prior to use each day. Three items, one inert 20-mm projectile (or surrogate), an empty CAI (or surrogate), and an empty CAD (or surrogate) will be buried at approximately 1 foot below the ground surface to ensure that these items can be detected to that depth each day prior to beginning operations. Because the only MEC found or anticipated to be found at the site consist of DMM, it is not anticipated that individual MEC items will be found below 1 foot.

6.3 Anomaly Discrimination

Because of the site limitations, no digital geophysical mapping or anomaly discrimination is proposed.

6.4 Detection Method

6.4.1 Detection Procedures

6.4.1.1 Vegetation Removal Detection

Vegetation removal will be accomplished using gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a tractor equipped with a bush hog mower. The brush will be cut to a height of approximately 6 inches above ground surface to allow UXO Technicians to visually observe the ground surface during the mag & dig operations. MEC avoidance will be performed during vegetation removal. This includes visual observation of the ground surface by UXO Technicians prior to and during vegetation removal and 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.

6.4.1.2 Water Removal from Drainage Ditch

Prior to initiating mag & dig operations, a vacuum truck or pumping system will be utilized to remove standing water from the drainage ditch and relocate the water downstream. The intake end of the water transfer hose will have a screen covering with openings no larger than 0.25-inch by 0.25-inch to prevent inadvertent pickup and transfer of MEC items.

6.4.1.3 Mag & Dig

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 surveying within the survey lane. When a subsurface anomaly is detected, the UXO Technician will mark and excavate the anomaly to determine if it presents a MEC hazard. UXO Technicians will not perform mag & dig operations over areas covered in asphalt or concrete or within approximately 10 feet of buildings, fences, and other structures containing metal.

6.4.2 Selection Criteria and Rationale

As discussed above, it is anticipated that MEC at the site will be constructed of both ferrous and non-ferrous metals, thus an instrument having the ability to detect both ferrous and non-ferrous metals is required. A digital geophysical mapping survey of the site is not proposed.

6.4.3 Quality Assurance and Quality Control (QA/QC)

QA/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 (for example, geophysical sensors and 2-way radios) for functioning and appropriate response prior to use.

As described in Section 6.2, geophysical instruments will be checked in an ECA prior to use each day.

6.4.4 Personnel Qualifications

All MEC operations personnel will be qualified and certified in accordance with NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program; terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel; and DDESB TP-18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and personnel.

6.5 Disposition of MEC and Related Scrap

On mobilization to the site, the MRS will be secured for a surface inspection of MEC items. In the event MEC items are identified, the SUXOS will secure the site and notify the CH2M HILL Project Manager, who in turn will notify the NAVFAC EFD SOUTH Remedial Project Manager (RPM). If the SUXOS and one other qualified UXO Technician determines the MEC item(s) are safe to move, the MEC item(s) will be placed in a portable Type 2 HE storage magazine and secured for disposal by detonation at the end of the TCRA. If the SUXOS determines the MEC item(s) are not safe to move, the site will remain secured until disposal operations can be performed.

In the event additional MEC items are identified at the site during mag & dig operations, the SUXOS will secure the site and notify the CH2M HILL Project Manager, who in turn will notify the NAVFAC EFD SOUTH RPM. If the SUXOS and one other qualified UXO Technician determines the MEC item(s) safe to move, the MEC item(s) will be placed in a portable Type 2 HE storage magazine, and secured for disposal by detonation at the end of the TCRA. If the SUXOS determines the MEC item(s) not safe to move, the site will remain secured until disposal operations can be performed.

MEC items that are required to be moved onsite (that is, to the temporary Type II HE storage magazine or from the storage magazine to the demolition site) will primarily be moved by hand; however, these items may be moved by vehicle across the open areas within the MRS. The terrain within the MRS is flat and vegetation is either mowed or will be removed as part of site preparation activities. All vehicle movements of MEC within the MRS will comply with the requirements of SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar.

Arrangements for delivery of explosives to countercharge discovered MEC will be made with a commercial explosives vendor and the explosives will be delivered within 24 hours. 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, weekly inventory, any discovery of a discrepancy in the quantities on hand versus quantities on inventory, and final disposition (for example, return to distributor or destruction). The

SUXOS and a UXO Technician III will evaluate the recovered MEC and existing ESQD arcs to ensure that that disposal by detonation can be safely effected. If insufficient ESQD arcs exist, a plan using engineering controls will be developed and expeditiously submitted by email to NOSSA for review and approval prior to executing disposal by detonation operations. Based on the MGFD and distances to the nearest IBD/PTR, it is anticipated that the only engineering controls that will be needed are sandbags. Disposal will be conducted in accordance with 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).

MPPEH and Munitions Debris (MD) will be inspected, certified, and verified in accordance with the requirements of DoD 4160.21-M (Chapter 4, Paragraph B) and OP 5 Volume 1 (Chapter 13, 14, and 15) and demilitarized, if necessary, in accordance with DoD 4160.21-M-1. Discussions are underway with the DRMO to establish protocols for disposition of munitions related scrap metal.

SECTION 7

Explosives Safety Quantity-Distance

This section contains information about the minimum ESQD requirements for the site.

The area where mag & dig operations are to be performed will have an EZ established prior to operations beginning in the area. An initial IBD ESQD/EZ arc for the JAU-22/B CAI will be established. The IBD ESQD/EZ arc will be expanded to the 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered. The MRS work area is shown on the ESQD maps (Figures 2-3 and 2-4).

Coordination of all work activities at the MRS with the JAA and Federal Aviation Authority (FAA) air traffic controller, NAVFAC EFD SOUTH, and the Resident Officer in Charge of Construction (ROICC) Project Office will be the responsibility of the CH2M HILL Project Manager and SUXOS. In addition, any required intentional detonations, including approach, timing, and required public notification, will be coordinated by the CH2M HILL Project Manager and SUXOS through the JAA and FAA air traffic controller, NAVFAC EFD SOUTH, and ROICC Project Office.

7.1 Munitions Response Sites

No MRS other than the one in this submission (shown on Figures 1-1, 2-2, 2-3, and 2-4) is known. Only one UXO Team conducting mag & dig operations will be employed inside the EZ.

7.1.1 IBD

Several buildings are located near the MRS, as described below:

- Building 860: An inhabited FLARNG aircraft maintenance hangar is partially located within the EZ. The actual distance from the nearest boundary of the MRS work area to the inhabited section of Building 860 is approximately 50 feet. 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. Alternate exits will be marked and posted within the hangar in the event of an emergency.

  An uninhabited fire pump room with masonry block walls is attached to the west end of Building 860, approximately 25 feet from the nearest boundary of the MRS work area. A single, steel man-door (in west wall) and a roll-up door (in north wall) provide access to the fire pump room and remain locked from the outside. The fire pump room provides a secured buffer between the MRS work area and the inhabited section of Building 860.

  The hangar HVAC unit is located adjacent to the north of the fire pump room. Three 250-gallon diesel aboveground storage tanks for the fire pumps and fire suppressant storage are located adjacent to the south of the fire pump room.

DDESB TP-16, Revision 1 provides the calculations to demonstrate that 4.11 inches of 4,000 pounds per square inch (psi) concrete is sufficient to prevent penetration from fragmentation of a 105-mm M1 (NEW 5.07 lb). The masonry block west walls of Building 860 and the fire pump room provide adequate protection from fragmentation in the event of an unintentional detonation of a JAU-22/B CAI (NEW 0.0116 lb) or 20-mm HE projectile/cartridge (NEW 0.026 lb).

In the event an MEC item(s) is identified at the site at a location where the IBD ESQD/EZ includes Building 860 or adjacent structures, and if the SUXOS and one other qualified UXO Technician determines the item(s) safe to move, the MEC item(s) will be placed in the portable Type 2 HE storage magazine and secured for disposal by detonation at the end of the TCRA. If the SUXOS determines the MEC item(s) are not safe to move, the site will remain secured until disposal operations can be performed. 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. If insufficient ESQD arcs exist, a plan using 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 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.

- Building 861: Located within the EZ is uninhabited and used as a concrete fire protection water reservoir for Hangar 860.
- Building 865: Located within the EZ is an uninhabited cinderblock ready service magazine used by the USCG and FLARNG. Building 865 is discussed in Section 3.3.1.
- Building 873: Located within the EZ and is uninhabited and used by the FLARNG for storage of nonhazardous aircraft parts.
- Former Water Treatment Plant: Partially located within the 20-mm HE projectile IBD EZ for an intentional detonation without engineering controls and is uninhabited, closed, and secured by the Jacksonville Electric Authority.

7.1.2 PTR Distance

Several roads and aircraft taxiways are located near and within the EZ of the MRS:

- Dirt Access Road (west of MRS): Runs north and south along the western boundary of the MRS within the EZ. The Dirt Access Road is not contained within the JAA and FLARNG fence line. A locked gate prevents access from the south and barriers and signs will be used to restrict access from the north.
- Aircraft Parking Apron/Taxiways: Located on the eastern side of the MRS within the EZ. Access from the aircraft parking apron and taxiway will be secured by barriers and access restricted by air traffic control.

- FLARNG Access Drive: Runs east and west, north of Hangar 860 within the EZ. The Access Drive is located within the JAA and FLARNG fence line. The road is secured from the east by a locked and guarded gate. Additional barriers and signs will be used to restrict access to the EZ from the east.

7.2 Magazines

MEC which has been determined safe to move by the SUXOS and one other qualified UXO Technician will be temporarily stored in a portable Type 2 HE storage magazine (located as shown in Figure 2-4). A maximum MEC NEW of 15 lbs will be stored at one time.

7.2.1 Portable Outdoor Type 2 HE Storage Magazine

A portable Type 2 HE storage magazine will be used for temporary MEC storage. The Type 2 HE storage magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type 2 magazine as described in Section 55.208(a) of ATF P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations. Details for the Type 2 HE storage magazine are provided in Section 3.3.2.

Based on Table 7-22 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.4 class/division explosives up to 3,000 lbs NEW is 75 feet. The maximum NEW to be stored in the magazine is 15 lbs.

Based on Tables 7-7 and 7-9 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.1 class/division explosives is 506 feet/303 feet. The ESQD is based on the hazardous fragment distance for 15 lbs NEW. The PTR distance is 60 percent of the IBD.

The IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage. The ESQD arcs are shown on Figure 2-4.

An intermagazine distance of at least 51 feet will be maintained.

No inhabited buildings or roads are located within the IBD ESQD for the Type 2 HE storage magazine.

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. Once onsite, the explosives materials will immediately be prepared and used without storage.

7.3 Planned or Established Treatment Areas

In the event an MEC item is identified at the site, the SUXOS will secure the site and notify the CH2M HILL Project Manager, who in turn will notify the NAVFAC EFD SOUTH RPM. If the SUXOS and one other qualified UXO Technician determines the MEC item(s) are safe to move but are not safe to transport for offsite disposal, the MEC item(s) will be placed in a portable Type 2 HE storage magazine and secured for disposal by detonation at the end of

the TCRA. If the SUXOS determines the MEC item(s) are not safe to move, the site will remain secured until disposal operations can be performed.

7.3.1 Planned or Established Demolition Area

MEC item(s) which have been moved for temporary storage in the portable Type 2 HE storage magazine will be disposed of by detonation at the MEC demolition location shown on Figures 2-3 and 2-4. Engineering controls which conform to the standards of HNC-ED-CS-S-98-7 will be used to maintain the IBD ESQD of 200 feet. Calculations for the engineering controls are discussed in detail in Section 7.3.3.

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.

7.3.2 Exclusion Zone

Table 7-1 provides the basis of determining the EZ for the expected munitions response operations at the former NAS Cecil Field.

TABLE 7-1
Determining Sizes of Exclusion Zones[1]

Operation	Basis for Determining Size of Exclusion Zone	Minimum Separation Distance (for Nonessential Personnel)	Safe Separation Distance (for Other UXO Teams)
Excavation Activities (JAU-22/B CAI, 1.4 class/division explosive)	Unintentional Detonation	75 feet[2] (IBD/PTR for ESQD) (Safe Separation Distance)	75 feet[2]
Excavation Activities (20-mm HE projectile, 1.1 class/division explosive)	Unintentional Detonation	236 feet[3] (IBD for ESQD), 142 feet[3] (PTR for ESQD) (Safe Separation Distance)	200 feet[4]
Detonation of MEC at MRS (Max. <1 lb NEW; JAU-22/B CAI, 1.4 class/division explosive)	Intentional Detonation	75 feet[2] (IBD for ESQD)	75 feet[2]
Detonation of MEC at MRS (Max. <1 lb NEW; 20-mm HE projectile, 1.1 class/division explosive)	Intentional Detonation	320 feet[5] (IBD for ESQD)	320 feet[5]
Detonation of MEC at Planned Demolition Area (Max. <6 lbs NEW)	Intentional Detonation	200 feet[6] (IBD for ESQD)	200 feet[6]

[1] The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

[2] Based on OP 5 Volume 1, Table 7-22.

[3] Based on OP 5 Volume 1, Table 7-9.

[4] Based on EM 1110-1-4009.

[5] Based on OP 5 Volume 1, Table 13-2.

[6] Based on calculations from TP-16 and HNC-ED-CS-S-98-7 as described in Section 7.3.3.

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. If insufficient ESQD arcs exist, a plan using engineering controls will be developed and expeditiously submitted via e-mail to NOSSA for review and approval prior to executing disposal by detonation operations. Based on the MGFD and distances to the nearest IBD/PTR, it is anticipated that the only engineering controls that will be needed are sandbags. Disposal will be conducted in accordance with 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.

7.3.3 Calculations for Engineering Controls and ESQD

To safely perform planned detonation of recovered DMM at the MEC demolition location shown on Figures 2-3 and 2-4, 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. Table B-1 and the calculation from Chapter 5 of DDESB TP-16, Revision 1, were utilized to determine the expected maximum fragmentation weight and velocity from a planned detonation of (10) each, 20-mm projectiles laid side by side.

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 2-3 and 2-4.

Attachment 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**.**

SECTION 8

Offsite Disposal

No offsite disposal of MEC is expected.

SECTION 9

Environmental Considerations

9.1 Environmental Regulatory Considerations

The Navy will conduct this MEC response action under the CERCLA framework, as is consistent with Department of Defense policy. OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy*, 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 EFD SOUTH 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 to be provided in the project Work Plan (CH2M HILL, in preparation):

- 29 CFR, Occupational Safety and Health Act (OSHA) Regulations: Construction (29 CFR 1926) and General Industry (29 CFR 1910), applicable sections
- U.S. Army 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 will be discussed in detail in the Work Plan (CH2M HILL, in preparation).

9.2 Ecological and Cultural Environmental 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.

SECTION 10

Technical Support

CH2M HILL is the MEC contractor for this submission. The nearest EOD Team that is available for technical support and/or emergency response is the Navy EOD Detachment at Mayport, Florida.

SECTION 11

Land Use Restrictions

Proposed land use is unrestricted use with no land use controls.

SECTION 12

Public 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 EFD SOUTH RPM of the site conditions, proposed removal plan, and progress of the removal action.

SECTION 13

References

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

CH2M HILL. November 2005. *Explosives Safety Submission for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Amendment No. 03. Prepared for NAVFAC EFD SOUTH.

CH2M HILL. November 2005. *Explosives Siting Plan for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Amendment No. 03. Prepared for NAVFAC EFD SOUTH.

CH2M HILL. January 2006. *Explosives Siting Plan for Munitions Response for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC EFD SOUTH.

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

DDESB. December 1, 2003. Technical Paper 16, Revision 1, *Methodologies for Calculating Primary Fragment Distances.*

DoD. October 21, 1991. DoD 4160.21-M-1, *Defense Demilitarization Manual*.

DoD. August 1997. DoD 4145.26-M, *Contractors Safety Manual for Ammunition and Explosives.*

DoD. 1997. DoD 4160.21-M, *Defense Materiel Disposition Manual*

DoD. January 5, 2004. DoD 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*, Rewrite Version, Revision 4.

NAVFAC. 1990. P-397, Structures to Resist the Effects of Accidental Explosions.

NAVSEA. Revised May 1994. Publication SW060-AA-MMA-010, Volumes I and II. *Technical Manual Explosive Ordnance Disposal Procedures*, Naval Explosive Ordnance Disposal Technology Center.

NAVSEA. January 15, 2001. SWO20-AF-ABK-010, *Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials*.

NAVSEA. 2004. SW023-AG-WHM-010, *On-Station Movement of Ammunition and Explosives by Truck and Railcar*

NAVSEA. June 1, 2004. Ordnance Publication 5 Volume 1, *Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Seventh Revision, Change 3.*

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

NOSSA. 2004 (2004a). Instruction 8020.15, *Military Munitions Response Oversight Program*.

Tetra Tech NUS, Inc. August 1999. *Environmental Baseline Survey for Transfer, Jacksonville Port Authority Parcel, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC EFD SOUTH.

U.S. Army Corps of Engineers. June 23, 2000. *Engineering and Design, Ordnance and Explosives Response* (EM 1110-1-4009).

U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville. August 1998. *Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions* (HNC-ED-CS-S-98-7).

U.S. Bureau of Alcohol, Tobacco, and Firearms (ATF) and U.S. Department of the Treasury. 1990. ATF P 5400.7, *ATF Explosives Laws and Regulations.*

U.S. Department of the Navy, Chief of Naval Operations. 1999. OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy.*

ATTACHMENT 1

MRS Identification and Notification Report

MUNITIONS RESPONSE SITE (MRS)
IDENTIFICATION AND NOTIFICATION REPORT

Instructions for use:
The Navy project manager or other cognizant official will submit this report to NOSSA within one week of initial encounter with Munitions and Explosives of Concern (MEC). Use a continuation sheet, as necessary.

Date submitted:	11 Feb 2005	Supporting EOD unit and/or UXO contractor:	Fl Air National Guard EOD; Mayport EOD; CH2M HILL.
MRS identifier: (activity, City and State)	Former Naval Air Station (NAS) Cecil Field, Jacksonville, FL [parcel now owned by Jacksonville Airport Authority (JAA)]		
Project manager name and activity:	Mark Davidson NAVFAC EFD SOUTH, Charleston, SC	Phone, fax, e-mail:	(843) 820-5526 voice (843) 820-5563 fax mark.e.davidson@navy.mil
Site history: (briefly describe past site use; discuss why MEC are known or suspected to be present)	The site consists of an open storm-water drainage ditch located SW of Hangar 860 at the former NAS Cecil Field. The ditch was transferred from Navy ownership to JAA in 1999 as part of BRAC III. There was no previously documented disposal of MEC at the site. On Friday, 4 Feb 2005, the tenant in Hangar 860 (FL Army Reserve National Guard) observed multiple items in the ditch, which had recently been mowed/cleared, that were believed to be potential MEC. On 4 Feb 2005, FL Air National Guard (FANG) EOD responded to the site and removed one of the items, which was later identified as a Cartridge Actuated Initiator (CAI). On Tuesday, 8 Feb 2005, JAA notified NAVFAC EFD SOUTH, Mark Davidson, of the discovered CAIs. On Wednesday, 9 Feb 05, a site visit was conducted by CH2M HILL (Navy on-site contractor) and JAA. Approximately 12 CAIs remain on site and are visible. One is located on the slopes of the ditch while the remaining CAIs are located in the bottom of the ditch, visible through the standing water. Bldg 873, located 450 NW of the MRS was formerly used for sonobuoy storage. Bldg 865, 800 feet W-NW of the MRS was formerly used as a ready service magazine. Both JAA and Army Guard fences secure the area.		
MEC encountered or believed to be present: (quantity, type/nomenclature, and condition)	1) Approximately 12 JAU-22/B Cartridge Actuated Initiators (CAI) with a NEW of 0.0116 lb each and rated as a 1.4C class/division explosive. It is our understanding that these CAIs are used for sonobuoy deployment. All CAIs appear to be in poor (rusted) condition.		
Summary of actions taken to date and planned actions:	MEC was discovered 4 Feb 2005. On 4 Feb 2005 FANG EOD responded and removed one CAI. NAVFAC EFD South was contacted 8 Feb 2005 by JAA. A site visit was conducted by NAVFAC EFD SOUTH contractor (CH2M HILL) and JAA on 9 Feb 2005. EOD Mayport will be contacted (11 Feb 2005) by NAVFAC EFD SOUTH to determine if they can remove remaining, visible CAIs. If EOD cannot remove CAIs, NAVFAC EFD SOUTH will contract with CH2M HILL to remove and dispose of remaining CAIs. CH2M HILL and NACFAC EFD SOUTH will assess the need for further investigation.		

A completed request may be submitted via: Fax: 301-744-6749 (DSN 354); E-mail: (call NOSSA N5 at 301-744-4450 for e-mail address)

Mail: COMMANDING OFFICER,
NAVAL ORDNANCE SAFETY AND SECURITY ACTIVITY
ATTN: CODE N5, 101 STRAUSS AVE, BLDG D327
INDIAN HEAD, MD 20640-5555

ATTACHMENT 2

Engineering Controls Calculations and Operational Hazard Analysis

Calculations for Engineering Controls and ESQD

References: (a) Department of Defense Explosive Safety Board (DDESB) Technical Publication 16, Revision 1, Methodologies for Calculating Primary Fragment Characteristics, dated December 1, 2003

(b) Department of the Army Technical Manual 43-0001-27, Army Ammunition Data Sheets – Small Caliber Ammunition, dated April 29, 1994

(c) 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

Probable recovery of multiple discarded military munitions (DMM) has generated a need to plan for their safe disposal. To safely detonate recovered DMM within the work area for the former NAS 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 Cecil Field is 320-ft for an intentional detonation based on the munition with the greatest fragment distance (MGFD), a M56A4, 20-mm HE projectile.

