

**REVISION 1 to FINAL
PROGRAM-LEVEL WORK PLAN**

MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIATION

**ALPHA AND BRAVO MUNITIONS RESPONSE AREAS OF
McCLELLAN, ANNISTON, ALABAMA**

**Prepared for:
The Anniston-Calhoun County Fort McClellan Development
Joint Powers Authority**

**Prepared by:
Matrix Environmental Service, LLC
283 Rucker Street
Anniston, AL 36205**

**April 2006
Revised September 2007**



ONIS "TREY" GLENN, III
DIRECTOR



BOB RILEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2059 ♦ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700
FAX (334) 271-7950

November 16, 2007

Ms. Miki Schneider
Director of Planning
McClellan Joint Powers Authority
180 Headquarters Drive
Fort McClellan, Alabama 36205

RE: ADEM Review and Concurrence: *Revision 1 to Final Program-Level Work Plan Munitions and Explosives of Concern Remediation Alpha and Bravo Munitions Response Areas of McClellan*; dated September 2007
Fort McClellan, Calhoun County, Alabama
Facility I.D. No. AL4 210 020 562

Dear Ms. Schneider:

The Alabama Department of Environmental Management (ADEM or the Department) has completed its review of the Joint Powers Authority's *Revision 1 to Final Program-Level Work Plan Munitions and Explosives of Concern Remediation Alpha and Bravo Munitions Response Areas of McClellan*. The revised document addresses all comments ADEM submitted for the previous final work plan dated August 2007. The unit of production certification process now includes the blind seed program. The document also states that authorized visitors will be allowed in the exclusion zone. Furthermore, a site-specific construction support work plan should be prepared and submitted to ADEM prior to any future construction support activities. Finally, the terminology used to describe the staffing plan for unexploded ordinance (UXO) personnel has been modified to comply with Department of Defense Explosives Safety Board (DDESB) terminology. The Department concurs with the document and all comments are considered resolved.

For any questions or concerns regarding this matter, please contact Ms. Julie Ange of the Remediation Engineering Section at 334-270-5646 or via email at jange@adem.state.al.us.

Sincerely,

A handwritten signature in black ink, appearing to read "S.A. Cobb", is written over a faint, circular embossed seal of the Alabama Department of Environmental Management.

Stephen A. Cobb, Chief
Governmental Hazardous Waste Branch
Land Division

SAC/TPS/JLA/mal

cc: Mrs. Tracy P. Strickland/ADEM
Mr. Richard Satkin/Matrix
Mrs. Brandi Little/ADEM

Ms. Lisa Holstein/FTMC
Mr. Steve Young/Matrix

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (Fax)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (Fax)



Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (Fax)

Mobile - Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (Fax)

Table of Contents

1.0	INTRODUCTION.....	1-1
1.1	General Scope of Work Information.....	1-1
1.2	Project Location	1-2
1.3	Site History.....	1-2
1.4	Site Description.....	1-2
	1.4.1 Topography and Features.....	1-2
2.0	TECHNICAL MANAGEMENT PLAN	2-1
2.1	Project Objectives	2-1
2.2	Qualified Project Personnel	2-1
2.3	Project Communication and Reporting	2-3
	2.3.1 Meetings, Regulatory Interaction and Stakeholder Support.....	2-3
	2.3.2 Information Management.....	2-3
2.4	Project Execution	2-4
	2.4.1 Pre-mobilization and Mobilization	2-4
	2.4.2 Site Preparation	2-5
2.5	Production	2-6
	2.5.1 PDAs	2-6
	2.5.2 Surface Sweep in Advance of Brush Cutting.....	2-7
	2.5.3 Aggressive Surface/Near Surface Clearance	2-7
	2.5.4 Clearance to One foot Depth	2-8
	2.5.5 Digital Geophysical Mapping	2-9
	2.5.6 Intrusive Operations - Clearance to Depth of Detection	2-9
	2.5.7 Removal Action Report	2-11
	2.5.8 MEC Disposal	2-11
2.6	Munitions Response Sites	2-13
	2.6.1 Northern Alpha.....	2-13
	2.6.2 Southern Alpha	2-14
	2.6.3 MRS-1	2-14
	2.6.4 MRS-2	2-15
2.7	Construction Support	2-16
3.0	EXPLOSIVES MANAGEMENT PLAN	3-1
3.1	Licenses/Permits.....	3-1
3.2	Acquisition.....	3-1
	3.2.1 Description and Estimated Quantity of Explosives	3-1
	3.2.2 Acquisition Source	3-2
	3.2.3 Storage of Explosives	3-2
	3.2.4 Inventory and Loss Procedures	3-4
4.0	EXPLOSIVES SITING PLAN	4-1
4.1	Munitions Response Areas	4-1
4.2	Munitions Response Sites	4-1
4.3	Type of MEC	4-1
4.4	Minimum Separation Distances	4-2
	4.4.1 Exclusion Zone Control.....	4-3
	4.4.2 Intrusive Investigation	4-3
	4.4.3 Disposal Shots	4-4
4.5	Planned or Established Demolition Areas	4-4
4.6	Footprint Areas.....	4-4
	4.6.1 Blow-in-Place	4-4
	4.6.2 Collection Points	4-4
	4.6.3 In-Grid Consolidated Shots.....	4-4
4.7	Explosives Storage Magazines.....	4-4
	4.7.1 Types of Magazines Used	4-5