To determine the specifications for engineering controls for planned detonation activities, Table B-1 and the calculation from Chapter 5, reference (b) 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 (b) 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%."

Table B-1 in reference (b) provides the following data for a M56A4, 20mm HE projectile:

- Explosive Weight: 0.026 lbs.
- Max Fragment Weight: 0.0006 lbs.
- Fragment Initial Velocity: 3,183 feet/second

Reference (c) 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 (b).

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

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 0.0006 lbs. = **0.0009 lbs.**)
- The **expected initial velocity** = 2.0 x velocity from Table B-1 (2.0 x 3,183 feet/second = **6,366 feet/second**)
- **NEW** = NEW Donor (TNT Eq) + NEW Projectiles (TNT Eq.) (3.75 (1.27) + 10(0.026)(1.09) = **5.1 lbs. of TNT Eq**

Reference (d) 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-ft^2/s^2 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 ($W_F V_F^2/2$) = (0.0009 x 6,366^2 / 2) = 18,236.6802 or 0.018236 x 10^6 lb-ft^2/s^2

Take into account for the total NEW of the planned detonation (**5.1 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 (d).

According to Table 7, reference (d), 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**. The IBD ESQD arc is shown on Figures 2-3 and 2-4.

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

Operational Hazard Analysis
– Destruction of MEC (20-mm projectiles and Miscellaneous Cartridge Actuated Initiators/Devices (CAIs/CADs) at former NAS Cecil Field

1.1 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.

1.2 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 CAIs/CADs 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

1.3 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 transport

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 ¾ 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 CAIS/CADS'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

2.4 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	• Dropping 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
		• MEC Items not safe to move	• Initiation of ammunition and/or explosives	I B	• MEC Items will be determined safe to move IAW approved work plan and SSHP	II D	• UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
		• 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
	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 2	Functioning of Ordnance	• Dropping 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
		• MEC Items not safe to move	• 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
		• 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

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**
							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	• 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
	• 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 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	• Dropping 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
		• 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 5	• Functioning of Ordnance	• Dropping 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
		• 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

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**
	• Vehicle Accident	• Improper vehicle operations or vehicle malfunction	• Injuries to vehicle operators, pedestrians or property	III C	• Only licensed operators can operate vehicle • Performance of daily inspections and maintenance	IV C	hazards of MEC • Document daily safety inspections and maintenance • Conduct daily safety briefings for operators
II Construct Engineering Controls							
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
	• Lifting & Carrying Heavy Loads	• Bending to lift heavy items • Turning while lifting heavy items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury	III B	• Keep operational area free to debris or unnecessary objects that could create tripping hazards • Limit single person lifting to below 40 pounds	IV B	• All personnel will receive back safety and proper lifting technique training • Operations personnel will be certified IAW local command directives
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 • 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 3	• Functioning of Ordnance	• Dropping plywood on MEC and Explosives	• 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
	• 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

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**
	• 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
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	• Dropping sandbags on MEC and Explosives	• 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
	• 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
III Preparation of MEC for Detonation							
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 • 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 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 • 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

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**
	• 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 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
Step 2	• Initiation of explosives from shock or friction	• Dropping or mishandling ammunition and explosives	• Initiation of ammunition and/or explosives	I B	• Allow only qualified and certified personnel to handle ammunition and explosives	II D	• Operations personnel will be certified IAW local command directives

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**
	• Sharp banding under tension	• Cutting banding without PPE or using a non-standard cutting device	• Hand, arm, head or eye injury from banding when cut and hits operator	III B	• Provide PPE and standard band cutting device	IV B	•
Step 3	• Initiation of explosives from shock or friction	• Dropping or mishandling ammunition and explosives	• Initiation of ammunition and/or explosives	I B	• Allow only qualified and certified personnel to handle ammunition and explosives	II D	• Operations personnel will be certified IAW local command directives
	• Lifting Heavy Items	• Bending to lift heavy items • Turning while lifting heavy items • Tripping while carrying explosives • Dropping ammunition and explosive items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury • Initiation of explosives from shock and friction	III B	• 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	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 surfaces	• 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
	• Receiving incorrect amount of explosives	• Contract carrier having incorrect amount of explosives	• Exceeding explosive limits and requiring work stoppage	IV B	• Do not accept delivery of more explosives than required	IV D	• Verify amount of explosives ordered with amount of explosives delivered.
	• Receiving damaged or deteriorated explosives or ammunition	• Contract Carrier delivering damaged or deteriorated explosives	• Hazardous explosives which requires evacuation	IV B	• SUXOS will inspect all explosives prior to accepting delivery from contract carrier	IV D	• Document the condition of explosives prior to accepting delivery
V- Detonation of MEC							
Step 1	• Walking across uneven surfaces	• 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

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 2	NO HAZARDS						
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/ Explosives	• 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
Step 4	NO HAZARDS						
Step 5	• Flying debris	• Intentional Detonation of MEC and Explosives	• Injury from flying debris	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
	• Blast wave	• Intentional Detonation of MEC and Explosives	• Injury from blast wave	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
Step 6	NO HAZARDS						
VI- Miss-Fire Procedures							
Step 1	NO HAZARDS						
Step 2	NO HAZARDS						

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 3	• Flying debris	• Intentional Detonation of MEC and Explosives	• Injury from flying debris	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
	• Blast wave	• Intentional Detonation of MEC and Explosives	• Injury from blast wave	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
Step 4	NO HAZARDS						
Step 5	• 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
Step 6	• 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/ Explosives	• 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	I 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
Step 7	• 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

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**
	• Functioning of Ordnance/ Explosives	• 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
VII- Post Detonation Procedures							
Step 1	• Functioning of Ordnance/ Explosives	• 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
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 2	• Functioning of Ordnance/ Explosives	• 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

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**
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 3	• Functioning of Ordnance/ Explosives	• 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
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 4	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• Cuts, splinters and abrasions	I B	• Wearing of Leather work gloves	II D	• Personnel will be required to wear appropriate hand protection while performing operations

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**
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV B	• Personnel will be required to wear appropriate eye 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
Step 5	• Lifting & Carrying Heavy Loads	• Bending to lift heavy items • Turning while lifting heavy items • Tripping while carrying explosives • Dropping ammunition and explosive items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury • Initiation of explosives from shock and friction	I B	• 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	II D	• All personnel will receive back safety and proper lifting technique training • Operations personnel will be certified IAW local command directives
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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

Sandbag Construction Examples

*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

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

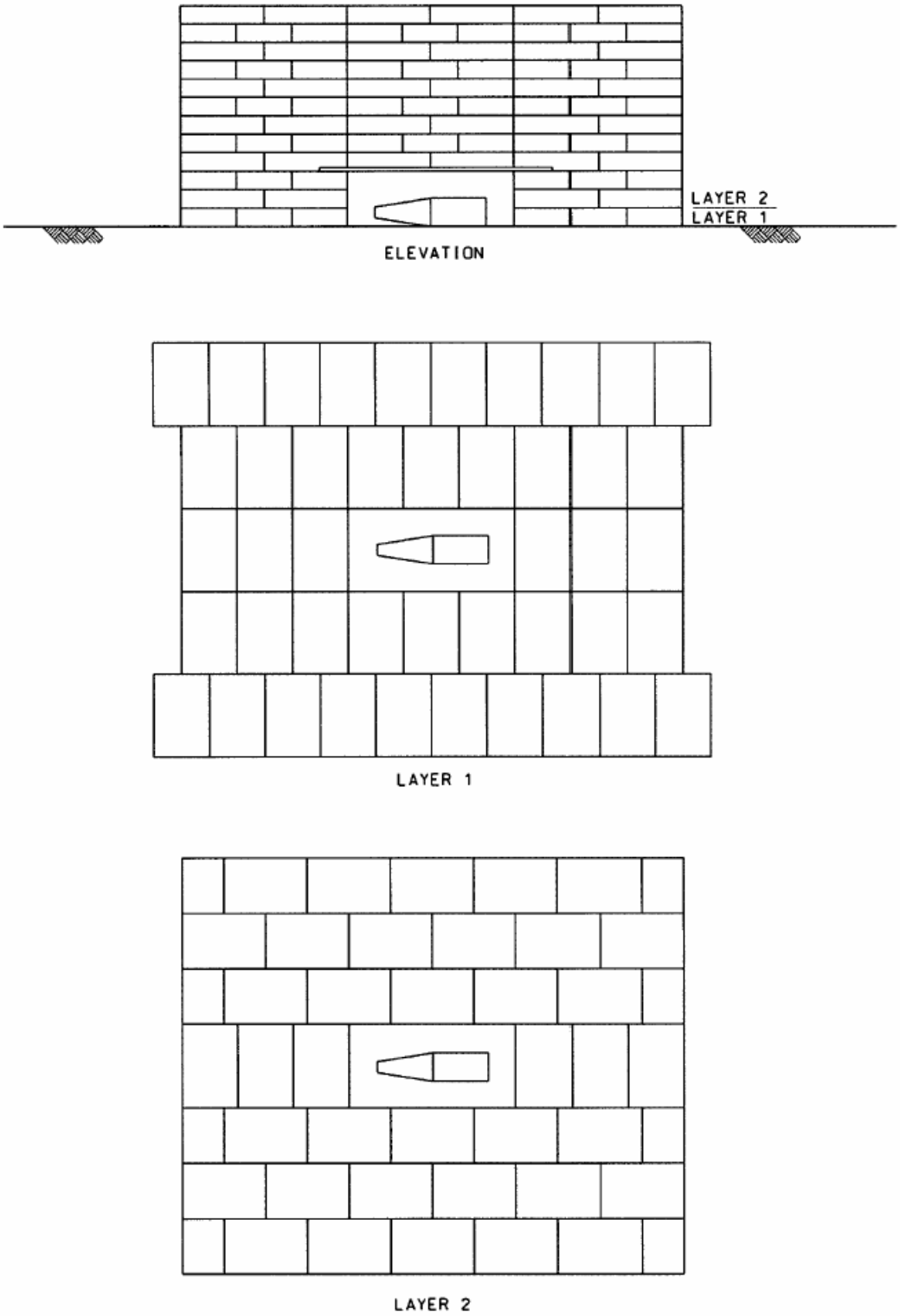


Figure 6 - Interlocking Alternate Layers of Sandbags

Appendix D

Explosives Siting Plan

REQUEST FOR PROJECT SITE APPROVAL/EXPLOSIVES SAFETY CERTIFICATION NAVFAC 11010/31 (REV. 5-2001)

PART I

INSTRUCTIONS IN NAVFACINST 11010.45

SECTION A – INSTALLATION SUBMISSION

1. To: Naval Ordnance Safety and Security Activity (N7)

2. From: Southern Division, Naval Facilities Engineering Command

3. Program Year: 2006

4. Cost ($000):

5. Type Funding

6. Activity UIC

7. Date:

8. Category Code and Project Title: **Munitions Response for location and removal of Discarded Military Munitions at the Former Naval Air Station, Cecil Field, Jacksonville, Florida**

9. Project Number: N/A

10. Type of Project:

- ☐ New Construction
- ☐ Change Use
- ☐ Addition to Existing Facility
- ☐ Major Modification to Existing Facility
- ☐ Relocation of Structure
- ☐ Maintenance and/or Repairs
- ☐ Repair by Replacement
- ☐ Demolition
- ☒ **Other**

11. Type of Request:

- ☐ Airfield Safety Site Approval
- ☒ **Explosives Site/Safety Certification**
- ☐ EMR Site Approval
- ☐ Resubmittal or Standard Site Approval (No Safety Criteria Involved)

12. Project Description

Munitions response to locate and remove munitions and explosives of concern (MEC) as part of a Time-Critical Removal Action (TCRA) at the former Naval Air Station (NAS) Cecil Field near Hangar 860. The area covered by this Explosive Siting Plan (ESP) was designated a Munitions Response Site (MRS) by the Naval Ordnance Safety and Security Activity (NOSSA) after receipt of a MRS Identification and Notification Report submitted by the Naval Facilities Engineering Command, Southern Division on Feb 11, 2005. The area was not a known or suspected munitions response site until discovery of discarded military munitions (DMM) on Feb 4, 2005 during a visual site survey for a future construction project. Multiple MEC items were discovered by the Florida Army Reserve National Guard (FLARNG), the tenant occupying Hangar 860, in an open stormwater drainage ditch. A Florida Air National Guard (FANG) Explosive Ordnance Disposal (EOD) team responded on Feb 4, 2005, recovered one of the possible MEC items and identified it as a JAU-22/B cartridge actuated initiator (CAI). It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response. Approximately 12-15 CAIs were seen during a follow-on site visit. EOD Mayport responded February 22, 2005 at the request of NAVFAC EFD SOUTH to remove the CAIs remaining on-site. EOD Mayport removed 22 CAIs and identified the CAIs as expended. The future FLARNG construction project is planned to consist of converting the open stormwater ditch to underground pipe drainage; filling in the ditch with soil; expanding the aircraft taxiway; and constructing climate controlled hangars for helicopters. The construction project is currently in the preliminary design phase.

13. 4 Sets of Project Maps Attached

14. 4 Sets Part II Division(s) A Attached

SECTION B – EFD REVIEW

1. Name/Code/Phone No. of Reviewer/E-Mail Address:

2. Date Received:

3. Evaluation:

4. Safety Review Requested: (check appropriate box(es))

☒ **NOSSA** ☐ DDESB ☐ SPAWAR ☐ NAVAIR ☐ CNO ☐ OTHER

5. Date Forwarded:

6. Date of Safety Certification: _____ NOSSA _____ DDESB _____ SPAWAR _____ NAVAIR _____ CNO _____ OTHER

SECTION C – FINAL SITE APPROVAL ACTION

1. Approvals:

- ☐ Site Approved
- ☐ Site Disapproved
- ☐ Deferred/Returned
- ☐ Explosives Safety Certification Approved
- ☐ Explosives Safety Certification DISAPPROVED
- ☐ Interim Construction Waiver Approved

2. Certification Identification:

3. Remarks

4. Other Approvals Required

- ☐ Airfield Safety Waiver Required
- ☐ Final Explosives Safety Review Required

5. Approving Official:

6. Date:

REQUEST FOR PROJECT SITE APPROVAL/EXPLOSIVES SAFETY CERTIFICATION NAVFAC 11010/31 (REV. 5-2001)

PART II DIVISION A-EXPLOSIVES SAFETY

INSTRUCTIONS IN NAVFACINST 11010.45

1. NEW/Class/Division/ESQD arcs* of project:

a. MRS Work Area: NEW <0.1 lb based on JAU-22/B CAI; Class/ Division 1.4; ESQD Arc 75-ft IBD.

b. MRS Work Area: NEW <0.1 lb based on MGFD (20mm HE projectile); Class/ Division 1.1; ESQD Arc 320-ft IBD.

c. BIP Detonation Area: NEW <0.1 lb based on JAU-22/B CAI; Class/ Division 1.4; ESQD Arc 75-ft IBD.

d. BIP Detonation Area: NEW <0.1 lb based on MGFD (20mm HE projectile); Class/ Division 1.1; ESQD Arc 320-ft IBD.

e. MEC Demolition Area: NEW<6 lbs; Class/Division 1.1/1.4; ESQD Arc 200-ft (based on Engineering Controls**).

f. Bldg 865: NEW <1,000 lbs; Class/Division 1.3/1.4; IBD/PTR 75 ft.

g. Portable Type 2 HE Storage Magazine***: <15 lbs; Class/Division 1.4; IBD/PTR 75-ft.

h. Portable Type 2 HE Storage Magazine***: <15 lbs; Class/Division 1.1; IBD/PTR 506-ft/303-ft.

i. Intermagazine: NEW </=100 lbs; Class/Division 1.1; IM 51 ft.

Refer to Figures 2-3 and 2-4 in the attached list.

* The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

** Engineering controls will conform with DDESB Technical Paper 16, Revision 1 and 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. Based on the engineering controls calculations and referencing Table 7, HNC-ED-CS-S-98-7, 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 an ESQD arc of 200 feet.

*** IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage.

SEE ADDITIONAL INFORMATION ON CONTINUATION SHEET.

2. CNO Waivers and Exemptions: N/A

3. Personnel (numbers):

Munitions Response: The number of personnel that may be located within the ESQD during operations includes the 5-man proposed contractor UXO team operating in the MRS work area and up to 125 persons (on average) occupying Hangar 860, an inhabited aircraft maintenance hangar, during a typical "busy" work day.

BIP Detonation Area: Up to four proposed contractor UXO personnel conducting BIP may be exposed during munitions operations. All nonessential personnel will be evacuated from within the IBD ESQD/EZ for detonation operations.

MEC Disposal by Detonation Operations: Up to four proposed contractor personnel conducting MEC disposal operations will be exposed during such operations.

Explosives Storage (Building 865/ Type II Temporary Storage): Up to five proposed contractor personnel conducting response actions may be located within the ESQD of the storage facilities at any one time. There will be no access to Building 865 while intrusive work is being performed.

NOTE: All personnel are the same persons relocating from one ESQD to another.

	Proposed	Existing
Military:		
Civilian:	5	125
Other:		
Total:	5	125

4. Facility Number/Type | Personnel | NEW | Class/Division | Distance Actual/Required

SEE CONTINUATION SHEET FOR THIS SECTION

5. Siting Rationale:

The location of the munitions response support area has been determined by the requirements of future construction and the discovery of DMM. The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered. The ESQD/EZ arcs depicted on Figure 2-3 encompass the FLARNG Access Drive to Building 860 and a Dirt Access Road along the western boundary of the MRS; and Buildings 860, 861, 865, and 873, and the former water treatment plant that surround the DMM discovery area. Access to the work site is restricted by fencing and security patrols. The location of the planned MEC Disposal site and the Type II Temporary Storage Magazine were selected to maintain required IBD/PTR ESQDs, to be fully encompassed within the MRS EZ and to maintain the IM to Building 865.

* Distance from project. Specify IB (Inhabited Building); IL (Intraline); IM (Intermagazine); PTR (Public Transportation Route); B (Barricaded); UB (Unbarricaded)

6. Signature of Public Works/Base Civil Engineer (Name/Code) Incl E-Mail Address		9. Signature of Explosive Safety Officer/Installation Safety Officer Incl. E-Mail Address Ben Redmond Ben.Redmond@ch2m.com	
7. Telephone Numbers: ( ) DSN	8. Date:	10. Telephone Numbers: ( ) 865.483.9032 DSN	11. Date: February 21, 2006

CONTINUATION SHEET:

4. FACILITY NUMBER/TYPE

Explosives Safety Quantity-Distance Criteria

Facility Number/Type	Personnel	Maximum NEW	Class/ Division	Distance Actual/Required
MRS Work Area[1]	130[3]	<1 lb	1.4	50 feet/75 feet[4]
MRS Work Area[1]	130[3]	<1 lb	1.1	50 feet/320 feet[4]
BIP Detonation Area[1]	4	<1 lb	1.4	50 feet/75 feet[4]
BIP Detonation Area[1]	4	<1 lb	1.1	50 feet/320 feet[4]
Planned MEC Demolition Area	4	<6 lbs	1.1/1.4	300 feet[5]/200 feet[6]
Building 865	0	<1,000 lbs	1.3/1.4	145 feet/75 feet[5]
Portable Type 2 HE Storage Magazine[2]	0	<15 lbs	1.4	585 feet/75 feet[5]
Portable Type 2 HE Storage Magazine[2]	0	<15 lbs	1.1	585 feet/506 feet[5]

[1] The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

[2] IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage.

[3] The number of personnel includes the 5-man UXO team operating in the MRS work area and up to 125 persons (on average) occupying Hangar 860, an inhabited aircraft maintenance hangar, during a typical “busy” work day.

[4] Building 860 is the nearest IBD/PTR to the MRS work area and is an inhabited FLARNG aircraft maintenance hangar. The actual distance from the nearest boundary of the MRS work area/potential BIP detonation area to the inhabited section of Building 860 is approximately 50 feet. Attached to the west end of Hangar 860, approximately 25 feet from the nearest boundary of the MRS work area, is an uninhabited fire pump room with masonry block walls. Operational and administrative controls as described in Section 2.2.6 of the Explosives Safety Submission will be implemented to mitigate personnel exposure.

[5] The Dirt Access Road is the nearest IBD/PTR to the planned MEC demolition area, Building 865, and the planned location of the Portable Type 2 HE Storage Magazine. The Dirt Access Road is located outside of the required ESQD for each.

[6] Based on Engineering Controls as described in Section 2.2.6.1.

Final

Explosives Siting Plan

Munitions Response for Discarded Military Munitions at Hangar 860 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
Engineering Field Division South

Prepared by

115 Perimeter Center Place, NE.
Suite 700
Atlanta, GA 30346

February 2006

Contents

Acronyms and Abbreviations ..... **iii**

1.0 Introduction **1-1**
- 1.1 Site Description, Background, and History 1-1
- 1.2 Purpose of this Plan 1-3

2.0 Explosives Siting Plan **2-1**
- 2.1 Explosives Operations Areas 2-2
  - 2.1.1 Minimum Separation Distances for Non-Detonation Activities 2-3
  - 2.1.2 Planned or Established MEC Demolition Areas 2-8
- 2.2 Footprint Operating Areas 2-9
  - 2.2.1 Blow-in-Place Areas 2-9
  - 2.2.2 In-Grid Consolidated Shots 2-9
  - 2.2.3 MRS Work Areas 2-9
  - 2.2.4 Collection Points 2-9
  - 2.2.5 Explosives Storage Magazines 2-9
  - 2.2.6 Explosives Safety Quantity-Distance 2-12
  - 2.2.7 Physical Security 2-14
- 2.3 Transportation 2-14
  - 2.3.1 Onsite Transportation Procedures 2-14
  - 2.3.2 Vehicle Requirements 2-14

3.0 References **3-1**

Figures

1-1 Vicinity Map
2-1 Regional Map
2-2 Activity Map
2-3 Quantity-Distance Map for MRS Work Area
2-4 Quantity-Distance Map for Portable Outdoor Type 2 High Explosive Storage Magazine

Tables

2-1 Determining Sizes of Exclusion Zones
2-2 Calculated Fragment Distance for 20-mm Projectile
2-3 Explosives Safety Quantity-Distance Criteria

Attachments

1 Engineering Controls Calculations and Operational Hazard Analysis

Acronyms and Abbreviations

ATF	Alcohol, Tobacco, and Firearms
BIP	blow(n)-in-place
CAD	cartridge actuated device
CAI	cartridge actuated initiator
CDL	Commercial Drivers License
CH2M HILL	CH2M HILL Constructors, Inc.
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DMM	Discarded Military Munitions
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
EOD	Explosive Ordnance Disposal
ES	Exposed Site
ESP	Explosives Siting Plan
ESQD	Explosives Safety Quantity-Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FAA	Federal Aviation Authority
FANG	Florida Air National Guard
FLARNG	Florida Army Reserve National Guard
HE	High Explosive
IBD	Inhabited Building Distance
JAA	Jacksonville Airport Authority
lb	pound(s)
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
mm	millimeter(s)
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
NAS	Naval Air Station
NAVFAC EFD SOUTH	U.S. Naval Facilities Engineering Command, Engineering Field Division South
NAVSEA	Naval Sea Systems Command
NEW	Net Explosives Weight
NOSSA	Naval Ordnance Safety and Security Activity
OP 5	Ordnance Publication 5
PES	Potential Explosion Site
psi	pounds per square inch
PTR	Public Transportation Routes
Q-D	Quantity-Distance
ROICC	Resident Officer in Charge of Construction

RPM	Remedial Project Manager
SUXOS	Senior UXO Supervisor
TCRA	Time Critical Removal Action
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Corps of Engineers, Huntsville Center
USCG	U.S. Coast Guard
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer

SECTION 1

Introduction

This Explosives Siting Plan (ESP) is prepared in support of Munitions Response to locate and remove Munitions and Explosives of Concern (MEC) and Material Potentially Presenting and Explosive Hazard (MPPEH) at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. This ESP is also included as Appendix D in the *Work Plan Addendum for Munitions Response for Discarded Military Munitions at Hangar 860 at the former NAS Cecil Field, Jacksonville, Florida* (CH2M HILL Constructors, Inc. [CH2M HILL], in preparation) and is supplemented by the project Explosives Safety Submission. The munitions response action for MEC is being implemented by CH2M HILL for the U.S. Naval Facilities Engineering Command, Engineering Field Division, South (NAVFAC EFD SOUTH), under Response Action Contract No. N62467-01-D-0331, Contract Task Order (CTO) No. 0029.

The ESP presents the site-specific requirements for establishing Explosives Safety Quantity-Distance (ESQD) arcs for the following:

- Removal, temporary storage, and disposal of MEC items that may be discovered during the Time Critical Removal Action (TCRA) in the vicinity of Hangar 860 at the former NAS Cecil Field
- Detonation of discovered discarded military munitions (DMM) on the project site

1.1 Site Description, Background, and History

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 a summary via email 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 class/division explosives. It was estimated that approximately one dozen of the CAIs remained in place at the site following the FANG EOD response.

FLARNG notified the Jacksonville Airport Authority (JAA) of the discovery via email on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC EFD SOUTH. Based on a request from NAVFAC EFD SOUTH, CH2M HILL visited the site with JAA and FLARNG. Approximately 12 to 15 CAIs were seen during the site visit. One CAI was located along the slope of the ditch and the remainder of the CAIs were located in the bottom of the ditch, visible through standing water. At the request of NAVFAC EFD SOUTH, EOD Mayport responded on Tuesday, February 22, 2005, to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified these CAIs as expended.

The future FLARNG construction project is planned to consist of converting the open stormwater ditch to underground pipe drainage; filling in the ditch with soil; expanding the aircraft taxiway; and constructing climate controlled hangars for helicopters. The construction project is currently in the preliminary design phase.

Buildings 865 and 873 are located approximately 800 feet west-northwest and 450 feet northwest, respectively, of the open stormwater drainage ditch and the location of the discovered CAIs (Figure 1-1). According to the Environmental Baseline Survey (EBS) for Transfer Report, 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 in the EBS for Transfer Report. The area previously had been found suitable to transfer, with property transfer from the Navy to JAA completed in 1999.

No munitions disposal operations are known to have taken place in or near the munitions response site (MRS). It is likely that the recovered MPPEH (23 expended JAU-22/B CAIs) were discarded by person or persons unknown. Although recovery at this site has been limited to MPPEH, the potential presence of a variety of MEC is considered probable due to the findings at a similar MRS located near Building 365 at the former NAS Cecil Field. The physical settings and features of the two MRSs are similar in that both are collocated in the vicinity of probable arm/de-arm areas and ready service magazines at the end of their respective runways. The assumption of recovering similar MEC/MPPEH types and quantities to the MRS located near Building 365 is used to guide the development of this ESP.

To date, the following items have been recovered at the MRS located near Building 365:

- (173) each 20-millimeter (mm) high explosive (HE) projectiles (combination of unfired/fuzed with cartridge intact and projectile only)
- (416) each cartridge actuated devices (CADs)/impulse cartridges (unfired/MK2, MK14, MK18, MK19, miscellaneous small)
- (49) each small arms blanks (5.56-mm and 7.62-mm)
- (15) each MK4 bomb dummy unit signal cartridges
- (2) each suspect aircraft part suspected to contain (2) each CADs/impulse cartridges (determined to be type of actuator with two ports labeled for CAD use with caps and leads intact)
- Approximately 720 lbs of MPPEH consisting of expended CADs/impulse cartridges, 20-mm cartridges, 20-mm link belts, and (2) each MK76 bomb dummy units with no signal cartridges
- Approximately 3,500 lbs of non-MEC related scrap metal

The MPPEH discovery has prompted the need for additional MEC support. The additional support is a cautionary action to: 1) ensure that the presence of the discovered MPPEH was

unique to the area where the items were found, 2) protect human health and safety for site personnel, and 3) allow the continued land use of the area.

1.2 Purpose of this Plan

This ESP provides explosives safety criteria for planning and siting explosives operations, including temporary MEC storage, that will be performed by CH2M HILL and its subcontractors during the munitions response to locate and remove MEC and MPPEH that may be discovered during the TCRA at the MRS located in the vicinity of Hangar 860 (Figure 1-1) at the former NAS Cecil Field. The purpose of this ESP is to obtain U.S. Department of Defense Explosives Safety Board (DDESB) site approval for the inhabited building distance (IBD) excavation exclusion zone (EZ) and the IBD deliberate detonation EZ for the explosives removal action in the vicinity of Hangar 860.

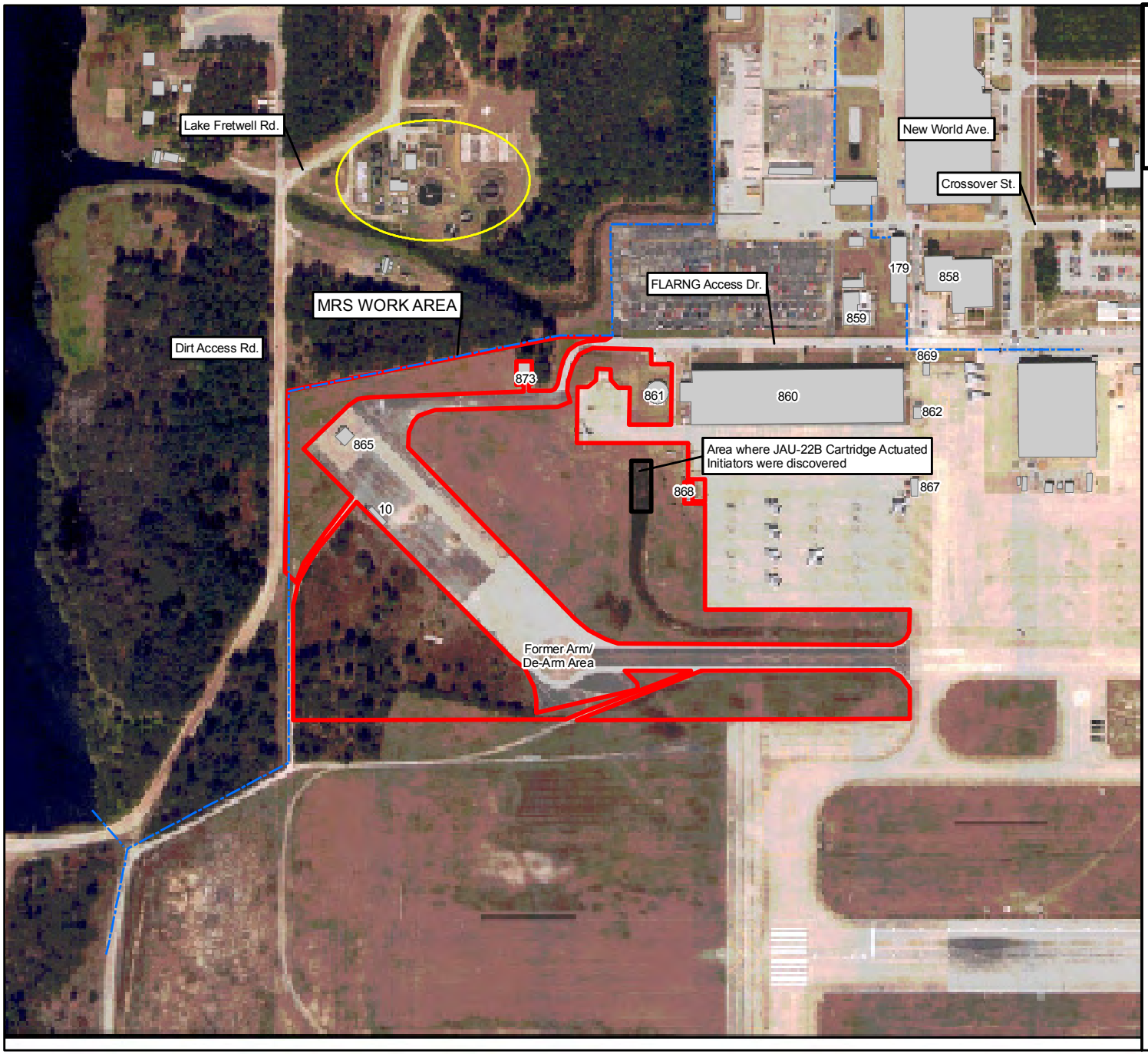


FIGURE 1-1
VICINITY MAP

Legend

MRS Work Area

Structures

DEMOLITION

PERMANENT

JAA and FLARNG Fence Line

Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig1-1_Vicinity_Map.mxd

SECTION 2

Explosives Siting Plan

This section presents the site-specific requirements for siting the munitions response for locating and removing MEC that is discovered at the site. Safety criteria for planning and siting explosives operations were developed in accordance with the following:

- U.S. Department of Defense (DoD), 1997, 4160.21-M, *Defense Materiel Disposition Manual*
- DoD, 1991, 4160.21-M-1, *Defense Demilitarization Manual*
- DoD, 1997, 4145.26M, *Contractors Safety Manual for Ammunition and Explosives*
- DoD, 2004, 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*
- Naval Sea Systems Command (NAVSEA), 2004, Ordnance Publication (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 3*
- NAVSEA, 2001, SWO20-AF-ABK-010, *Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials*
- NAVSEA, 2004, SW023-AG-WHM-010, *On-Station Movement of Ammunition and Explosives by Truck and Railcar*
- U.S. Department of the Navy, Chief of Naval Operations, 1999, OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy*
- DDESB, 2003, Technical Paper 16, Revision 1, *Methodologies for Calculating Primary Fragment Distances*
- NOSSA, 2004, Instruction 8020.15, *Military Munitions Response Oversight Program*
- U.S. Army Corps of Engineers (USACE), June 23, 2000, *Engineering and Design, Ordnance and Explosives Response* (EM 1110-1-4009)
- U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville (USAESCH), 1998, *Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions* (HNC-ED-CS-S-98-7)

Detailed descriptions of the determination of minimum separation distances (ESQD arcs and EZs), and the establishment of explosives operations areas are presented in this ESP.

2.1 Explosives Operations Areas

During the TCRA, work will be conducted at the following areas where MEC, MPPEH, and explosives may be exposed to the public:

- The MRS, where mag & dig operations may result in the recovery of DMM, MEC, and/or MPPEH (Figures 1-1, 2-1, 2-2, 2-3, and 2-4)
- Detonation Area for blow-in-Place (BIP) disposal operations of recovered MEC for a maximum NEW of <1 lb (Figures 2-3 and 2-4)
- Planned MEC Demolition/Detonation Area for disposal operations of recovered MEC for a maximum NEW of <6 lbs (Figures 2-3 and 2-4)

In each of these areas, an EZ with a minimum separation distance based on an ESQD arc will be established to protect the public in the event of intentional and/or unintentional detonation. Only personnel essential to the project will be permitted in each EZ. Essential personnel are generally considered to be unexploded ordnance (UXO)-qualified personnel. Heavy equipment operators and technicians needed to support this effort will be escorted by UXO qualified personnel whenever they enter the EZ.

The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted during intrusive work. The IBD ESQD/EZ arc for intrusive work will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

Minimum separation distances for non-detonation activities and for unintentional and intentional detonation activities are discussed below. Safe separation distances for qualified UXO teams can be reduced based on the Munition with the Greatest Fragmentation Distance (MGFD) and the K40 overpressure distance. Table 2-1 summarizes basic activities that will be conducted in MEC-related areas and the basis for determining the appropriate EZ minimum separation distances.

TABLE 2-1
Determining Sizes of Exclusion Zones[1]

Operation	Basis for Determining Size of Exclusion Zone	Minimum Separation Distance (for Nonessential Personnel)	Safe Separation Distance (for Other UXO Teams)
Excavation Activities (JAU-22/B CAI, 1.4 class/division explosive)	Unintentional Detonation	75 feet[2] (IBD/PTR for ESQD) (Safe Separation Distance)	75 feet[2]
Excavation Activities (20-mm HE projectile, 1.1 class/division explosive)	Unintentional Detonation	236 feet[3] (IBD for ESQD), 142 feet[3] (PTR for ESQD) (Safe Separation Distance)	200 feet[4]

TABLE 2-1
Determining Sizes of Exclusion Zones[1]

Operation	Basis for Determining Size of Exclusion Zone	Minimum Separation Distance (for Nonessential Personnel)	Safe Separation Distance (for Other UXO Teams)
Detonation of MEC at MRS (Max. <1 lb NEW; JAU-22/B CAI, 1.4 class/division explosive)	Intentional Detonation	75 feet[2] (IBD for ESQD)	75 feet[2]
Detonation of MEC at MRS (Max. <1 lb NEW; 20-mm HE projectile, 1.1 class/division explosive)	Intentional Detonation	320 feet[5] (IBD for ESQD)	320 feet[5]
Detonation of MEC at Planned Demolition Area (Max. <6 lbs NEW)	Intentional Detonation	200 feet[6] (IBD for ESQD)	200 feet[6]

[1] The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

[2] Based on OP 5 Volume 1, Table 7-22

[3] Based on OP 5 Volume 1, Table 7-9

[4] Based on EM 1110-1-4009

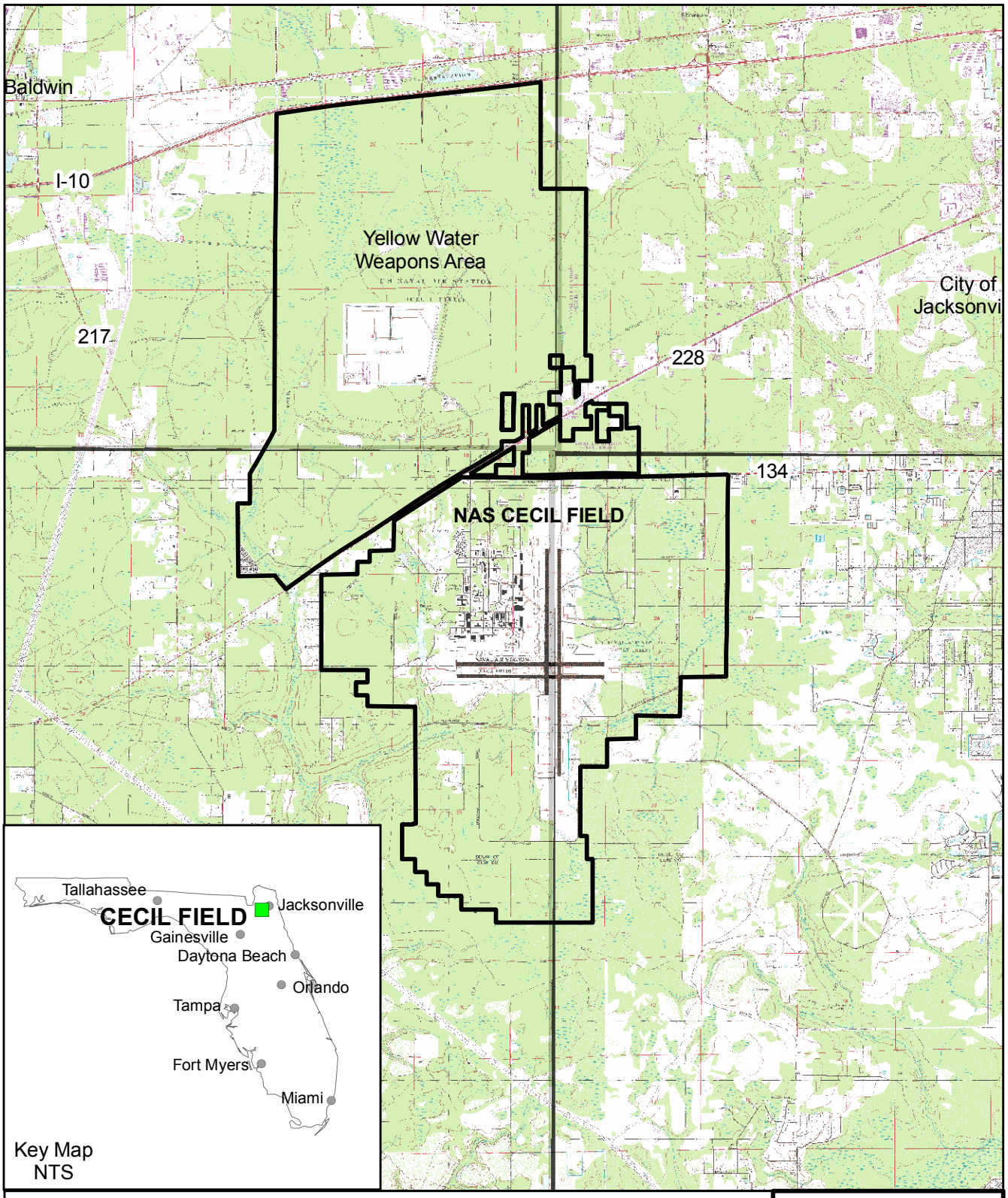
[5] Based on OP 5 Volume 1, Table 13-2

[6] Based on calculations from DDESB Technical Paper 16 and HNC-ED-CS-S-98-7 as described in Section 2.2.6.1

2.1.1 Minimum Separation Distances for Non-Detonation Activities

Certain activities in work areas will require EZs even though no explosive detonation is planned. For example, unintentional detonation of ordnance items could potentially occur during mag & dig operations, soil excavation, or vegetation removal. Although this situation is unlikely because of the rigorous use of safety procedures, an EZ is required as a precaution to protect nonessential personnel. Minimum separation distances for nonessential personnel during operations onsite will be determined based on the MGFD and the guidance published in DDESB Technical Paper 16, Revision 1 and OP 5 Volume 1, or the K40 distance as calculated in accordance with OP 5 Volume 1 (when engineering controls are used).

An initial IBD ESQD/EZ arc of 75 feet for the JAU-22/B CAI, based on Table 7-22 in OP 5 Volume 1, will be enacted during MEC removal and intentional detonation operations. The IBD ESQD/EZ arc will be expanded to the 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered. If expanded, an initial EZ of 236 feet, based on Table 7-9 in OP 5 Volume 1, will be used during MEC removal operations, with an initial EZ of 320 feet, based on Table 13-2 in OP 5 Volume 1, used for intentional detonations.