	4.7.2	Explosives Data	4-5
5.0		GEOPHYSICAL PROVE-OUT PLAN.....	5-1
	5.1	Geophysical Prove-Out Site.....	5-1
	5.1.1	GPO Plot Design.....	5-1
	5.1.2	GPO Size and Location	5-2
	5.1.3	Function Check Area	5-2
6.0		GEOPHYSICAL INVESTIGATION PLAN	6-1
	6.1	UXO Safety	6-1
	6.2	Personnel Qualifications	6-1
	6.3	Geophysical Investigation Plan Outline	6-1
	6.3.1	Geophysical Mapping Tasks.....	6-1
	6.3.2	Geophysical Site Conditions.....	6-1
	6.3.3	Geophysical Investigation Methods.....	6-3
	6.3.4	Geophysical Investigation Performance Goals.....	6-9
	6.3.5	Geophysical Mapping Data.....	6-9
7.0		GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS	7-1
	7.1	General	7-1
	7.1.1	Data Sources	7-1
	7.1.2	Data Management	7-1
	7.1.3	GIS Hardware	7-2
	7.1.4	GIS Software.....	7-2
	7.1.5	File Formats and Requirements.....	7-2
	7.1.6	Metadata Requirements.....	7-2
	7.1.7	GIS Data Directory Structure and Spatial Data Standards.....	7-3
	7.1.8	Data Distribution.....	7-3
	7.1.9	General Map Requirements.....	7-3
	7.1.10	Documentation	7-4
	7.1.11	GIS Project Tracking.....	7-4
	7.1.12	GIS Staffing.....	7-4
	7.2	Database and Information Management	7-4
	7.2.1	Structure and Design	7-4
	7.2.2	Data Distribution.....	7-4
	7.2.3	Staffing	7-5
	7.2.4	Database Manager	7-5
	7.2.5	Database User Administration	7-5
	7.2.6	Database Backup Routines	7-5
	7.2.7	Digital Image Catalog.....	7-5
	7.3	GIS Quality Management.....	7-5
	7.3.1	GIS Quality Control	7-6
	7.3.2	Database Quality Control.....	7-6
8.0		WORK, DATA, AND COST MANAGEMENT PLAN.....	8-1
	8.1	Project Management Approach	8-1
	8.2	Schedule	8-1
	8.3	Recurring Deliverables.....	8-1
9.0		PROPERTY MANAGEMENT PLAN	9-1
10.0		QUALITY CONTROL.....	10-1
	10.1	Introduction	10-1
	10.2	Project Organization.....	10-1
	10.2.1	Program Manager	10-1
	10.2.2	Project Manager.....	10-2
	10.2.3	Site Operations Manager	10-2
	10.2.4	UXO Quality Control Specialist.....	10-2
	10.2.5	Geophysics Contractor	10-3
	10.2.6	Contractors.....	10-4