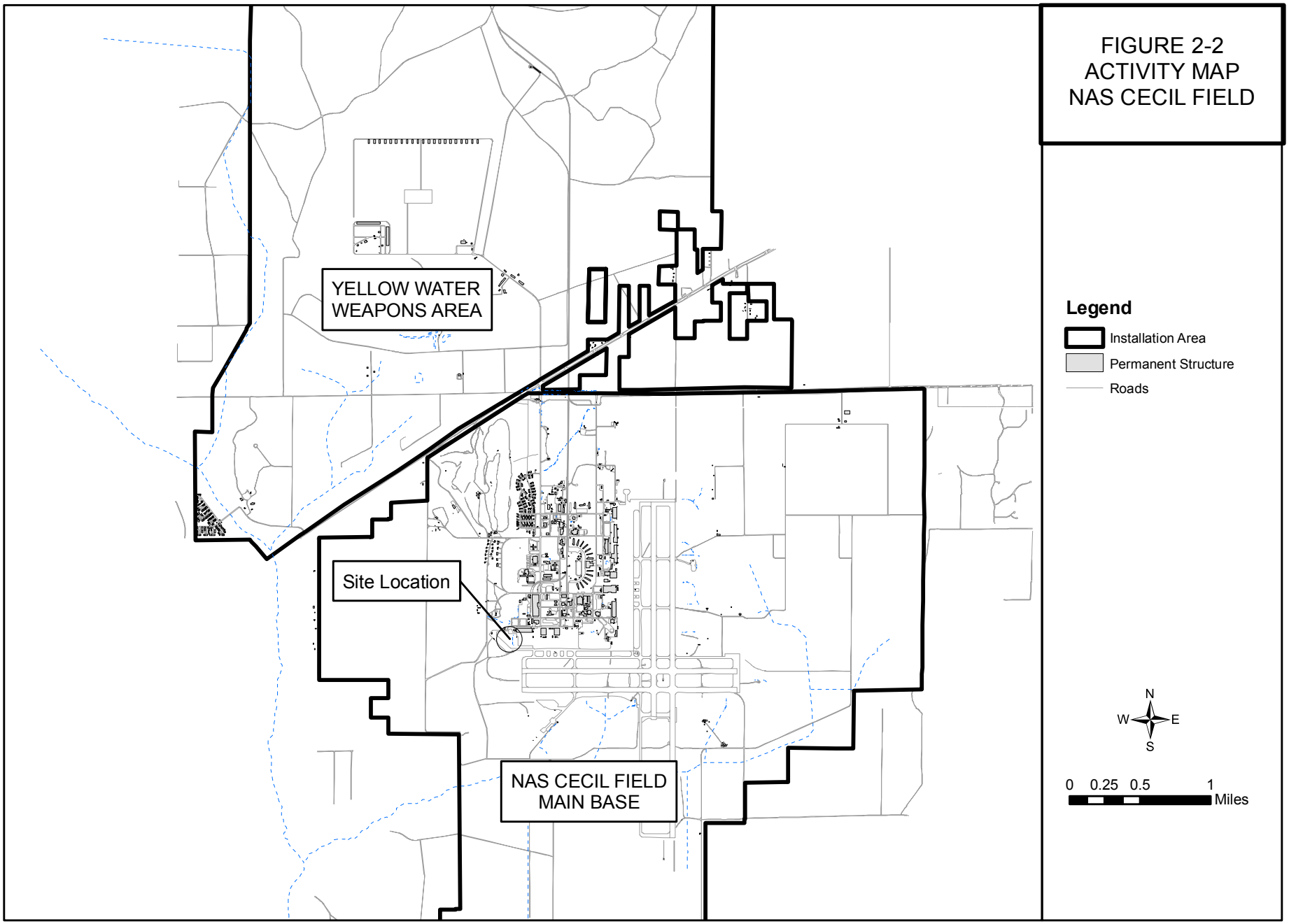


N
W E
S

0 4,000 8,000 16,000
Feet

FIGURE 2-1
REGIONAL MAP
NAS CECIL FIELD

\\volunteer\public\cecil_field\mxd\MRS_Work_Area\Fig2-1_Regional_Map.mxd



\\volunteer\public\cecil_field\mxd\2_Acre_Area\Fig2-2_Activity_Map.mxd

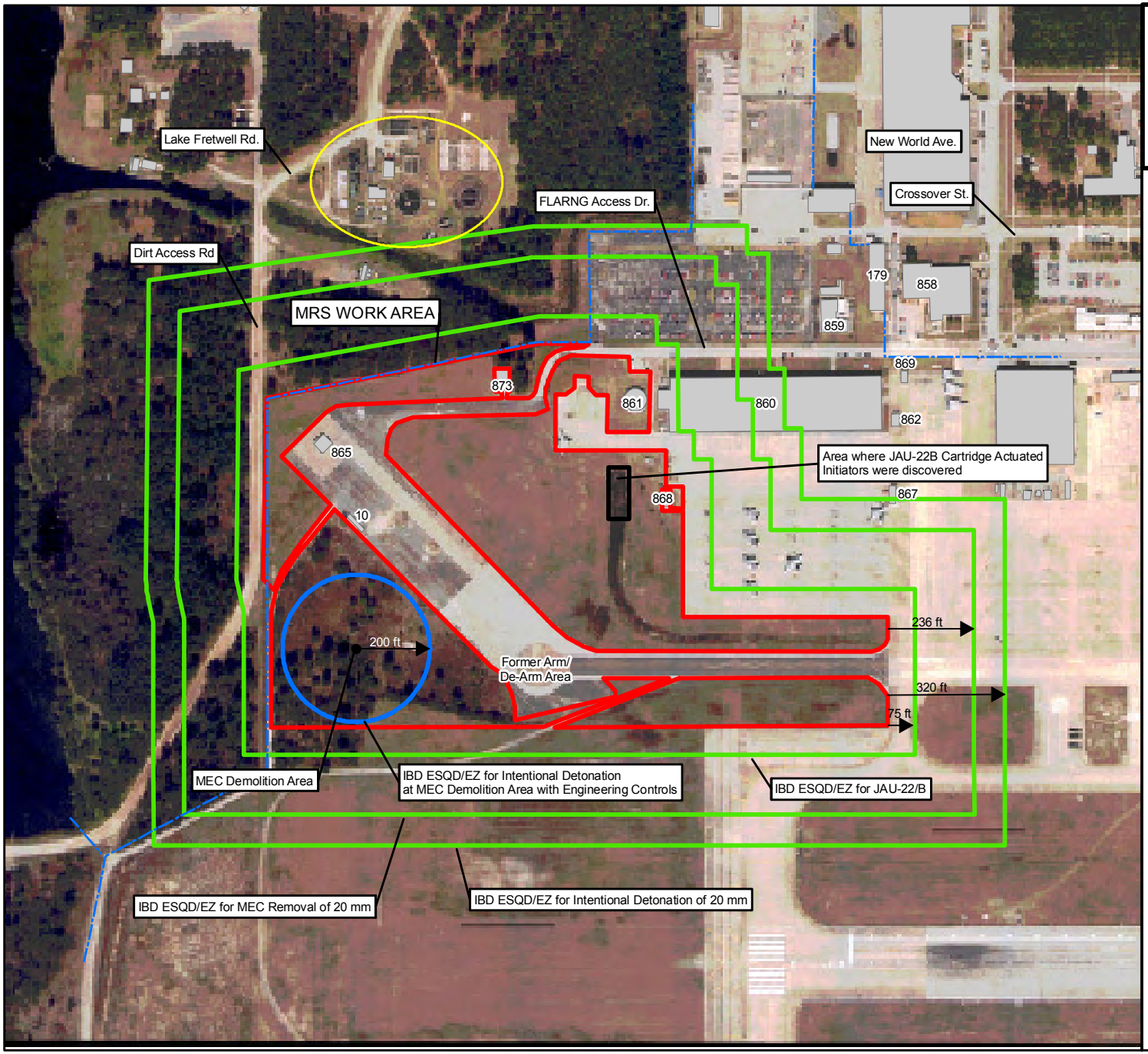


FIGURE 2-3 QUANTITY-DISTANCE MAP FOR MRS WORK AREA AT HANGER 860

Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

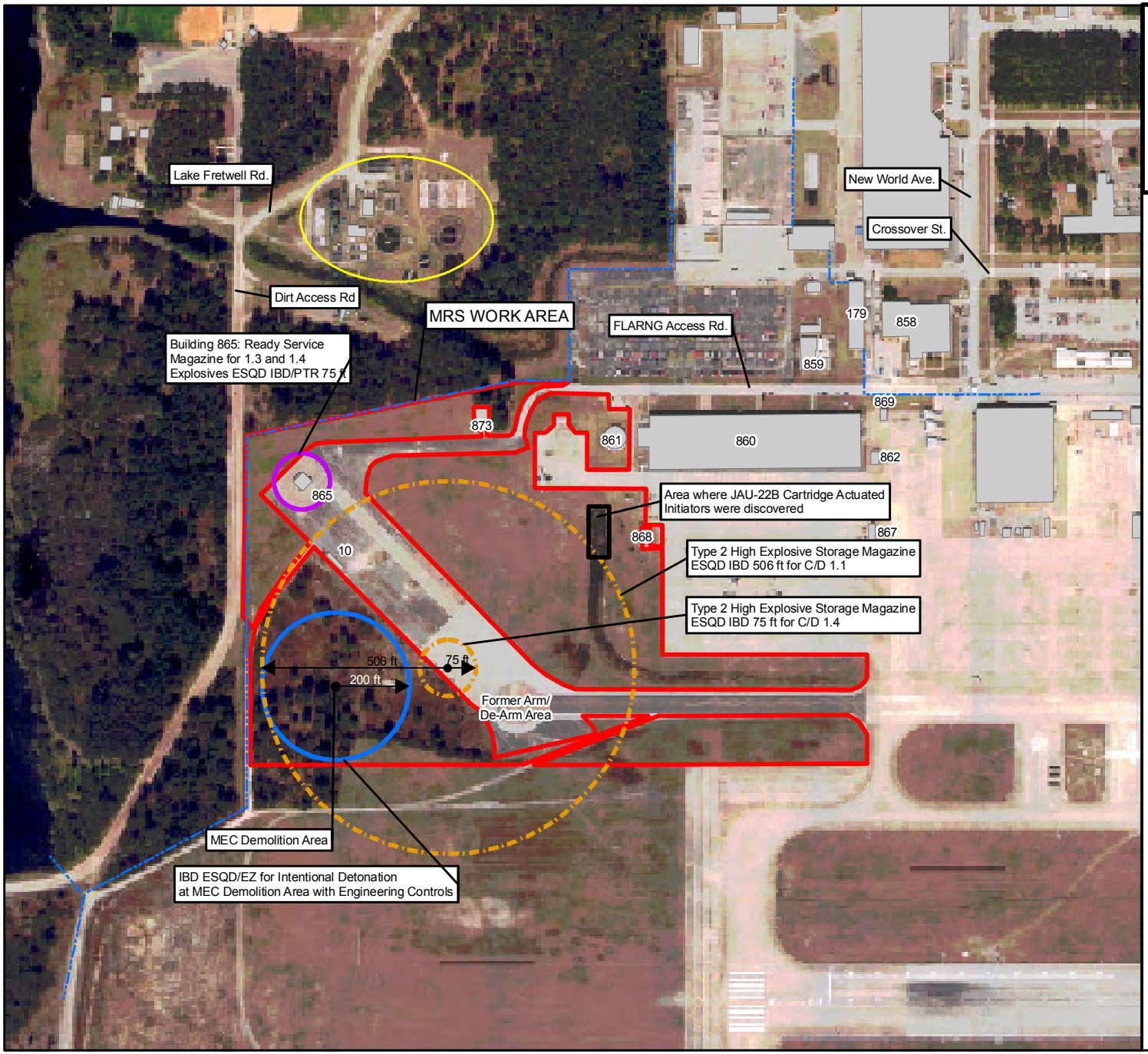
873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-3_20Acre_v2.mxd

FIGURE 2-4 QUANTITY-DISTANCE MAP FOR PORTABLE OUTDOOR TYPE 2 HIGH EXPLOSIVE STORAGE MAGAZINE



Legend

Structures

- DEMOLITION
- PERMANENT
- JAA and FLARNG Fence Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Building Information:

10: Removed

860: Inhabited FLARNG aircraft maintenance hanger. West end has masonry block and brick wall with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hanger/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.

861: Uninhabited; Concrete Fire Protection Water Reservoir for Hanger 860

865: Uninhabited; Cinderblock Magazine utilized by USCG and FLARNG for storage of small arms, pyrotechnics, flammable/nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

867: Removed

868: Removed

873: Uninhabited; Used by FLARNG for storage of nonhazardous aircraft parts.

N
W E
S

0 100 200 400 Feet

\\volunteer\public\cecil_field\mxd\20_Acre_Area\Fig2-4_Type2_Explosive_Storage_v2.mxd

Based on the work experience at the MRS located near Building 365, the MGFD assumed for this site is a 20-mm HE projectile. The calculated fragment distance for the 20-mm projectile without engineering controls is presented in Table 2-2. If, during the course of this project, a live MEC item with a greater fragmentation range is encountered, the ESQD arcs will be adjusted and an amendment to this ESP will be prepared.

TABLE 2-2
Calculated Fragment Distance for 20-mm Projectile

Munition[1]	Hazardous Fragment Distance[2] (feet)	Maximum Fragment Distance[3] (feet)	K40 Overpressure Distance[4] (feet)
20-mm projectile	320	320	200

[1] Fragment hazard distances will be recalculated based on the NEW, in the event that different munitions items are found.

[2] OP 5 Volume 1, Table 13-2, and DDESB Technical Paper 16: the distance at which fragments do not exceed a hazardous fragment density of one hazardous fragment per 600 square feet, where a hazardous fragment is defined as a fragment having an impact energy of 58 ft-lb or greater.

[3] OP 5 Volume 1, Table 13-2, and DDESB Technical Paper 16: the maximum distance at which a fragment of the munition may travel based on munition design specifications and maximum trajectories.

[4] As calculated in accordance with OP 5 Volume 1, Table 13.2, and DDESB Technical Paper 16: the distance at which blast overpressure exposure from Hazard Division 1.1 explosives is less than 0.90 psi—the lower end of the permissible exposure level for inhabited buildings and administrative and housing areas per DoD, 2004, 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*, Rewrite Version, Revision 4. Determined from the formula: $40 \times NEW^{1/3}$.

2.1.2 Planned or Established MEC Demolition Areas

MEC item(s) determined by the Senior UXO Supervisor (SUXOS) and one other qualified UXO Technician as safe to move but not safe to transport for offsite disposal and have been moved for temporary storage in a portable Type 2 HE storage magazine will be disposed of by detonation at the MEC demolition location shown on Figures 2-3 and 2-4. Engineering controls that conform to the standards of HNC-ED-CS-S-98-7 will be used to maintain the IBD ESQD of 200 feet. Calculations for the engineering controls are discussed in Section 2.2.6.1.

Arrangements for delivery of explosives to countercharge discovered MEC will be made with a commercial explosives vendor and the explosives will be delivered within 24 hours. 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, weekly inventory, any discovery of a discrepancy in the quantities on hand versus quantities on inventory, and final disposition (for example, return to distributor or destruction).

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.

2.2 Footprint Operating Areas

The location of the MRS work areas and the safety arcs are shown on Figures 1-1, 2-3, and 2-4.

2.2.1 Blow-in-Place Areas

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 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. The 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. Any required BIP, including approach, timing, and required public notification, will be coordinated through the JAA and Federal Aviation Authority (FAA) air traffic controller, NAVFAC EFD SOUTH, and the Resident Officer in Charge of Construction (ROICC) Project Office.

2.2.2 In-Grid Consolidated Shots

Recovered MEC and MPPEH that are safe to move may be relocated within the MRS work area to provide additional ESQD if needed.

2.2.3 MRS Work Areas

MEC-related activities within the MRS work area have the potential for an unintended detonation and require the placement of engineering controls for mitigation of potential blasts and fragmentation.

2.2.4 Collection Points

Collection points will be areas within the MRS work area where recovered MEC and MPPEH that are safe to move are temporarily accumulated pending disposal by detonation. Collection points will contain a sand-filled wooden box with a lockable lid.

2.2.5 Explosives Storage Magazines

2.2.5.1 Building 865

Building 865 is within this MRS and is an aboveground, flat-roof, cinderblock ready service magazine. The facility contains 12 storage units and is currently being used by the U.S. Coast Guard (USCG) for storage of small arms ammunition (1.4 class/division explosives) and pyrotechnics (1.3 class/division explosives) and FLARNG for storage of flammable/ nonflammable gases, oxygen, and miscellaneous nonhazardous materials.

The maximum storage according to USCG personnel is less than 1,000 lbs NEW. Based on Tables 7-20 and 7-22 in OP 5 Volume 1, the IBD/Public Transportation Route (PTR) ESQD

for Building 865 for 1.3 class/division explosives up to 1,000 lbs NEW and for 1.4 class/division explosives up to 3,000 lbs NEW is 75 feet. The ESQD arc is shown on Figure 2-4.

There will be no access to Building 865 while intrusive work is being performed.

2.2.5.2 Portable Outdoor Type 2 HE Storage Magazine

A portable Type 2 HE storage magazine will be necessary for temporary MEC storage during the munitions response. The Type 2 HE storage magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type 2 magazine as described in Section 55.208(a) of Alcohol, Tobacco, and Firearms (ATF) P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations. The maximum NEW to be stored in the magazine is 15 lbs. This explosives storage area will meet the requirements of:

- ATF P 5400.7 – Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DoD, 2004, 6055.9-STD – DoD Ammunition and Explosives Safety Standards
- NAVSEA, 2004, 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 2

The magazine will be located as shown on Figure 2-4 and secured within a fence.

Inspections

The magazine will be inspected at least every 7 days to determine whether there has been unauthorized entry or attempted entry into the magazine, or unauthorized removal of the contents of the magazine.

Physical Security

Magazine locks will meet the standards for ATF Type 2 magazines, as specified in Section 55.208(a)(4), ATF P 5400.7. The magazine will have two locks. The SUXOS will hold a key to one of the locks, and the UXO Safety Officer (UXOSO) will hold the key to the other. Access to the explosives will require both individuals.

Placards

The magazine will display the placards required by Department of Transportation 49 Code of Federal Regulations Part 172, Subpart F, for the appropriate hazard division and class. A hazard identification for fire fighting personnel will also be displayed at the magazine storage area. Signs stating “EXPLOSIVES” and "NO SMOKING" will be posted on the fence surrounding the magazines.

Lightning Protection System

The magazine will be grounded for lightening protection.

Fire Protection

Fire extinguishers of 10 pounds and type BC will be located in the magazine area. Smoking, matches, open flames, spark-producing devices, and firearms will not be permitted within

50 feet of the magazine. The land surrounding the magazine will be kept clear of all combustible materials for a distance of at least 50 feet.

Housekeeping

The area surrounding the magazine will be kept clear of rubbish, dry grass, or trees (except live trees more than 10 feet tall), for not less than 25 feet in all directions.

Quantity-Distance

Based on Table 7-22 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.4 class/division explosives up to 3,000 lbs NEW is 75 feet. The maximum NEW to be stored in the magazine is 15 lbs.

Based on Tables 7-7 and 7-9 in OP 5 Volume 1, the IBD/PTR ESQD for the Type 2 HE storage magazine for 1.1 class/division explosives is 506 feet/303 feet. The ESQD is based on the hazardous fragment distance for 15 lbs NEW. The PTR distance is 60 percent of the IBD. Additionally, based on Table 7-28 in OP 5 Volume 1, the QD standards for 1.1 class/division explosives over 0 lbs NEW but less than 50 lbs NEW at airfields and helipads is 110 feet. Table 7-29 in OP 5 Volume 1 further describes the application of the safety distances provided in Table 7-28. According to Table 7-29, to determine the distance from an ammunition and explosive storage facility to:

- A combat aircraft parking area or DoD component aircraft parking area, apply the value listed in Table 7-28 (110 feet);
- Taxiways and runways used by DoD components only, apply the PTR (303 feet); and,
- Taxiways and runways used jointly by the DoD and non-DoD components, apply the IBD (506 feet).

Therefore, the IBD of 506 feet will be applied to ensure safe distance between the portable Type 2 HE Storage Magazine and aircraft facilities when 1.1 class/division explosives are in temporary storage.

The IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage. The ESQD arcs are shown on Figure 2-4.

2.2.5.3 Intermagazine Distance

To determine the required intermagazine distance between Building 865 and the portable Type 2 HE Storage Magazine, the hazard factor, K, from Table 7-13 is applied to Table 7-14 in OP 5 Volume 1. According to Table 7-13, where the Potential Explosion Site (PES) is an unbarricaded Aboveground Magazine and the Exposed Site (ES) is also an unbarricaded Aboveground Magazine, the hazard factor K is 11. According to Table 7-14, where K is 11 and the NEW is 100 lbs or less, the intermagazine distance is 51 feet.

Therefore, an intermagazine distance of at least 51 feet will be maintained.

2.2.6 Explosives Safety Quantity-Distance

The applicable ESQD criteria for siting explosives operations areas at the site are specified in Chapter 7 of OP 5 Volume 1, and are listed in Table 2-3. The location of the site is shown on Figures 2-3 and 2-4, with the appropriate ESQD arcs included. Security measures will be implemented until all ordnance has been disposed of or demilitarized.

An initial IBD ESQD/EZ arc of 75 feet for the JAU-22/B CAI, based on Table 7-22 in OP 5 Volume 1, will be enacted during MEC removal and intentional detonation operations. The IBD ESQD/EZ arc will be expanded to the 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

The IBD ESQD arc for the portable Type 2 HE storage magazine of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted, depending on the class/division of explosives placed in temporary storage.

Building 860 is the nearest IBD/PTR to the MRS work area and is an inhabited FLARNG aircraft maintenance hangar. The actual distance from the nearest boundary of the MRS work area to the inhabited section of Building 860 is approximately 50 feet. 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. Alternate exits will be marked and posted within the hangar in the event of an emergency.

An uninhabited fire pump room with masonry block walls is attached to the west end of Building 860, approximately 25 feet from the nearest boundary of the MRS work area. A single, steel man-door (in west wall) and a roll-up door (in north wall) provide access to the fire pump room and remain locked from the outside. The fire pump room provides a secured buffer between the MRS work area and the inhabited section of Building 860.

Adjacent to the north of the fire pump room is the hangar HVAC unit. Adjacent to the south of the fire pump room are three 250-gallon diesel aboveground storage tanks for the fire pumps and fire suppressant storage.

DDESB Technical Paper 16, Revision 1, provides the calculations to demonstrate that 4.11 inches of 4,000 pounds per square inch (psi) concrete is sufficient to prevent penetration from fragmentation of a 105-mm M1 (NEW 5.07 lb). The masonry block west walls of Building 860 and the fire pump room provide adequate protection from fragmentation in the event of an unintentional detonation of a JAU-22/B CAI (NEW 0.0116 lb) or 20-mm HE projectile/cartridge (NEW 0.026 lb).

In the event an MEC item(s) is identified at the site at a location where the IBD ESQD/EZ includes Building 860 or adjacent structures, the MEC item(s), if the SUXOS and one other qualified UXO Technician determines as safe to move, will be placed in the portable Type 2 HE storage magazine and secured for disposal by detonation at the end of the TCRA. If the SUXOS determines the MEC item(s) are not safe to move, the site will remain secured until disposal operations can be performed. 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. If insufficient ESQD arcs exist, a plan using 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 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 Technical Paper 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.

TABLE 2-3
Explosives Safety Quantity-Distance Criteria

Facility Number/Type	Personnel	Maximum NEW	Class/ Division	Distance Actual/Required
MRS Work Area[1]	130[3]	<1 lb	1.4	50 feet/75 feet[4]
MRS Work Area[1]	130[3]	<1 lb	1.1	50 feet/320 feet[4]
BIP Detonation Area[1]	4	<1 lb	1.4	50 feet/75 feet[4]
BIP Detonation Area[1]	4	<1 lb	1.1	50 feet/320 feet[4]
Planned MEC Demolition Area	4	<6 lbs	1.1/1.4	300 feet[5]/200 feet[6]
Building 865	0	<1,000 lbs	1.3/1.4	145 feet/75 feet[5]
Portable Type 2 HE Storage Magazine[2]	0	<15 lbs	1.4	585 feet/75 feet[5]
Portable Type 2 HE Storage Magazine[2]	0	<15 lbs	1.1	585 feet/506 feet[5]

[1] The IBD ESQD/EZ arc for the 1.4 class/division explosive JAU-22/B CAI will initially be enacted. The IBD ESQD/EZ arc will be expanded to the 1.1 class/division explosive 20-mm HE projectile IBD ESQD/EZ arcs if a 20-mm HE projectile/cartridge is encountered.

[2] IBD ESQD arc of either 75 feet for 1.4 class/division explosives or 506 feet for 1.1 class/division explosives will be enacted depending on the class/division of explosives placed in temporary storage.

[3] The number of personnel includes the 5-man UXO team operating in the MRS work area and up to 125 persons (on average) occupying Hangar 860, an inhabited aircraft maintenance hangar, during a typical “busy” work day.

[4] Building 860 is the nearest IBD/PTR to the MRS work area and is an inhabited FLARNG aircraft maintenance hanger. The actual distance from the nearest boundary of the MRS work area/potential BIP detonation area to the inhabited section of Building 860 is approximately 50 feet. Attached to the west end of Hangar 860, approximately 25 feet from the nearest boundary of the MRS work area, is an uninhabited fire pump room with masonry block walls. Operational and administrative controls as described in Section 2.2.6 and the Explosives Safety Submission will be implemented to mitigate personnel exposure.

[5] The Dirt Access Road is the nearest IBD/PTR to the planned MEC demolition area, Building 865, and the planned location of the Portable Type 2 HE Storage Magazine. The Dirt Access Road is located outside of the required ESQD for each.

[6] Based on Engineering Controls as described in Section 2.2.6.1

2.2.6.1 Calculations for Engineering Controls and ESQD

The probable recovery of multiple DMM has generated a need to plan for its safe disposal. To safely perform planned detonation of recovered DMM at the MEC demolition location shown on Figures 2-3 and 2-4, 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. Table B-1 and the calculation from Chapter 5 of DDESB Technical Paper 16, Revision 1, were utilized to

determine the expected maximum fragmentation weight and velocity from a planned detonation of (10) each, 20-mm projectiles laid side by side.

Based on the engineering controls calculations and referencing Table 7, HNC-ED-CS-S-98-7, 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 an ESQD arc of 200 feet. The IBD ESQD arc is shown on Figures 2-3 and 2-4.

Engineering controls will conform with DDESB Technical Paper 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.

Attachment 1 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**.**

2.2.7 Physical Security

Access to the MRS will be controlled by use of locked gates, barriers, and security guards (if necessary) to prevent entry of unauthorized personnel during munitions response operations.

2.3 Transportation

2.3.1 Onsite Transportation Procedures

MEC items that are required to be moved on-site (i.e., to the temporary Type II HE storage magazine or from the storage magazine to the demolition site) will primarily be moved by hand, however may be moved by vehicle across the open areas within the MRS. The terrain within the MRS is flat and vegetation is either mowed or will be removed as part of site preparation activities. All vehicle movements of MEC within the MRS 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 MRS work area as needed and will be immediately prepared and used to perform detonation of recovered MEC.

2.3.2 Vehicle Requirements

Vehicles transporting explosives on the project site must comply with NAVSEA SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar, 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.
- A vehicle used to transport explosives must have a non-sparking bed liner, and all explosive loads must be covered prior to departure.
- Vehicles transporting explosives must be operated by a qualified driver with a Commercial Drivers License (CDL) that includes an explosives certification.

SECTION 3

References

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

CH2M HILL. November 2005. *Explosives Safety Submission for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Amendment No. 03. Prepared for NAVFAC EFD SOUTH.

CH2M HILL. November 2005. *Explosives Siting Plan for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Amendment No. 03. Prepared for NAVFAC EFD SOUTH.

CH2M HILL. January 2006. *Explosives Safety Submission for Munitions Response for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC EFD SOUTH.

DDESB. December 1, 2003. Technical Paper 16, Revision 1, *Methodologies for Calculating Primary Fragment Distances.*

DoD. October 21, 1991. DoD 4160.21-M-1, *Defense Demilitarization Manual*.

DoD. August 1997. DoD 4145.26-M, *Contractors Safety Manual for Ammunition and Explosives.*

DoD. 1997. DoD 4160.21-M, *Defense Materiel Disposition Manual*

DoD. January 5, 2004. DoD 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*, Rewrite Version, Revision 4.

NAVFAC. 1990. P-397, *Structures to Resist the Effects of Accidental Explosions.*

NAVSEA. January 15, 2001. SWO20-AF-ABK-010, *Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials*.

NAVSEA. 2004. SW023-AG-WHM-010, *On-Station Movement of Ammunition and Explosives by Truck and Railcar*

NAVSEA. June 1, 2004. Ordnance Publication 5 Volume 1, *Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Seventh Revision, Change 3.*

NOSSA. 2004 (2004a). Instruction 8020.15, *Military Munitions Response Oversight Program*.

Tetra Tech NUS, Inc. August 1999. *Environmental Baseline Survey for Transfer, Jacksonville Port Authority Parcel, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for NAVFAC EFD SOUTH.

U.S. Army Corps of Engineers. June 23, 2000. *Engineering and Design, Ordnance and Explosives Response* (EM 1110-1-4009).

U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville. August 1998. *Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions* (HNC-ED-CS-S-98-7).

U.S. Bureau of Alcohol, Tobacco, and Firearms (ATF) and U.S. Department of the Treasury. 1990. ATF P 5400.7, *ATF Explosives Laws and Regulations.*

U.S. Department of the Navy, Chief of Naval Operations. 1999. OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy.*

ATTACHMENT 1

Engineering Controls Calculations and Operational Hazard Analysis

Calculations for Engineering Controls and ESQD

References: (a) Department of Defense Explosive Safety Board (DDESB) Technical Publication 16, Revision 1, Methodologies for Calculating Primary Fragment Characteristics, dated December 1, 2003

(b) Department of the Army Technical Manual 43-0001-27, Army Ammunition Data Sheets – Small Caliber Ammunition, dated April 29, 1994

(c) 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

Probable recovery of multiple discarded military munitions (DMM) has generated a need to plan for their safe disposal. To safely detonate recovered DMM within the work area for the former NAS 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 Cecil Field is 320-ft for an intentional detonation based on the munition with the greatest fragment distance (MGFD), a M56A4, 20-mm HE projectile.

To determine the specifications for engineering controls for planned detonation activities, Table B-1 and the calculation from Chapter 5, reference (b) 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 (b) 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%."

Table B-1 in reference (b) provides the following data for a M56A4, 20mm HE projectile:

- Explosive Weight: 0.026 lbs.
- Max Fragment Weight: 0.0006 lbs.
- Fragment Initial Velocity: 3,183 feet/second

Reference (c) 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 (b).

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

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 0.0006 lbs. = **0.0009 lbs.**)
- The **expected initial velocity** = 2.0 x velocity from Table B-1 (2.0 x 3,183 feet/second = **6,366 feet/second**)
- **NEW** = NEW Donor (TNT Eq) + NEW Projectiles (TNT Eq.) (3.75 (1.27) + 10(0.026)(1.09) = **5.1 lbs. of TNT Eq**

Reference (d) 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-ft^2/s^2 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 ($W_F V_F^2/2$) = (0.0009 x 6,366^2 / 2) = 18,236.6802 or 0.018236 x 10^6 lb-ft^2/s^2

Take into account for the total NEW of the planned detonation (**5.1 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 (d).

According to Table 7, reference (d), 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**. The IBD ESQD arc is shown on Figures 2-3 and 2-4.

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

Operational Hazard Analysis
– Destruction of MEC (20-mm projectiles and Miscellaneous Cartridge Actuated Initiators/Devices (CAIs/CADs) at former NAS Cecil Field

1.1 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.

1.2 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 CAIs/CADs 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

1.3 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 transport
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 ¾ 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 CAIS/CADS'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

2.4 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	• Dropping 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
		• MEC Items not safe to move	• Initiation of ammunition and/or explosives	I B	• MEC Items will be determined safe to move IAW approved work plan and SSHP	II D	• UXO personnel will be certified IAW DOD Policy • Conduct Daily Safety Briefing for the type and hazards of MEC
		• 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
	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 2	Functioning of Ordnance	• Dropping 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
		• MEC Items not safe to move	• 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
		• 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

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**
							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	• 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
	• 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 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	• Dropping 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
		• 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 5	• Functioning of Ordnance	• Dropping 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
		• 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

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**
	• Vehicle Accident	• Improper vehicle operations or vehicle malfunction	• Injuries to vehicle operators, pedestrians or property	III C	• Only licensed operators can operate vehicle • Performance of daily inspections and maintenance	IV C	hazards of MEC • Document daily safety inspections and maintenance • Conduct daily safety briefings for operators
II Construct Engineering Controls							
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
	• Lifting & Carrying Heavy Loads	• Bending to lift heavy items • Turning while lifting heavy items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury	III B	• Keep operational area free to debris or unnecessary objects that could create tripping hazards • Limit single person lifting to below 40 pounds	IV B	• All personnel will receive back safety and proper lifting technique training • Operations personnel will be certified IAW local command directives
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 • 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 3	• Functioning of Ordnance	• Dropping plywood on MEC and Explosives	• 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
	• 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

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**
	• 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
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	• Dropping sandbags on MEC and Explosives	• 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
	• 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
III Preparation of MEC for Detonation							
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 • 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 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 • 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

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**
	• 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 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
Step 2	• Initiation of explosives from shock or friction	• Dropping or mishandling ammunition and explosives	• Initiation of ammunition and/or explosives	I B	• Allow only qualified and certified personnel to handle ammunition and explosives	II D	• Operations personnel will be certified IAW local command directives

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**
	• Sharp banding under tension	• Cutting banding without PPE or using a non-standard cutting device	• Hand, arm, head or eye injury from banding when cut and hits operator	III B	• Provide PPE and standard band cutting device	IV B	•
Step 3	• Initiation of explosives from shock or friction	• Dropping or mishandling ammunition and explosives	• Initiation of ammunition and/or explosives	I B	• Allow only qualified and certified personnel to handle ammunition and explosives	II D	• Operations personnel will be certified IAW local command directives
	• Lifting Heavy Items	• Bending to lift heavy items • Turning while lifting heavy items • Tripping while carrying explosives • Dropping ammunition and explosive items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury • Initiation of explosives from shock and friction	III B	• 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	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 surfaces	• 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
	• Receiving incorrect amount of explosives	• Contract carrier having incorrect amount of explosives	• Exceeding explosive limits and requiring work stoppage	IV B	• Do not accept delivery of more explosives than required	IV D	• Verify amount of explosives ordered with amount of explosives delivered.
	• Receiving damaged or deteriorated explosives or ammunition	• Contract Carrier delivering damaged or deteriorated explosives	• Hazardous explosives which requires evacuation	IV B	• SUXOS will inspect all explosives prior to accepting delivery from contract carrier	IV D	• Document the condition of explosives prior to accepting delivery
V- Detonation of MEC							
Step 1	• Walking across uneven surfaces	• 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

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 2	NO HAZARDS						
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/ Explosives	• 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
Step 4	NO HAZARDS						
Step 5	• Flying debris	• Intentional Detonation of MEC and Explosives	• Injury from flying debris	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
	• Blast wave	• Intentional Detonation of MEC and Explosives	• Injury from blast wave	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
Step 6	NO HAZARDS						
VI- Miss-Fire Procedures							
Step 1	NO HAZARDS						
Step 2	NO HAZARDS						

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 3	• Flying debris	• Intentional Detonation of MEC and Explosives	• Injury from flying debris	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
	• Blast wave	• Intentional Detonation of MEC and Explosives	• Injury from blast wave	II B	• All personnel will be out to the established ESQD Distance	IV D	• Brief personnel on the ESQD distances • Visual check of area for personnel prior to the detonation
Step 4	NO HAZARDS						
Step 5	• 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
Step 6	• 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/ Explosives	• 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	I 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
Step 7	• 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

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**
	• Functioning of Ordnance/ Explosives	• 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
VII- Post Detonation Procedures							
Step 1	• Functioning of Ordnance/ Explosives	• 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
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 2	• Functioning of Ordnance/ Explosives	• 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

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**
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 3	• Functioning of Ordnance/ Explosives	• 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
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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
Step 4	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• Cuts, splinters and abrasions	I B	• Wearing of Leather work gloves	II D	• Personnel will be required to wear appropriate hand protection while performing operations

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**
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV B	• Personnel will be required to wear appropriate eye 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
Step 5	• Lifting & Carrying Heavy Loads	• Bending to lift heavy items • Turning while lifting heavy items • Tripping while carrying explosives • Dropping ammunition and explosive items	• Disabling back injury • Disabling back injury • Disabling leg, knee and ankle injury • Initiation of explosives from shock and friction	I B	• 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	II D	• All personnel will receive back safety and proper lifting technique training • Operations personnel will be certified IAW local command directives
	• Hand Injuries	• Handling MEC items with sharp metal edges, demolition debris	• 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
	• Flying debris	• Moving demolition debris	• Eye hazards	III B	• Personnel will be required to wear ANSI approved safety glasses.	IV C	• Personnel will be required to wear appropriate eye 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

Sandbag Construction Examples

*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

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

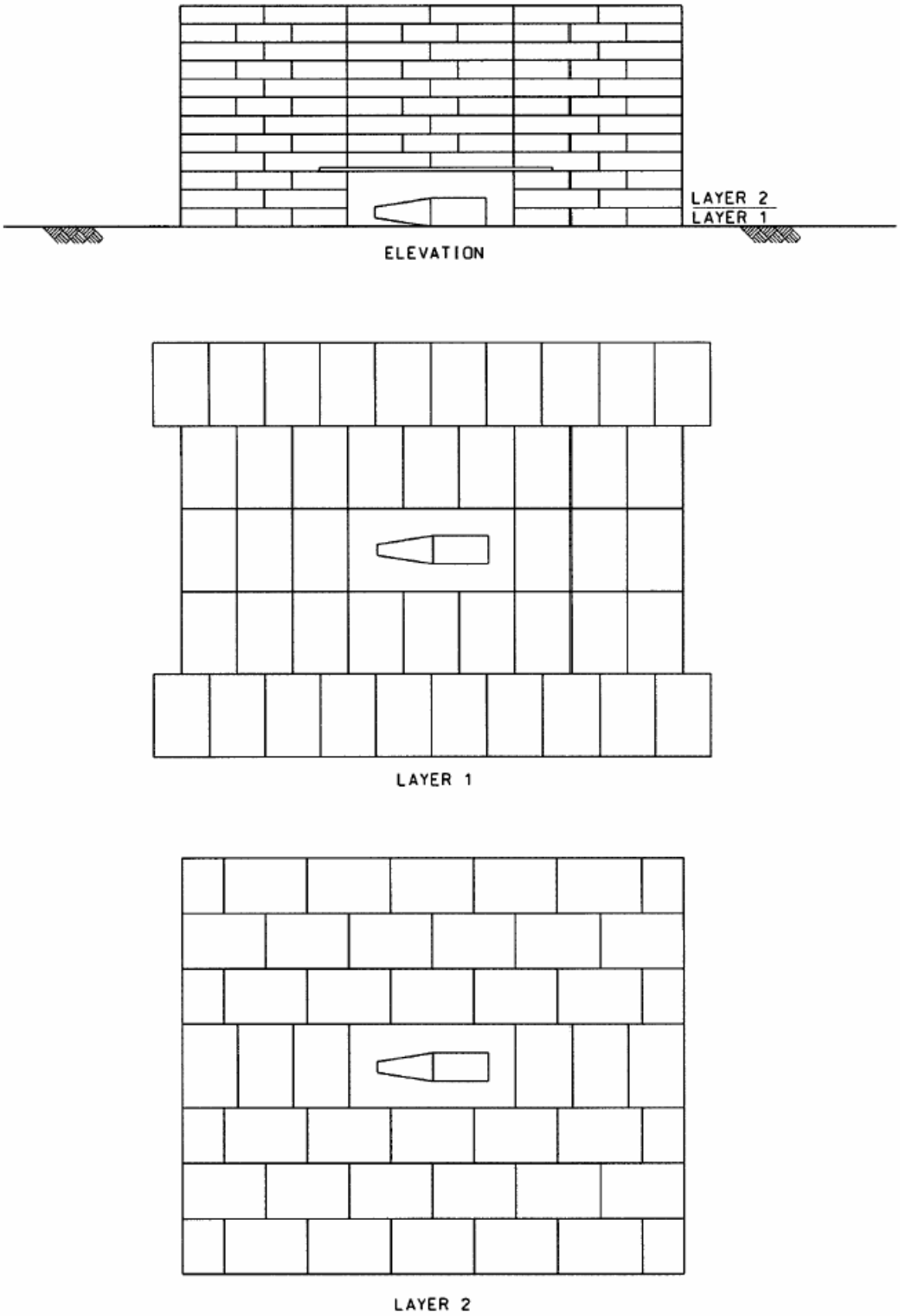


Figure 6 - Interlocking Alternate Layers of Sandbags

Appendix E

Example Florida Department of Environmental Protection Emergency Permits for Detonation

- Example Emergency Permit Request
- Example Emergency Permit Order
- Example Emergency Permit Order Public Notice

STATE OF FLORIDA
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
TWIN TOWERS OFFICE BUILDING
2700 BLAIRSTONE RD
TALLAHASSEE, FLORIDA 32399

PERMIT NO. 13526/HE/005

NOTICE OF ISSUANCE OF AN EMERGENCY PERMIT UNDER
THE RESOURCE CONSERVATION AND RECOVERY ACT
AND THE FLORIDA RESOURCE RECOVERY AND MANAGEMENT ACT.

On February 14, 2005, the Department of Environmental Protection (DEP) issued an Emergency Permit to U. S. Naval Facilities Engineering Command.

The treatment site is in an open field, now owned by Jacksonville Airport Authority – Cecil Field, located at the intersection of Loop Road and Skymaster Drive, former Naval Air Station Cecil Field, Jacksonville, Florida.

The permit authorized detonation and treatment of unstable, reactive, flammable, shock-sensitive or explosive materials.

An emergency permit pursuant to Sections 403.726(5) and 120.59(3), F.S., and Rule 62-730.320, F.A.C., was warranted because there was an imminent and substantial endangerment to human health and the environment. The issuance of this permit resulted in environmental benefits as compared with the previous storage conditions of the waste. The permit was drafted in accordance with the provisions of the Resource Conservation and Recovery Act and the Florida Resource Recovery and Management Act, and were designed to protect human health and the environment.