10.3	Personnel Qualifications and Training	10-5
10.3.1	Project Personnel Training.....	10-5
10.3.2	Contractor Qualifications.....	10-6
10.3.3	Health and Safety Training	10-6
10.3.4	Documentation	10-7
10.4	Definable Features of Work	10-7
10.5	Data Quality Objectives	10-7
10.6	Equipment Calibration/Maintenance Requirements	10-8
10.7	Inspections and Communication.....	10-9
10.7.1	Three Phases of Control	10-9
10.7.2	Units of Production.....	10-9
10.7.3	UoP Certification Process	10-9
10.7.4	UoP Pass/Fail Criteria.....	10-19
10.7.5	Additional Inspections	10-20
10.7.6	Geophysical Confirmation Remapping	10-20
10.7.7	Safety Inspections.....	10-20
10.7.8	Surveillance of Contractor Activities	10-21
10.7.9	Quality Control Meetings.....	10-21
10.8	Deficiency Management	10-21
10.8.1	Deficiencies and Nonconformance	10-21
10.8.2	Root Cause Analysis.....	10-22
10.8.3	Corrective Action.....	10-23
10.8.4	Completion of Inspection Punch List	10-23
10.8.5	Notification	10-23
10.8.6	Continual Improvement.....	10-24
10.9	Field Logbook.....	10-24
10.10	Quality Control Certification Statement.....	10-24
10.11	Quality Control Forms	10-24
11.0	ENVIRONMENTAL PROTECTION PLAN	11-1
11.1	Assessment.....	11-1
11.2	Environmental Issues and Concerns	11-1
11.2.1	Cultural Resources	11-2
11.2.2	Biological Resources	11-4
11.2.3	Water Resources	11-7
11.3	Potential Impacts of Field Activities	11-7
11.3.1	Cultural Resources	11-7
11.3.2	Biological Resources	11-7
11.3.3	Potential Effects on Sensitive Habitats	11-8
11.4	Impact Minimization Measures	11-8
11.4.1	Cultural Resources	11-8
11.4.2	Worker Education Briefing	11-8
11.4.3	Treatment of Unanticipated Finds.....	11-8
11.4.4	Biological Resources	11-8
11.4.5	Worker Education Briefing	11-8
11.4.6	Mitigation by Avoidance	11-8
11.4.7	Minimize Vegetation Impacts	11-9
11.4.8	Dust Suppression and Emission Control	11-9
11.4.9	Spill Control and Prevention	11-9
11.4.10	Post-activity Cleanup	11-9
11.4.11	Site Restoration/Compensation	11-9
12.0	INVESTIGATION-DERIVED WASTE.....	12-1
13.0	INTERIM HOLDING FACILITY SITING PLAN.....	13-1
14.0	RECOVERED CHEMICAL WARFARE MATERIALS PLAN.....	14-1
15.0	REFERENCES.....	15-1

Appendices

Appendix A – Figures

Appendix B – Emergency Points of Contact

Appendix C – Accident Prevention Plan (APP)

Appendix D – Forms

Appendix E – SOPs

List of Figures

Figure 2-1. Project Organization	2-1
Figure 2-3. Northern Alpha MRS	Appendix A
Figure 2-4. Southern Alpha MRS.....	Appendix A
Figure 2-5. Bains Gap Road MRS-1	Appendix A
Figure 2-6. MRS-2.....	Appendix A
Figure 4-1. Intentional Detonation Area and Portable Magazine Location	Appendix A
Figure 10-1 Initial UoP Selection Northern Alpha MR	Appendix A
Figure 10-2 Initial UoP Selection Southern Alpha MRS.	Appendix A
Figure 10-3 Initial UoP Selection Bains Gap Road MRS-1.....	Appendix A
Figure 10-4 Initial UoP Selection MRS-2	Appendix A
Figure 11-1 Alpha & Bravo MRAs.....	Appendix A

List of Tables

Table 2-1. Pre-Mobilization and On-Site Mobilization Startup Activities	2-5
Table 2-2. MEC Removal Areas	2-12
Table 3-1. Estimated Explosives Requirements.....	3-2
Table 3-2. Explosives Storage Data	3-2
Table 4-1. Munitions Response Actions Summary.....	4-1
Table 4-2. Type of MEC Recovered	4-1
Table 4-3. Minimum Separation Distances.....	4-2
Table 4-4. Team Separation Distances	4-3
Table 7-1. Database QC Action and Responsibilities.....	7-6
Table 10-1. MEC Clearance Depths.....	10-7
Table 10-2. GPO Construction Information	10-10
Table 10-3. Definable Features of Work - QC Inspection Points/Frequency	10-14
Table 10-4. Excavation QC Minimum Sample Populations.....	10-18
Table 11-1. Environmental Concerns	11-1
Table 11-2. Rare and Uncommon Species Recorded.....	11-5
Table 11-3. Candidate Species	11-6