The permit files are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at Department of Environmental Protection, Northeast District, 7825 Baymeadows Way, Suite B200, Jacksonville, Florida 32256.

Persons wishing to comment upon the permit issuance or to the permit conditions are invited to submit same in writing within forty-five (45) days of the date of this notice to the address given in above paragraph, Attention: Ashwin Patel (Northeast District). The public notice number should be included in the first page of the comment.

All comments received within the 45-day period will be considered in the formulation of future emergency permits.

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

February 14, 2005

CERTIFIED – RETURN RECEIPT

Mark E. Davidson, Environmental Engineer
U. S. Naval Facilities Engineering Command
Engineering Field Division South
P. O. Box 190010
North Charleston, S.C. 29419-9010

SUBJECT: Naval Facilities Engineering Command – Cecil Field
EPA ID No. FL5 170 022 474
Emergency Permit 13526-HE-005
Duval County

Dear Mr. Davidson:

Enclosed you will find a Department Emergency Permit Order, along with the public notice. Please ensure publication is within the time allotted.

Please contact John Griffin at (850)245-8785 if you have any questions.

Sincerely,

Tim Bahr, Administrator
Hazardous Waste Regulation Section

TJB/jeg

Enclosure

cc (with enclosure):

Don Webster, EPA/Region 4
Ashwin B. Patel, DEP/Jacksonville
David Grabka, DEP/Federal Facilities

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

BEFORE THE STATE OF
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

In Re:
Request for an Emergency Permit by
U. S. Naval Facilities Engineering Command
Engineering Field Division South
P.O. Box 190010
2155 Eagle Drive
North Charleston, S.C. 29419-9010

Date: February 14, 2005

Permit Number: 13526-HE-005

FINAL ORDER

BY THE DEPARTMENT:

On January 31, 2005, the Department received a request from Mark E. Davidson of the U. S. Naval Facilities Engineering Command for an emergency permit to allow the thermal treatment and disposal of waste. The treatment of the waste will be carried out by the Naval Ordnance Safety and Security Activity (NOSSA), NAVFAC EFD SOUTH, and the NAVFAC EFD SOUTH Munitions Response/Explosive Ordnance Disposal (EOD) Contractor (CH2M HILL Constructors, Inc. (CH2M HILL) with USA Environmental, Inc. (USA) at the munitions response site located at the intersection of Loop Road and Skymaster Drive, Former Naval Air Station Cecil Field, Jacksonville, Florida. The treatment involves deactivation or destruction of reactive waste, (i.e., recovered munitions and explosives of concern (MEC)) that present a shock-sensitive characteristic, which could create an imminent danger to persons handling the waste and to the general public. This permit is for the detonation of MEC found during the initial, or Phase I, five-acre investigation completed on December 17, 2004. A Phase II MEC investigation is currently being planned for an additional 15 acres. After completion of the Phase II investigation an additional detonation, and permit, will likely be required.

FINDINGS OF FACT

The waste came into the possession of the Department of Navy. Because of the flammable, shock-sensitive, reactive, and explosive nature of the material, there was a potential danger to the

health and welfare of those persons coming in contact with this waste if the waste was not handled in a proper manner.

1. The specific waste to be thermally treated/destroyed by detonation is the following:

77 - 20-mm high explosive projectiles
191 – Cartridge Actuated Devices (CADs)
33 – Small Arms Blanks
8- Spotting Charges
1 – Suspect aircraft part
2- CADs/impulse cartridges

Based on the above-stated facts, the Department finds that the hazardous waste presents an imminent hazard to persons and property in proximity to it.

2. NOSSA, NAVFAC EFD SOUTH, CH2M HILL, and USA will abate the imminent hazard identified in Findings of Fact #1 of this permit by thermal destruction of the unstable, flammable, shock-sensitive, and potentially explosive hazardous waste.

3. Thermal treatment/destruction will be accomplished according to the procedures specified in the "Work Plan Addendum No. 01 Munitions Response and Onsite Construction Support for Discarded Military Munitions," dated November 30, 2004,("Work Plan") and Revision No. 01 to the project Explosives Safety Submission and Explosives Siting Plan, dated January 2005 ("Revision No. 01"). The general procedure will be to use 0.75-lb PETN boosters to thermally treat and destroy the items listed in Finding of Fact #1. Multiple items listed in Finding of Fact #1 will be secured around the boosters. The boosters will then be segregated into treatment/detonation events not to exceed 6 lbs. Net Explosives Weight. The boosters will be initiated with a detonation cord and /or blasting caps depending on the composition of the treatment/detonation event. All treatment/detonation events will be done with protective works/engineering controls by surrounding with an enclosure which has 24 inches of sand bags on the roof and walls.

4. Based on the engineering controls calculations provided in Revision No. 01, an enclosure which has 24 inches of sand bags on the roof and walls would have a maximum sandbag throw of 135 feet and would require a safety arc of 200 feet. Revision No. 01 provides the detailed engineering controls and calculations, risk assessment, and operational hazard analysis, as well as sand bag construction examples.

5. The hazardous waste will be thermally treated under the supervision and control of personnel from NOSSA, NAVFAC EFD SOUTH, CH2M HILL and USA. These officials are experienced in the handling and disposal of explosives.

CONCLUSION

NOSSA, NAVFAC EFD SOUTH, CH2M HILL, and USA will conduct this thermal treatment operation in an environmentally sound and a Department-approved manner. Therefore, pursuant to Sections 403.726(5) and 120.59(3), Florida Statutes, it is

ORDERED

1. This Permit authorizes thermal treatment of the waste as specified above in Findings of Fact #1, in accordance with the Work Plan and Revision No. 01.

2. The hazardous waste will be treated/destroyed via detonation in a field (latitude: 30^0 23' 50''North; longitude: 81^0 88' 08''West) within the munitions response site located at the intersection of Loop Road and Skymaster Drive, former Naval Air Station Cecil Field, Jacksonville, Florida ("the treatment site") between February 20 through March 11, 2005.

3. Any visible material resulting from the treatment process will be removed within 24 hours of detonation and properly disposed of by approved methods. Post-treatment soil sampling will be completed to ensure no contamination remains following residue/debris removal, by collection and laboratory analysis of one surface soil sample from the center of the treatment site for metals and nitro aromatics (explosives) only.

4. Adequate fire and personal protection to assure confinement and control of any fire resulting from the operation, and to prevent injuries of personnel present will be provided.

5. Prior to the thermal treatment, the treatment site will be secured and access restricted except to authorized personnel. Additionally, prior to the treatment operation, a visual inspection will be performed within a minimum 200-foot radius of the treatment site to assure that no unauthorized personnel are on site.

6. The Permittee will notify the local FDEP Northeast District representative or its designee to offer the option of being present to observe the thermal treatment operation.

7. The Permittee is required to obtain all other local, state and federal approvals and licenses required for conducting the activities in this permit.

8. Within 60 days of completion of the thermal treatment authorized by this permit, the Permittee shall submit a detailed written summary of the specific description of the actual procedures used for treatment, and the disposition of any residues from the treatment process, as well as any additional pertinent information shall be submitted to the Waste Program Administrator, Department of Environmental Protection, Northeast District Office, 7825 Baymeadows Way, Suite B200, Jacksonville, Florida 32256; Environmental Administrator, Federal Facilities Group, Bureau of Waste Cleanup, M.S. 4535, Department of Environmental

Protection, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 and to the Environmental Administrator, Hazardous Waste Regulation Section, M.S. 4560, Bureau of Solid and Hazardous Waste, Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

The Permittee shall undertake whatever action necessary to comply with Rule 62-730.320, F.A.C.

Issued this 4th day of February

DOTTY DILTZ, ASSISTANT DIRECTOR
DIVISION OF WASTE MANAGEMENT

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true copy of the foregoing FINAL ORDER has been furnished by U.S. Mail to:

1. Mark E. Davidson, NAVFAC EFD SOUTH
2. Ashin Patel, DEP/Jacksonville
3. David Grabka, DEP/Federal Facilities
4. Don Webster, EPA/Atlanta

on this _____ day of _____, _____ in Tallahassee, Florida.

Filing and Acknowledgment
Filed on this date, pursuant to
Section 120.52, Florida Statutes,
with the designated Clerk, receipt
of which is acknowledged.

_____ _____
CLERK DATE

STATE OF FLORIDA
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
TWIN TOWERS OFFICE BUILDING
2700 BLAIRSTONE RD
TALLAHASSEE, FLORIDA 32399

PERMIT NO. 13526/HE/005

NOTICE OF ISSUANCE OF AN EMERGENCY PERMIT UNDER
THE RESOURCE CONSERVATION AND RECOVERY ACT
AND THE FLORIDA RESOURCE RECOVERY AND MANAGEMENT ACT.

On February 14, 2005, the Department of Environmental Protection (DEP) issued an Emergency Permit to U. S. Naval Facilities Engineering Command.

The treatment site is in an open field, now owned by Jacksonville Airport Authority – Cecil Field, located at the intersection of Loop Road and Skymaster Drive, former Naval Air Station Cecil Field, Jacksonville, Florida.

The permit authorized detonation and treatment of unstable, reactive, flammable, shock-sensitive or explosive materials.

An emergency permit pursuant to Sections 403.726(5) and 120.59(3), F.S., and Rule 62-730.320, F.A.C., was warranted because there was an imminent and substantial endangerment to human health and the environment. The issuance of this permit resulted in environmental benefits as compared with the previous storage conditions of the waste. The permit was drafted in accordance with the provisions of the Resource Conservation and Recovery Act and the Florida Resource Recovery and Management Act, and were designed to protect human health and the environment.

The permit files are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at Department of Environmental Protection, Northeast District, 7825 Baymeadows Way, Suite B200, Jacksonville, Florida 32256.

Persons wishing to comment upon the permit issuance or to the permit conditions are invited to submit same in writing within forty-five (45) days of the date of this notice to the address given in above paragraph, Attention: Ashwin Patel (Northeast District). The public notice number should be included in the first page of the comment.

All comments received within the 45-day period will be considered in the formulation of future emergency permits.

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

ES32MD
4 Feb 2005

Florida Department of Environmental Protection
ATTN: Mr. Douglas Outlaw
2600 Blairstone Road, Twin Towers
Mail Stop 4560
Tallahassee, Florida 32399

Request by Naval Facilities Engineering Command, Engineering Field Division South (NAVFAC EFD SOUTH) for an emergency permit from the Florida Department of Environmental Protection (FDEP) to allow the thermal treatment/destruction of hazardous waste. The treatment will be carried out by the Naval Ordnance Safety and Security Activity (NOSSA), NAVFAC EFD SOUTH, and the NAVFAC EFD SOUTH Munitions Response/Explosive Ordnance Disposal (EOD) Contractor (CH2M HILL Constructors, Inc. [CH2M HILL] with USA Environmental, Inc. [USA]) at the munitions response site located at the intersection of Loop Road and Skymaster Drive, former Naval Air Station Cecil Field, Jacksonville, Florida. The treatment involves deactivation or destruction of a reactive waste, (i.e., recovered munitions and explosives of concern that present an unacceptable hazard for transportation to a disposal site). This permit is for the detonation of munitions and explosives of concern (MEC) found during the initial, or Phase I, five-acre investigation completed on December 17, 2004. A Phase II MEC investigation is currently being planned for an additional 15 acres. Please recognize that after the completion of the Phase II investigation that an additional detonation, and permit, will likely be required.

FINDINGS OF FACT

1. The specific waste to be thermally treated/destroyed by detonation is the following:

   - (77) each 20-mm high explosive projectiles (unfired/fuzed with cartridge intact) consisting of a primer which initiates the smokeless powder (approx. 0.07 lbs.) contained in a steel or brass cartridge case, which in turn propels a projectile constructed of steel; copper in the rotating band and an aluminum ogive.

   - (191) each Cartridge Actuated Devices (CADs) consisting of a primer which initiates a nitro cellulose (black powder) (0.0021 - 0.01014 lbs.) charge that is contained in an aluminum cartridge.

   - (33) each Small Arms Blanks (5.56-mm and 7.62-mm) consisting of a primer which initiates a smokeless powder charge that is contained in a brass cartridge case.

   - (8) each Spotting Charges consisting of a primer which initiates smokeless powder charge (10 gauge shotgun) that in turns expels a smoke mixture, all of which is contained in a cardboard or aluminum case.

- (1) each suspect aircraft part suspected to contain (2) each CADs/impulse cartridges (determined to be type of actuator with two ports labeled for CAD use with caps and leads intact).

CH2M HILL and USA have determined the above waste to be unsafe to transport for disposal. Because of the flammable, shock-sensitive, reactive, and explosive nature of this hazardous waste, there is a potential danger to the health and welfare of those persons coming in contact with this waste if the waste is not handled in the proper manner. Based on the above, the hazardous waste presents an imminent hazard to persons and property in its proximity.

2. NOSSA, NAVFAC EFD SOUTH, CH2M HILL, and USA will abate the imminent hazard identified in Findings of Fact #1 by thermal destruction of the unstable, flammable, shock-sensitive, and potentially explosive hazardous waste.

3. Only the waste specified in Findings of Fact #1 will be thermally treated to deactivate or destroy the hazardous nature of the waste. The treatment operation will be accomplished in accordance with this request; "Work Plan Addendum No. 01 Munitions Response and Onsite Construction Support for Discarded Military Munitions," dated November 30, 2004; and Revision No. 01 to the project Explosives Safety Submission and Explosives Siting Plan, dated January 2005.

4. All other local, state, and federal approvals and licenses will be obtained prior to conducting thermal treatment activities.

5. The hazardous waste will be treated/destroyed via detonation in a field (latitude: 30.2350° North; longitude: 81.8808° West) within the munitions response site located at the intersection of Loop Road and Skymaster Drive, former Naval Air Station Cecil Field, Jacksonville, Florida. The treatment site is owned by:

   Jacksonville Airport Authority – Cecil Field
   ATTN: Russel Chandler, Cecil Field Airport Manager
   13365 Aeronautical Circle
   Jacksonville, Florida 32221
   (904) 573-1630

   Written permission to use the treatment site will be received from the Jacksonville Airport Authority prior to thermal treatment/destruction.

   The closest permanent residences are the Cecil Pines senior housing complex that is located approximately 3,300 feet from the treatment site. Additionally, a Jacksonville Sheriff's Office Duty Officer for Cecil Field is currently using Building 823 as his temporary residence. Building 823 is approximately 1,250 feet from the treatment site

6. Thermal treatment/destruction will be accomplished according to the procedures specified in the "Work Plan Addendum No. 01 Munitions Response and Onsite Construction Support for Discarded Military Munitions," dated November 30, 2004 and Revision No. 01 to the project Explosives Safety Submission and Explosives Siting Plan, dated January 2005. The general procedure will be to use 0.75-lb PETN boosters to thermally treat and destroy the items listed in Findings of Fact #1. Multiple items listed in Findings of Fact #1 will be secured around

the boosters. The boosters will then be segregated into treatment/detonation events not to exceed 6 lbs. Net Explosives Weight. The boosters will be initiated with a detonation cord and/or blasting caps depending on the composition of the treatment/detonation event. All treatment/detonation events will be done with protective works/engineering controls by surrounding with an enclosure which has 24 inches of sand bags on the roof and walls.

7. The hazardous waste will be thermally treated under the supervision and control of NOSSA, NAVFAC EFD SOUTH, CH2M HILL, and USA. These officials are experienced in the handling and disposal of explosives.

8. Any visible residue or debris resulting from the treatment process will be removed and properly disposed of offsite by approved methods. Post-treatment soil sampling will be completed to ensure no contamination remains following residue/debris removal. Collection and laboratory analysis of one soil sample from the treatment site for metals and nitro aromatics (explosives) only are planned.

9. Adequate fire and personal protection to assure confinement and control of any fire resulting from the operation, and to prevent injuries of personnel present, will be provided.

10. Prior to the thermal treatment, the treatment site in Findings of Fact #5 will be secured and access restricted except to authorized personnel. Additionally, prior to the treatment operation, a visual inspection will be performed within a minimum 200-foot radius of the treatment site described in Findings of Fact #5 to assure that no unauthorized personnel are on site. Based on the engineering controls calculations provided in Revision No. 01 to the project Explosives Safety Submission and Explosives Siting Plan, dated January 2005, an enclosure which has 24 inches of sand bags on the roof and walls would have a maximum sandbag throw of 135 feet and would require a safety arc of 200 feet. Revision No. 01 to the project Explosives Safety Submission and Explosives Siting Plan, dated January 2005 provides the detailed engineering controls and calculations, risk assessment, and operational hazard analysis, as well as sand bag construction examples.

11. A detailed written summary of the actual procedures used for treatment, details on the reasons for any deviations from the plans and information submitted for this request, the disposition of any residues from the treatment process, as well as any additional pertinent information will be submitted within 60 days of field work completion to both:

    Florida Department of Environmental Protection, Northeast District
    ATTN: Waste Program Administrator
    7825 Baymeadows Way, Suite B200
    Jacksonville, Florida 32256

    and

    Florida Department of Environmental Protection
    ATTN: Mr. Douglas Outlaw
    2600 Blairstone Road, Twin Towers
    Mail Stop 4560
    Tallahassee, Florida 32399

12. Thermal treatment of the waste as specified above in Findings of Fact #1 will occur in an open field as described in Findings of Fact #5 within the next 120 days.

13. FDEP Northeast District will be notified at least 5 days before the beginning of the disposal operation.

Sincerely,

MARK E. DAVIDSON
Restoration II Branch

Copy to:
CH2M Hill (Michael Halil)
EPA Region IV (Doyle Brittain)
FDEP (Dave Grabka)

Appendix F

Munitions Response Operations Forms

MEC Information
MEC Disposal Checklist
Misfire Checklist
BATF Form 5400.5

MEC INFORMATION FORM

DATE/TIME: _____ **TRACKING NUMBER:** _____
LOCATION: _____

1. **ITEMS REMOVED FROM SITE (YES/NO)**

2. **WHO REMOVED THE ITEM(S)?**
   Name:_____ **Organization:** _____

3. **IF ITEMS WERE REMOVED, WHERE WERE THEY TAKEN?** _____
   _____

4. **ITEMS DESTROYED ONSITE (YES/NO)**

5. **WHO DESTROYED ITEM(S)?**
   Name: _____ **Organization:** _____
   Time of Detonation:_____ **MEC Down Time:**_____

6. **MEC ENCOUNTERED:**

Type	Quantity	Condition	Disposition

7. **NAVY NOTIFIED AT (TIME):** _____ **REP:** _____

8. **PERSONNEL NOTIFIED AT (TIME):** _____ **REP:** _____

9. **COMMENTS (Significant events or findings):** _____
   _____
   _____
   _____

_____ _____
CH2M HILL UXO Representative (Signature) **CH2M HILL MEC Representative**
(Print Name)

CHECKED BY _____	APPROVED BY _____

MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) DISPOSAL CHECKLIST

Be sure to equalize electrical potential "Ground" wherever appropriate.

_____ A. Approval of disposal plan from Senior UXO Supervisor, Government Safety Representative, and Site Authorities.

_____ B. Site is secure. Appropriate EZ per work plan.

_____ C. Ensure the blasting machine is in control of the downrange team.

_____ D. Test the firing cable for continuity and short the wires or clips.

_____ E. Barricade the electric blasting caps (EBCs).

_____ F. Remove the shunt on an EBC.

_____ G. Facing away from the barricade, test the continuity of the EBC with a galvanometer.

_____ H. Replace the shunt or short the EBC.

_____ I. Repeat steps F, G, and H for the second EBC.

_____ J. Recheck the firing cable to ensure the cable is shorted.

_____ K. Make a parallel circuit and connect the leg wires of the EBCs to the firing cable.

_____ L. Connect the EBCs to the main charge. Return to the firing point.

_____ M. Using binoculars, ensure the area is clear and blow the air or vehicle horn three times.

_____ N. Fire the charge.

_____ O. Conduct a destruction site inspection

GENERAL DEMOLITION ELECTRIC MISFIRE CHECKLIST

_____ A. Repeat firing attempts.

_____ B. Check circuit with galvanometer.

_____ C. Switch blasting machines, if possible.

_____ D. Repeat firing attempts.

_____ E. Check circuit with galvanometer.

_____ F. Short firing cable wires.

_____ G. Wait 60 minutes before going downrange.

_____ H. Using new EBCs, countercharge the main charge.

GENERAL DEMOLITION NON-ELECTRIC MISFIRE CHECKLIST

_____ A. Wait 60 minutes plus time fuze burn time before going downrange.

_____ B. Using new firing train, countercharge the main charge.

OMB No. 1512-0185 (09/30/2002)

DEPARTMENT OF THE TREASURY

BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

REPORT OF THEFT OR LOSS-EXPLOSIVE MATERIALS

DATE

Upon discovery of any theft or loss of any of your explosive materials:

-First, contact ATF toll free at 1-800-461-8841 between 8:00 a.m. - 5:00 p.m. EST (or after-hours and weekends contact ATF collect at 1-888-283-2662) to report the theft or loss;
-Second, contact your local law enforcement office to report the theft or loss to obtain a police report; and
-Third, complete this form and attach any additional reports, sheets or invoices necessary to provide the required information, and fax then mail the form with additional material(s) to the nearest ATF office listed on the reverse. We suggest you retain a copy of the completed form. Please complete each item, as applicable, to the best of your ability.
NOTE: Section 842(k), 18 U.S.C., Chapter 40, states, "It shall be unlawful for any person who has knowledge of the theft or loss of any explosive materials from his stock to fail to report such theft or loss within twenty-four hours of discovery thereof to the Secretary and to appropriate local authorities." Codified at 27 C.F.R., Section 55.30.

1. NAME, ADDRESS AND TELEPHONE NUMBER OF PERSON MAKING REPORT *(Include corporate or business name, if applicable)*

2. LOCATION OF THEFT OR LOSS *(If different from item 1)*

3. THEFT OR LOSS	DATE	TIME
a. DISCOVERED		
b. OCCURRED *(Show approximate if exact not known)*		
c. REPORTED TO ATF BY TELEPHONE		
d. REPORTED TO LOCAL AUTHORITIES		

4. NAME AND ADDRESS OF LOCAL AUTHORITY TO WHOM REPORTED

POLICE REPORT NUMBER: _____

5. EXPLOSIVE MATERIALS LOST OR STOLEN *(Attach invoices or additional sheets, if necessary)*

a. MANUFACTURER OR BRAND NAME *(Include date and shift code)*	b. QUANTITY *(Pounds of Explosives, Number of Caps)*	c. TYPE AND DESCRIPTION *(Dynamite, Blasting Agents, Detonators, etc. Include for each type, size, MS delay or length of legwire, as applicable)*

6. THEFT OR LOSS OCCURRED FROM *(Check applicable box)*

☐ PERMANENT MAGAZINE ☐ PORTABLE MAGAZINE ☐ TRUCK ☐ WORK SITE ☐ OTHER *(Explain)* _____

7. ENTRY TO MAGAZINE MADE THROUGH *(Complete if applicable)*

☐ DOOR ☐ ROOF ☐ FLOOR ☐ FOUNDATION

☐ WALL ☐ CEILING ☐ VENTS ☐ OTHER *(Explain)* _____

8. NUMBER AND TYPE OF LOCKS FORCED *(Complete if applicable)*

9. OTHER INFORMATION PERTINENT OT THE THEFT OR LOSS

10. SIGNATURE AND TITLE OF PERSON MAKING REPORT

11. FEDERAL EXPLOSIVES LICENSE OR PERMIT, IF ANY

FOR ATF USE ONLY

DATE RECEIVED	TIME RECEIVED	UNIQUE IDENTIFIER

ATF F 5400.5 (6-2002) PREVIOUS EDITIONS ARE OBSOLETE

REPORTING INSTRUCTIONS

Forward or Fax this completed form to the ATF address listed below:

Bureau of Alcohol, Tobacco and Firearms
Arson and Explosives National Repository Branch (AENRB)
P.O. Box #50980
Washington, DC 20077-8001
Toll Free Fax: 1-866-927-4570

Questions regarding the completion of this form should be referred to the AENRB toll free at 1-800-461-8841.

PRIVACY ACT INFORMATION

The following information is provided pursuant to section 3 of the Privacy Act of 1974 (5 U.S.C. § 522a(e)(3).

1. **Authority.** Solicitation of this information is made pursuant to Title XI of the Organized Crime Control Act of 1970 (18 U.S.C. Chapter 40). Disclosure of a theft or loss of explosive materials is mandatory pursuant to 18 U.S.C. § 842(k) for any person who has knowledge of such theft or loss from his stock.

2. **Purpose.** The purpose for the collection of this information is to give ATF notice of the theft or loss of explosive materials, and to furnish ATF with the pertinent facts surrounding such theft or loss. In addition, the information is used to confirm and verify prior notification of this theft or loss of explosive materials.

3. **Routine Uses.** The information will be used by ATF to aid in the administration of laws within its jurisdiction concerning the regulation of explosive materials and other related areas. In addition, the information may be disclosed to other Federal, State, foreign, and local law enforcement of laws within their jurisdiction.

4. **Effects of not supplying information requested.** 18 U.S.C. § 842(k) makes it unlawful for any person, who has knowledge of the theft or loss of explosive materials from his stock, to fail to report such theft or loss within twenty-four hours of discovery thereof, to the Secretary and to appropriate local authorities. The penalty for violation of this section is a fine of not more than $1,000 or imprisonment for not more than one year, or both. 18 U.S.C. § 844(b).

PAPERWORK REDUCTION ACT NOTICE

This request in accordance with the Paperwork Reduction Act of 1995. The purpose of this information collection is to report the theft or loss of explosive materials. The information is used for investigative purposes by ATF officials. This information is mandatory by stature. (18 U.S.C. § 842)

The estimated average burden associated with this collection of information is 1 hour and 48 minutes per respondent or recordkeeper, depending on individual circumstances. Comments concerning the accuracy of this burden estimate and suggestions for reducing this burden should be addressed to Reports Management Officer, Document Services Branch, Bureau of Alcohol, Tobacco and Firearms, Washington, D. C. 20226.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Appendix G

Materials that Present a Potential Explosive Hazard/Munitions Debris Collection and Inspection Procedures

Materials that Presents a Potential Explosive Hazard (MPPEH)/Munitions Debris (MD) Collection and Inspection Procedures

Table of Contents

1.0 Purpose 10-4

2.0 Background 10-4

3.0 Collection Procedures 10-4

4.0 Removal of Scrap Metal/Range Residue 10-5
- **4.1 Segregation of Scrap Metal/Range Residue 10-5**
  - **4.1.1 Group 1 Scrap Metal/Range Residue 10-5**
    - **4.1.1.1 Group 1a Scrap Metal/Range Residue 10-5**
    - **4.1.1.2 Group 1b Scrap Metal/Range Residue 10-5**
  - **4.1.2 Group 2 Scrap Metal/Range Residue 10-6**

5.0 Disposition of Munitions List Items (MLI) 10-6
- **5.1 Assignment of Demilitarization Codes 10-6**
- **5.2 Demilitarization Requirements 10-6**
  - **5.2.1 Category III. Ammunition 10-8**
  - **5.2.2 Category V. Military Explosives, Solid and Liquid Propellants, Bombs, Mines, Incendiary Agents, and their Constituents 10-9**
  - **5.2.3 Venting of MPPEH Related Scrap 10-12**

6.0 Certification/Disposal of Scrap Metal 10-13

List of Figures

Figure	*Title*
Figure 1	**Logic Diagram for the Collection and Disposition of MPPEH Related Scrap**

1.0 Purpose

This SOP is intended to guide Project Delivery Managers, Health & Safety personnel, and UXO Technicians in the safe and efficient handling and disposal of materials that present a potential explosive hazard (MPPEH)/munitions debris (MD) related scrap metal found at CH2M HILL project sites. The inherently dangerous characteristics of Ammunition Explosives Dangerous Articles (AEDA) dictate that special precaution be taken to ensure that demilitarization is performed only by properly trained and technically qualified personnel.

2.0 Background

During excavation and investigation operations, UXO Technicians will encounter the following types of metallic contamination: UXO items; ordnance related scrap that is contaminated with explosives or other hazardous materials; non-hazardous ordnance related scrap metal; and general metallic debris. Because the metal scrap recovered will ultimately be disposed of off-site, it is imperative that procedures be established to preclude live ordnance or hazardous materials from becoming intermingled with other non-hazardous metal scrap.

Current and past practices have only required the inspection of MPPEH/MD related scrap and a certification by a qualified EOD/UXO technician that it is safe to the best of their knowledge. There are several pitfalls with this approach depending on the type of ordnance being inspected. The following paragraphs provide guidance for avoiding these pitfalls.

References:

DOD 4160.21-M	Department of Defense Reutilization and Marketing Manual
DOD 4160.21-M-1	Department of Defense Demilitarization Manual
TB 700-4	Department of the Army Technical Bulletin - Decontamination of Facilities and Equipment

3.0 Collection Procedures

We will use a systematic approach for collecting and inspecting metal scrap. Our approach is designed to ensure that the materials undergo a continual evaluation/inspection process from the time acquired until finally removed from the site.

At the operating site, we will preposition two scrap metal containers. One container will be marked "Non-MPPEH/MD Scrap Metal" and will be used to collect general metal debris. The other container will be marked "MD Related Scrap Metal" and will be used to collect non-hazardous ordnance related scrap metal (i.e. Metal components that <u>do not</u> contain any explosives or other hazardous materials).

Collection procedures begin at the time the metal 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 non-ordnance related scrap it is placed in a temporary Non-

MPPEH/MD scrap accumulation point located within the current operating grid. If the item is identified as ordnance related scrap it is placed in a temporary MPPEH related scrap accumulation point, again this point is located within the current operating grid.

Upon completion of operations within a grid, the UXO Supervisor for the team that cleared the grid will inspect each of the scrap piles and direct movement of the scrap into the appropriate site collection container. To preclude migration of the material from one pile to the other during movement to the scrap containers, each pile will be moved as a distinct and separate vehicle load.

4.0 Removal of Scrap Metal/Range Residue

The UXO Excavation and Disposal Team will collect the scrap piles deposited at the gird corner markers by the UXO Clearance Team, perform an inspection to confirm that segregation of the MPPEH/MD related scrap had been done correctly and that no live MEC has been placed in the MPPEH/MD related scrap pile. The MPPEH/MD related scrap will be inspected and divided into two groups: 1) MPPEH related scrap requiring further demilitarization; and 2) MD related scrap that does not require further demilitarization. **Figure 1** is a Logic Diagram for the Collection and Disposition of MPPEH Related Scrap.

4.1 Segregation of Scrap Metal/Range Residue

For purposes of disposal, it shall be segregated and defined as either Group 1a, Group1b, or Group 2.

4.1.1 Group 1 Scrap Metal/Range Residue

Group 1 includes property that previously contained explosives or that does not contain items of a dangerous nature and can be certified inert and/or free of explosives or other dangerous materials such as targets, certain expended ordnance, etc.

4.1.1.1 Group 1a Scrap Metal/Range Residue

Group 1a includes firing range expended small arms cartridge and inert metals gleaned from range clean up. Metals gleaned include material for which the only use is for its basic material content (e.g. clean shrapnel, target metal, etc.) And does not include material with any residual utility or capability or that is considered to be MLI or CCLI. Such material is eligible under the Resource Recovery and Recycling Program for disposition by a QRP in accordance with DODI 7514.1, Pollution Prevention. DOD Components may exercise direct sale authority for firing range expended small arms cartridge cases provided that it is crushed, shredded or otherwise destroyed prior to release from DOD control.

4.1.1.2 Group 1b Scrap Metal/Range Residue

Group 1b includes any certifiable material or item not meeting the criteria in 1a above. A determination shall be made as to whether the material/item requires demilitarization. Damaged sustained does not necessarily constitute demilitarization. Destruction shall, at a minimum, satisfy the provisions of DOD 4160.21-M-1. This material is not eligible for a QRP.

4.1.2 Group 2 Scrap Metal/Range Residue

Group 2 includes inherently dangerous items that may potentially contain munitions residue and cannot be certified as inert, such as practice bombs (that is, duds, unexploded ordnance (UXO), BDU-33, MK-106, etc.)

5.0 Disposition of Munitions List Items (MLI)

Demilitarization should be accomplished by the most cost effective method consistent with adequate security and surveillance as economically as practical in accordance with existing environmental standards, safety and operational regulations, to the point of assuring freedom from explosives, toxic or incendiary materials, smoke content or design hazards by one of the following methods:

a. By a sales contractor, as a condition of sale. Unless otherwise authorized, property to be demilitarized in accordance with DOD 4160.21-M-1 must be demilitarized prior to transfer of title to a purchaser.

b. By the DRMO, generating activity, designated Military Service/Defense Agency or contractor personnel (having qualified UXO personnel).

c. Under a service/performance contract.

5.1 Assignment of Demilitarization Codes

The proper procedure requires that MPPEH scrap be assigned a demilitarization code and that code determines the type of processing required. For almost all MPPEH scrap the assigned code should be "A". Assignment of this code is the responsibility of the generating activity (for range maintenance contracts such as Fort Irwin it is the National Training Command; for BRAC removal actions it is the BRAC office; and for FUDS it is the Corp of Engineers). CH2M HILL as the contractor and expert in munitions response (MR) should assist the generating activity in determining the demilitarization code to be assigned and the method and degree of demilitarization required.

Definition of Demilitarization Code G:

"G" MLI -- Demilitarization required - AEDA, Demilitarization, and if required, declassification and/or removal of sensitive markings or information, will be accomplished prior to physical transfer to a DRMO. This code will be used for all ADEA items, including those which also require declassification and/or removal of sensitive marking or information. [When in doubt assign Demilitarization Code "G" for all recovered OE related scrap.]

5.2 Demilitarization Requirements

Demilitarization and decontamination of MPPEH scrap is based on a system that assigns decontamination levels commensurate with the post treatment use. For metal that is being released to the public as recyclable, 5X is the acceptable degree of decontamination.

Past practices for recovery and certification of MPPEH scrap from range maintenance contracts, BRAC and FUDS removal actions have improperly certified MPPEH scrap as safe for turn-in to DRMO for recycling based on inspection and certification by UXO/EOD technicians. In most cases this achieves a 3X level of decontamination by de facto. This is not sufficient for resale to the public. Three X=s indicate the equipment or facilities (in this case OE scrap) have been examined and decontaminated by approved procedures and no contamination can be detected by appropriate instrumentation, test solutions, or by visual inspections on easily accessible surfaces or in concealed housings, etc. and are considered safe for the intended use. Items decontaminated to this degree can not be furnished to qualified DOD or Industry users or subjected directly to open flame cutting, welding, high temperature heating devices), or operations which generate extreme heat, such as drilling and machining. Newly implemented certification procedures require two signatures for certification of which only one signature may be from a government contractor.

The only acceptable way to get to 5X decontamination is by partial or complete removal, neutralization, or destruction of explosives/explosive residue by flashing, steaming, neutralization, or other approved desensitizing methods such as shredding. This is often expensive and nullifies the value of the scrap. However to leave MPPEH scrap on a range site increases the possibility of residues such as RDX, HBX, and TNT entering the ground water and causing a more expensive problem.

Technical instructions issued by the Defense Agency or Military Service having procurement responsibility for the item involved and/or instructions provided through the DOD demilitarization Bulletin Board System, will determine and identify the method of demilitarization and the degree to which additional demilitarization is necessary to meet the requirements in their respective areas. For additional information contact the following:

a. For ammunition procured by the Department of the Army, technical instructions relating to ballistic missiles, and large rockets, will be furnished by the Commander, U.S. Army Aviation and Missile Command (AMCOM), Attn: AMSAM-DSA-WO, Redstone Arsenal, AL 35898-5239

b. For conventional, chemical, and all other types of ammunition excluding lethal chemical agents and waste munitions, technical instructions will be provided by the U.S. Army Industrial Operations Command, Attn: AMSIO-SMK, Rock Island, IL 61299-6000

c. For lethal chemical agents including vesicants and nerve agents and their carriers, technical instructions will be furnished by the U.S. Army Armament Material Readiness Command Program Manager for the demilitarization of Chemical Material, Edgewood Arsenal, Aberdeen proving Ground, Maryland 21010

d. For ammunition procured by the Department of the Navy, technical instructions will be issued by the Commander, Naval Sea Systems Commander or by the

Commander Naval Air Systems Command, department of the Navy, Washington, D.C.

e. For ammunition procured by the Department of the Air Force, technical instructions will be issued by the Engineering and Reliability Branch (MMWR), Ogden Air Logistics Center, Ogden, UT 84056-5609.

The following paragraphs provide guidance for the method and degree of required demilitarization for most types of OE items:

5.2.1 Category III. Ammunition - Method and Degree of Required Demilitarization

a. **Artillery/Mortar Ammunition Components and Similar Items of All Types** including but not limited to high explosive, practice, inert loaded, incendiary, and smoke fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Burn propellant unless otherwise instructed to retain for sale or other purposes. Deform fin assembly threads or fin blades. Cartridge cases will be deformed by off-center punch-out of primer or split case neck or puncture the lower sidewall with a minimum of 3/4 inch hole or deform lower sidewall, which will prevent chambering, or crush or press. Burn out smoke mixture or detonate smoke canister.

b. **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the closure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent reloading or resealing.
NOTE: For inert loaded items (concrete, sand, plaster) a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture and air to expand and burst sealed casings causing a mechanical explosion. For this reason, DRMOs will not accept inert loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or by puncturing/drilling holes in the casing.

c. **Ammunition and Components Which Have Been Fired or Expended, Range Residue and Other Non-Explosive Items.** All items will be rendered free of energetic materials prior to accomplishment of demilitarization. Range residue will be processed in accordance with the defense Material Disposition Manual, DOD 4160.21-M, Chapter 4, paragraph B.3, after all required demilitarization is accomplished.

1. **Artillery/Mortar Ammunition Components and Similar Items of All Types.** Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Score practice round with a torch, displacing a minimum of one cubic inch of metal or shear into two pieces. Deform fin assembly threads and fin blades.

2. **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent relocating or resealing. **NOTE:** For inert loaded items (concrete, sand, plaster) a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture and air to expand and burst sealed casings causing a mechanical explosion. For this reason, DRMOs will not accept inert loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or by puncturing/drilling holes in the casing.

3. **Other Nonexplosive Filled Items** which perform a major function essential to the basic mission of the end item. Cut, crush, or process through a deactivation furnace. Burn or cut cartridge case lines and propelling charge bags. Cut, burn, or crush aircraft and ground signal cases. Crush or detonate piezoelectric (lucky) elements.

d. **Technical data** will be demilitarized by burning, shredding, or pulping.

5.2.2 Category V. Military Explosives, Solid and Liquid Propellants, Bombs, Mines, Incendiary Agents, and their Constituents - Method and Degree of Required Demilitarization

a. **Artillery/Mortar Ammunition Components and Similar Items of All Types** including but not limited to high explosive, practice, inert loaded, incendiary, and smoke fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Burn propellant unless otherwise instructed to retain for sale or other purposes. Deform fin assembly threads or fin blades. Cartridge cases will be deformed by off-center punch-out of primer or split case neck or puncture the lower sidewall with a minimum of 3/4 inch hole or deform lower sidewall, which will prevent chambering, or crush or press. Burn out smoke mixture or detonate smoke canister.

b. **Inert Loaded Projectiles, Warheads and Similar Items of All Types** loaded with inert filler to simulate service item. Remove fuze and/or spotting charge, where applicable, and burn or detonate. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent reloading or resealing.

c. **Bombs and Similar Items of All Types,** including but not limited to high explosive, practice, inert loaded, incendiary and photo flash fillers, military explosive excavating devices, demolition blocks, and grenades. Demilitarization will be accomplished by removal of explosive filler in an approved manner (e.g., wash-out, burn-out, etc.) And by deforming fuze cavity threads or removing base plate by other than normal disassembly (such as sawing) or by detonation. Grenades will be demilitarized by cutting or crushing (a minimum of 75% compression) the grenade body after item has been defuzed and explosive removed or by detonation.

d. **Small Explosive Items**, including but not limited to fuzes, boosters, primers, detonators, firing devices, ignition cartridges, blasting caps, grenade cartridges, tracer assemblies, and similar components. Demilitarization can be accomplished by processing through a deactivation furnace at settings of 1150 degrees at burner end and 450 to 500 degrees at stack end or by mutilation. Incendiary projectiles will normally be decored to expose and assist in the compete burning of the incendiary composition. Where decoring of projectile is not necessary, processing through the deactivation furnace is adequate. Burn out 20mm HE projectiles by processing through the deactivation furnace or detonate. Processing complete small arms ammunition cartridges, all caliber's, through the deactivation furnace at controlled temperatures will result in adequate demilitarization. Fuzes and boosters can be disposed of by disassembly and cutting, drilling, or punching to deform metal parts. Explosive components generated through disassembly are to be burned or detonated. Fuzes may also be processed through a deactivation furnace as a complete item when disassembly is not feasible. For grenades demilitarization may be accomplished by removal of explosive components by crushing, cutting, breaking, melting, burning, or otherwise to fully preclude their rehabilitation or further use as grenade components. Demilitarization may also be accomplished by detonation or burning as appropriate for the particular item involved.

e. **Rocket Motors, Warheads, Components and Similar Items of All Types,** including high explosive, inert, loaded, practice and smoke. Wash out or burn out rocket warhead filler and mutilate casing by crushing or cutting by torch and deforming threaded area. Disassemble and remove or burn out rocket motor propellant and cut or crush case, and deform threaded area of cases. Rocket motors and warheads may also be detonated.

f. **Mines, Anti-Personnel/Anti-Tank Explosive, Components and Similar Items of All Types** including high explosive, practice, inert loaded associated explosive components. Wash out or burn out filler and mutilate by crushing, cutting by torch, deforming threaded area or detonate. Process mine fuzes, activators, and firing devices through a deactivation furnace, burn in a cage or detonate. Mine firing such as the M56 or M61 types should be crushed, cut, or burned.

g. **Ammunition and Components Which Have Been Fired or Expended, Range Residue and Other Non-Explosive Items.** All items will be rendered free of energetic materials prior to accomplishment of demilitarization. Range residue will be processed in accordance with the defense Material Disposition Manual, DOD 4160.21-M, Chapter 4, paragraph B.3, after all required demilitarization is accomplished.