Acronyms and Definitions

Acronyms

ADEM	Alabama Department of Environmental Management
APP	Accident Prevention Plan
AR	Army Regulation
ASP	Ammunition Supply Point
ASR	Archives Search Report
ATF	Alcohol, Tobacco, and Firearms
BIP	Blow-in-Place
BP	Before Present
BRAC	Base Realignment and Closure Act
CADD	computer-aided design & drafting
CD	Compact Disc
CDTF	ID Chemical Decontamination Training Facility
CEHNC	U.S. Army Corps of Engineers Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
cm	centimeter
CPR	Cardio Pulmonary Resuscitation
CSP	Certified Safety Professional
CWM	Chemical Warfare Material
DCAA	Defense Contract Audit Agency
DDESB	Department of Defense Explosives Safety Board
DFW	Definable Feature of Work
DGM	Digital Geophysical Mapping
DID	Data Item Description
DMM	Discarded Military Munitions
DNR	Deficiency Notice Report
DoD	Department of Defense
DOE	Directorate of Environment
DOT	Department of Transportation
DQO	Data Quality Objectives
EBS	Environmental Baseline Study
EE/CA	Engineering Evaluation/Cost Analysis
EMS	Emergency Management Service
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
ESRI	Environmental Systems Research Institute
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FAR	Federal Acquisition Regulation
FCA	Functional Check Area
FGDC	Federal Geographic Data Committee
FOSET	Finding of Suitability for Early Transfer
FTP	File Transfer Protocol
GEOQCM	Geophysics Quality Control Manager
GeoQCS	Geophysics Quality Control Specialist
GIS	Geographic Information Systems
GPO	Geophysical Prove-Out
GPS	Global Positioning System

HAZMAT	Hazardous Materials
HSM	Health and Safety Manager
IAR	Industrial Access Road
ID	Identification
IDW	Investigation Derived Waste
JPA	Joint Power Authority
LLRW	Low Level Radioactive Waste
LUC	Land Use Controls
LUCIP	Land Use Control Implementation Plan
MBTA	Migratory Bird Treaty Act
MEC	Munitions and Explosives of Concern
MES	Matrix Environmental Services, LLC
MFD	Maximum Fragmentation Distance
MGFD	Munition with Greatest Fragmentation Distance
MMRP	Military Munitions Response Program
MOUT	Military Operations in Urbanized Terrain
MRA	Munitions Response Area
MRS	Munitions Response Sites
MS	Microsoft
MSD	Minimum Separation Distance
MSL	Mean Sea Level
mV	milliVolt
NAEVA	NAEVA Geophysics, Inc.
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NCR	Nonconformance Report
NCS	National Safety Council
NEW	Net Explosives Weight
NHPA	National Historic Preservation Act
NONEL	Non-electric
NRHP	National Registry of Historic Places
NSA	New South Associates, Inc.
ODC	Other Direct Cost
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PDA	Personal Data Assistant
PgM	Program Manager
PM	Project Manager
PWP	Program-Level Work Plan
QA	Quality Assurance
QC Team	The GeoQC and/or the UXOQCS or their designees
QC	Quality Control
QC/QM	Quality Control/Quality Management
QCM	Quality Control Manager
QCP	Quality Control Plan
QCS	Quality Control Specialist
RAR	Removal Action Report
RCRA	Resource Conservation & Recovery Act of 1976
RCWM	Recovered Chemical Warfare Materiel
SAA	Small Arms Ammunition
SDSFIE	Spatial Data Standards for Facilities, Infrastructure and Environment
SHPO	State Historic Preservation Office
SHSM	Site Health and Safety Manager
SINA	Special Interest Natural Area
SOM	Site Operations Manager
SOP	Standard Operating Procedure
SOW	Statement of Work

SRA	Saturated Response Area
SS	Site Superintendent
SSHP	Site Safety and Health Plan
SSWP	Site-Specific Work Plan
STD	Standard
SUXOS	Senior UXO Supervisor
SVOC	Semi-Volatile Organic Compound
SZ	Support Zone
T&M	Time and Materials
TAPP	Technical Assistance for Public Participation
TEU	Technical Escort Unit
THPO	Tribal Historic Preservation Officer
TMA	Target Matching Algorithm
TPP	Technical Project Planning
TSD	Team Separation Distance
UoP	Unit of Production
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USATCES	U.S. Army Technical Center for Explosive Safety
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
VDS	Validation of Detection Systems
VECP	Value Engineering Change Proposals
VOC	Volatile Organic Compound
WBS	Work Breakdown Structure
WP	Work Plan

Definitions

MEC: Military munitions that are (1) UXO, as defined in 10 United States Code (USC) 101(e)(5); (2) abandoned or discarded, as defined in 10 USC 2710(e)(2); and (3) munitions constituents [e.g., Trinitrotoluene (TNT), RDX, etc.] present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard. MEC will be disposed of on-site by detonation.