1. **Artillery/Mortar Ammunition Components and Similar Items of All Types** including but not limited to high explosive, practice, inert loaded, incendiary, and smoke fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Score practice round with a torch, displacing a minimum of one cubic inch of metal or shear into two pieces. Deform fin assembly threads and fin blades. Defective cartridge cases will be deformed by off-center punch-out of primer or split case neck or puncture the lower sidewall with a minimum of ¾ inch hole or deform lower sidewall, which will prevent chambering, or crush or press. Burn out smoke mixture or detonate smoke canister.

2. **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent relocating or resealing. **NOTE:** For inert loaded items (concrete, sand, plaster) a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture and air to expand and burst sealed casings. For this reason, DRMOs will not accept inert loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or by puncturing/drilling holes in the casing.

3. **Bombs and Similar Items of All Types**, including but not limited to high explosive, practice, inert loaded, incendiary and photoflash fillers, military explosive excavating devices, demolition blocks and grenades.

Demilitarization will be accomplished by deforming fuze cavity threads or removing base plate by other than normal disassembly (such as sawing) or by detonation. Grenades will be demilitarized by cutting or crushing (a minimum of 75% compression) the grenade body after item has been defuzed and explosive removed or by detonation.

4. **Rocket Motors, warheads, Components and Similar Items of All Types**, including high explosive, inert loaded, practice and smoke. Demilitarize casing by crushing or cutting by torch or deforming threaded area. Cut, crush case, or deform threaded area of rocket motor cases.

5. **Mines, Anti-Personnel/Anti-Tank, and Similar Items of All Types** including high explosive, practice, inert loaded and associated components. Demilitarize casing by crushing, or cutting by torch, and deforming threaded area or detonate. Mine firing devices such as the M56 or M61 types should be crushed, cut, or burned.

h. **Instructions For Specific Ordnance Items:**

1. **BDU-50 Practice Bomb:**

(a) Each bomb must be inspected by qualified EOD/UXO personnel to ensure that bombs are BDU-50s and that the bomb is expended. If the EOD/UXO personnel cannot verify both fuze wells, or absence thereof, it must be op-opened remotely by detonation.

(b) A 1/4 inch hole will be punched in each of the two spanner wrench receptacles, fracturing the metal to a depth in excess of 1/10 inch into the concrete filler material..

(c) A 1/4 inch punch will be utilized to further damage the threads of the nose plate, ensuring that the plate cannot be removed and replaced.

(d) Fins will be deformed or broken and paint will then be used to place a mark of contrasting color on the bomb or near the nose.

i. **Technical data** will be demilitarized by burning, shredding, or pulping.

5.2.3 Venting of MPPEH Related Scrap

Prior and current practices have taken this to mean that if the MPPEH item is intact and resembles a piece of military ordnance, such as a 105mm HEAT (Practice) projectile, it should have a hole punched through the side to expose the filler as non-explosive. This is typically accomplished through the use of a shape charge attack or vented using remotely operated water

jet cutting technology. The explosively created hole exposes the filler and disfigures the projectile so that it could not be used again. For a 105mm HEAT (Practice) round this approach is sufficient because the projectile never contained any explosives or energetic material used as a spotting charge. For a MK- 82 LDGP Bomb (Practice) this approach may not be sufficient because the bomb can contain various types of explosively activated spotting charges that have the capability to cause injury or death if exposed to the right elements such as flame from a cutting torch. And their is always the possibility that a shape charge attack may punch a hole in an explosive ordnance item exposing the filler but not causing a detonation. Because some explosive fillers look like inert fillers the possibility for misidentification and improper certification is real.

Munitions and explosives of concern (MEC) known or suspected to be inert (filled with an inert substance to simulate the weight of an explosive filler) will be explosively vented with conical-shaped charges or vented using a remotely operated water jet cutter. For the purpose of determining the fragmentation hazard area for venting, it will be assumed that the MEC has an explosive filler and that a high-order detonation will occur. Venting will be considered successful when the inert filler is exposed. The vented inert ordnance item can be treated and disposed as scrap after the venting and demilitarization process is complete.

6.0 Certification/Disposal of Scrap Metal

Generating activities shall have a Memorandum of Agreement (MOA) with the nearest DRMO for the disposal processing of ORS. DRMO will assist with the identification of a recycler that is Qualified Recycling Program (QRP) eligible. The generating activity will ensure that the quantities of demilitarized property turned in to the DRMO are accurate and that these quantities are readily verifiable by the DRMO. DRMOs will not accept any property unless the DD Form 1348-1A contains the demilitarization code or clear text statement of the demilitarization required. The generating activity is responsible for issuing a letter specifying who is authorized to sign the statement of inert certification. This letter will be kept in the project files, at the local DRMO, and with the generating activity. It must be update as needed. Personnel designated as authorized to sign on behalf of CH2M HILL must have a authorization letter from the MR Market Segment Leader.

All material generated from the firing and/or demilitarization of AEDA will be rendered **free from explosives** before being referred to a DRMO for sale. All scrap metal, generated at the site, will be disposed of through the local Defense Reutilization and Marketing Office (DRMO) or when appropriate and approved to a local scrap metal dealer, and will be transferred using DD Form 1348-1A. Prior to release of the material, the Senior UXO Supervisor will physically inspect the material in the containers to ensure that they are free of dangerous items or conduct demilitarization operations. The Senior UXO Supervisor will sign the certificate, typed on the DD Form 1348-1A, which states:

"I certify that the property listed hereon has been inspected
by me and, to the best of my knowledge and belief, contains
no items of a dangerous nature."

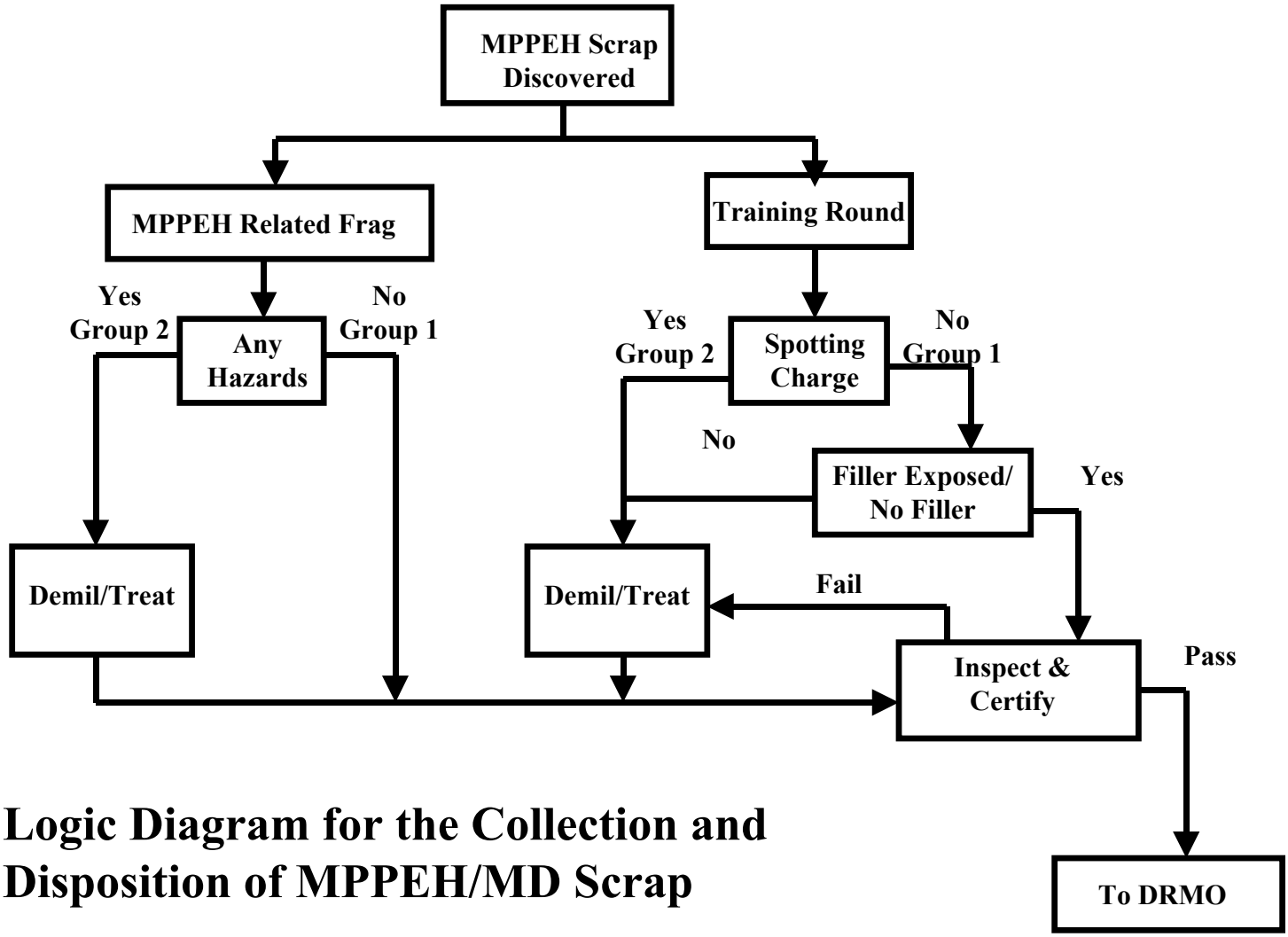
or

"I certify that (identify items) were demilitarized in accordance
with (cite specific instructions (Appendix and Item number)
that were complied with in the DOD 4160.21-M-1
and other applicable regulations."

The certification will be verified (countersigned) by a technically qualified U.S. government representative (U.S. citizen) designated by the responsible commander/generating activity. The government may delegate the responsibility for the second signature (verification) to a contractor. The delegation must be in writing and signed by the contracting officer.

Scrap will be segregated into like metals (mainly steel, aluminum, and mixed metal) and placed into palletized wooden shipping boxes. Each item placed into an inert-certified box will be inspected. The boxes will be filled, the covers will be nailed on, and a lead seal will be affixed. A Statement of Inert Certification will then be attached to the box. The box can then be picked up by a local scrap yard for disposal or recycling.

Using these procedures ensures that the collected scrap metal is properly inspected and classified. Our method includes three distinct inspections which are performed by persons of increasing levels of responsibility. The first inspection is performed at the operating grid by a qualified UXO Technician, the second is performed by the supervisor responsible for the operating grid, and the final inspection is performed by the Senior UXO Supervisor who is vested with overall responsibility.



Logic Diagram for the Collection and Disposition of MPPEH/MD Scrap

Figure 1

Appendix H

Quality Control/Transportation and Disposal Attachments

- Submittal Register
- Testing Plan and Log
- Transportation and Disposal Log
- Summary of Field Tests Log
- Contractor Daily Production Report
- Contractor Daily Quality Control Report
- Preparatory Phase Report

Contract Number: N62467-01-D-0331	CTO No.: 0029	CTO Title: Munitions Response and On-site Construction Support for Discarded Military Munitions	Location: Former NAS Cecil Field, Jacksonville, Fl	Contractor: CH2M HILL Constructors, Inc.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Spec Section	Item Description	Para. Number	Approving Authority	Other Reviewers	Submittal Number	Scheduled Submission Date	CCI Review Date	CCI Disposition	CCI Transmit Date	QC Admin Received Date	QC Disposition	QC Admin Transmit Date	Contracting Officer Received	Contracting Officer Disposition	Contracting Officer Return	Remarks

Rev 0: 26JUN98

Testing Plan and Log

Contract Number: N62467-01-D-0331		CTO No.: 0029		CTO Title: Munitions Response and On-site Construction Support for Discarded Military Munitions			Location: Former NAS Cecil Field, Jacksonville, Florida			
A	B	C	D	E	F	G	H	I	J	K
Spec Section and Paragraph	Test Required	Proposed Lab	Sampled By	Tested By	Test Location	Frequency	Date Test Made	Test Results	Date Results Forwarded	Remarks

CTO No	Project No	Project Name	Site Description	Container Type	Container Design	Waste Profile Sample No	Contractor	Transporter	Date Transported	Transporter EPA ID	Load ID	Disposal Facility	Disp Fac EPA ID	Media	Waste Type (Haz, Nonhaz, TSCA)	Waste Code/ Haz Waste No	Disposal Date	Manifest Number	Disposal Treatment Method (Enter disposal quantity under appropriate method)					Certif of Disp/ Destruc Date	Comments/ Notes	File Status (see note)
0029	321878	MR	Bldg 365																Incineration	Recycle	Landfill	Other	Unit			

Monthly Summary Report of Field Tests

Start Date:	End Date:	Submitted Date:	
Contract Number: Navy Contract # N62467-01-D-0331	CTO No.: CTO 0029	CTO Title: Munitions Response and On-Site Construction Support for Discarded Military Munitions	Location: Former NAS Cecil Field, Jacksonville, FL

A	B	C	D
Type of Test Required	Date of Test	Reporting Laboratory	Test Results

CH2M HILL **SOUTHDIV RAC** **N62467-01-D-0331**	**CONTRACTOR PRODUCTION REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	DATE OF REPORT: REVISION NO: REVISION DATE:

CTO NO: 0029	PROJECT NAME/LOCATION: Munitions Response and On-site Construction Support for Discarded Military Munitions		REPORT NO:
PROJECT NO: 321878	SUPERINTENDENT:	SITE H&S SPECIALIST:	
AM WEATHER:	PM WEATHER:	MAX TEMP: F	MIN TEMP: F

SUMMARY OF WORK PERFORMED TODAY

JOB SAFETY

Was A Job Safety Meeting Held This Date?	☐ Yes ☐ No	**TOTAL WORK HOURS ON JOB SITE THIS DATE** (Including Continuation Sheets)	
Were there any lost-time accidents this date? (If Yes, attach copy of completed OSHA report)	☐ Yes ☐ No	CH2MHILL On-Site Hours	
Was a Confined Space Entry Permit Administered This Date? (If Yes, attach copy of each permit)	☐ Yes ☐ No	JA JONES On-Site Hours	
Was Crane/Manlift/Trenching/Scaffold/HV Elec/High Work/Hazmat Work Done?? (If Yes, attach statement or checklist showing inspection performed)	☐ Yes ☐ No	Subcontractor On-Site Hours	
		Total On-Site Hours This Date	
Was Hazardous Material/Waste Released into the Environment? (If Yes, attach description of incident and proposed action)	☐ Yes ☐ No	Cumulative Total of Work Hours From Previous Report	
		Total Work Hours From Start of Construction	

SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED (Include Safety Violations, Corrective Instructions Given, Corrective Actions Taken, and Results of Safety Inspections Conducted):

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB

DESCRIPTION OF EQUIPMENT/MATERIAL RECEIVED	MAKE/ MODEL/ MANUFACTURER	EQUIPMENT/ LOT NUMBER	INSPECTION PERFORMED BY	NUMBER/ VOLUME/ WEIGHT

EQUIPMENT USED ON JOB SITE TODAY.

EQUIPMENT DESCRIPTION	EQUIPMENT MAKE/MODEL	SAFETY CHECK PERFORMED BY	NUMBER OF HOURS		
			USED	IDLE	REPAIR

CHANGED CONDITIONS/DELAY/CONFLICTS ENCOUNTERED (List any conflicts with the delivery order [i.e., scope of work and/or drawings], delays to the project attributable to site and weather conditions, etc.)**:**

VISITORS TO THE SITE:

LIST OF ATTACHMENTS (OSHA report, confined space entry permit, incident reports, etc.):

SAFETY REQUIREMENTS HAVE BEEN MET ☐

SUPERINTENDENT'S SIGNATURE DATE

CH2MHILL **SOUTHDIV RAC** **N62467-01-D-0331**	**CONTRACTOR PRODUCTION REPORT** (CONTINUATION SHEET)	DATE OF REPORT: REVISION NO: REVISION DATE:
CTO NO: 0029	PROJECT NAME/LOCATION: Munitions Response and On-site Construction Support for Discarded Military Munitions	REPORT NO:

WORK PERFORMED TODAY

EMPLOYEE	WORK PERFORMED	EMPLOYER	EMPLOYEE NUMBER	TITLE/TRADE	HRS

INCLUDE ALL PERSONNEL WORK HOURS IN THE TOTAL WORK HOURS ON JOB SITE

SAFETY REQUIREMENTS HAVE BEEN MET ☐

SUPERINTENDENT'S SIGNATURE DATE

CH2M HILL **SOUTHDIV RAC** **N62467-01-D-0331**	**CONTRACTOR QUALITY CONTROL REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:

CTO NO: 0029	PROJECT NAME/LOCATION: Munitions Response and On-site Construction Support for Discarded Military Munitions	REPORT NO:
PROJECT NO: 321878	PROJECT QC MANAGER:	SITE H&S SPECIALIST:

SAFETY MEETINGS AND INSPECTIONS

WAS A SAFETY MEETING HELD THIS DAY?	☐ YES	☐ NO	IF YES, ATTACH SAFETY MEETING MINUTES
WAS CRANE USED ON THE SITE THIS DAY?	☐ YES	☐ NO	IF YES, ATTACH DAILY CRANE REPORT OF INSPECTION AND CONTRACTOR CRANE OPERATION CHECKLIST

DEFINABLE FEATURES OF WORK STATUS

DFOW No.	Definable Feature Of Work	Preparatory	Initial	Follow-Up
1		☐	☐	☐
2		☐	☐	☐
3		☐	☐	☐
4		☐	☐	☐
5		☐	☐	☐
6		☐	☐	☐
7		☐	☐	☐
8		☐	☐	☐
9		☐	☐	☐
10		☐	☐	☐
11		☐	☐	☐
12		☐	☐	☐
13		☐	☐	☐
14		☐	☐	☐
15		☐	☐	☐

PREPARATORY

WAS PREPARATORY PHASE WORK PERFORMED TODAY? ☐ YES ☐ NO

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

DFOW No.(from list above).	TASK/ACTIVITY	PREPARATORY PHASE REPORT NO.

INITIAL AND FOLLOW-UP FEATURE OF WORK COMMENTS

DFOW No.(from list above)	Phase	Comment/Finding/Action
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)			**REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)**	
TASK/ACTIVITY	DATE ISSUED	DESCRIPTION	TASK/ACTIVITY	CORRECTIVE ACTION(S) TAKEN

CH2M HILL **SOUTHDIV RAC** **N62467-01-D-0331**	**CONTRACTOR QUALITY CONTROL REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:

CTO NO: 0029	PROJECT NAME/LOCATION: Munitions Response and On-site Construction Support for Discarded Military Munitions	REPORT NO:
PROJECT NO: 321878	PROJECT QC MANAGER:	SITE H&S SPECIALIST:

SAMPLING/TESTING PERFORMED

SAMPLING/TESTING PERFORMED	SAMPLING/TESTING COMPANY	SAMPLING/TESTING PERSONNEL

MATERIALS/EQUIPMENT INSPECTION (Materials received and inspected against specifications)

MATERIAL/EQUIPMENT DESCRIPTION	SPECIFICATION	MATERIAL ACCEPTED?	COMMENT/REASON/ACTION
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	

SUBMITTALS INSPECTION / REVIEW

SUBMITTAL NO	SUBMITTAL DESCRIPTION	SPEC/PLAN REFERENCE	SUBMITTAL APPROVED?	COMMENT/REASON/ACTION
			YES ☐ NO ☐	
			YES ☐ NO ☐	
			YES ☐ NO ☐	
			YES ☐ NO ☐	

OFF-SITE SURVEILLANCE ACTIVITIES, INCLUDING ACTIONS TAKEN:

ACCUMULATION/STOCKPILE AREA INSPECTION

INSPECTION PERFORMED BY:				SIGNATURE OF INSPECTOR:			
ACCUMULATION/ STOCKPILE AREA LOCATION							
NO OF CONTAINERS:		NO OF TANKS:		NO OF ROLL-OFF BOXES:		NO OF DRUMS:	

INSPECTION RESULTS:

TRANSPORTATION AND DISPOSAL ACTIVITIES/SUMMARY/QUANTITIES:

GENERAL COMMENTS (rework, directives, etc.):

LIST OF ATTACHMENTS (examples, as applicable: preparatory phase checklist, QC meeting minutes, safety meeting minutes, crane inspections, crane operation checklist, COCs, weight tickets, manifests, profiles, rework item list, testing plan and log, etc.):

On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.

PROJECT QC MANAGER'S SIGNATURE DATE

On behalf of the contractor, I attest that the work for which payment is requested, including stored material, is in compliance with contract requirements.

PROJECT QC MANAGER'S SIGNATURE DATE

CH2M HILL **SOUTHDIV RAC** **N62467-01-D-0331**	**PREPARATORY PHASE REPORT**	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:	CTO NO: 0029
PROJECT NO: 321878	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY: Munitions Response and On-site Construction Support for Discarded Military Munitions		

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED?

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING?

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES).

COMMENTS:

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN?

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS.

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK.

CLARIFY ANY DIFFERENCES.

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NO, WHAT ACTION IS TAKEN?

CH2M HILL **SOUTHDIV RAC** **N62467-01-D-0331**	**PREPARATORY PHASE REPORT**	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:	CTO NO: 0029
PROJECT NO: 321878	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY: Munitions Response and On-site Construction Support for Discarded Military Munitions		

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

TEST	FREQUENCY	PERFORMER

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAVE TEST FACILITIES BEEN APPROVED?

TEST FACILITY	APPROVED?
	YES ☐ NO ☐
	YES ☐ NO ☐

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

PROJECT QC MANAGER NAME	PROJECT QC MANAGER'S SIGNATURE		DATE	