- **UXO:** Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remain unexploded either by malfunction, design, or any other cause [10 USC 101(e)(5)].

- **Other MEC:** MEC as described above, other than UXO.

MEC (Related) Scrap: Scrap, components, parts, fragmentation, or other materials associated with MEC, that have been determined to pose no explosive safety hazard. MEC-related scrap will be managed in accordance with state and federal solid waste and recycling requirements, as well as DoD and Defense Logistics Agency trade security, demilitarization, and inert certification requirements (DoD Demilitarization Program Bulletin No. 99-005, DoD Manual 4160.21-M-1, and DoD Directive 2030.8).

- **MEC Fragmentation:** Produced by ordnance designed to kill by detonation of HE and fragmentation of the delivery vehicle casing. These are generally thick cased munitions.
- **Other MEC (Related) Scrap:** MEC-related scrap as described above, other than MEC fragmentation (tail fin, cartridge case, etc.).

Non-MEC(Related) Scrap/Material: Scrap metal or other materials, which may be discovered in the study area, that are not MEC-related scrap as described above (tin can, gate hinge,

barbed wire, etc.). Non-MEC-related scrap and other materials will be managed in accordance with state and federal solid waste and recycling requirements.

- **Scrap Metal:** Bits and pieces of metal parts, or metal pieces that may be combined together with bolts or soldering that, when worn or superfluous, can be recycled [40 Code of Federal Regulations (CFR) 261.1(c)(b)]. U.S. Environmental Protection Agency (EPA) guidance states that the material “must have a metal content of at least 50%” [Office of Solid Waste and Emergency Response (OSWER) Directive 941.1990(09a)] and that it be in “solid, nondispersible form (61 Federal Register 2362, 25 January 1996).
 - **Other Material:** Non-MEC-related material other than scrap metal as described above.
- Small Arms Ammunition:** Ordnance that is .50 caliber and smaller are considered small arms for the purposes of ordnance projects. The determining factor is that caliber .50 and smaller rarely contain explosive projectiles and presents a very low risk to the public (CEHNC-OE-CX 200-1c, April 21, 1999).

1.0 INTRODUCTION

The Anniston-Calhoun County Fort McClellan Development Joint Powers Authority (JPA), has retained Matrix Environmental Services, LLC (MES) to manage and conduct oversight of Munitions and Explosives of Concern (MEC) remediation in the Alpha and Bravo Munitions Response Areas (MRAs) at McClellan in Anniston, Alabama. This work supports remediation associated with the transfer of Army property to the JPA. The property was closed and transferred to the JPA under Federal authorities created for Base Realignment and Closure (BRAC). The property was previously used by the U.S. Department of Defense (DoD) as an active military installation.

This plan is written to address ordnance detection, identification, and disposal activities and construction support operations throughout McClellan. This program-level work plan (PWP) addresses all phases of work for MEC remediation in the Northern Alpha munitions response site (MRS), Southern Alpha MRS, Bains Gap Road/MRS-1 and MRS-2 necessary to complete anticipated future tasks. Site-specific Work Plan Addenda will be prepared for additional MRSs at McClellan as they are sequenced into the program. The PWP with task-specific addendums will be a dynamic document that captures site-specific work activities associated with optional tasks or other new assignments. The PWP includes a Technical Management Plan, Explosives Siting Plan, an Accident Prevention Plan (including a Site Safety and Health Plan in accordance with EM 385-1-1), an Environmental Protection Plan, and a Quality Control Plan that incorporates the basic elements of MILSTD-1916 for selecting sample populations.

Site-specific work plan addendums will include an activity hazard analysis to determine if there are any hazards different from those in the PWP. Maps, figures, and work sequences will be developed for each site using the PWP as a reference for pre-existing approaches, standard operating procedures (SOPs), reporting forms, etc.

1.1 General Scope of Work Information

The scope of work (SOW) governing this work includes the following general work elements:

- Preparation of Program Work Plan and conventional Explosive Safety Submission (ESS) documents.
- Professional land surveying to facilitate accurate data collection.
- Brush removal to support surface clearance and geophysical survey.
- Surface sweep activities for the location, identification, removal, and disposal of surface MEC.
- Digital Geophysical Mapping (DGM) and reacquisition of selected targets.
- Intrusive operations for identification, removal, and disposal of MEC.
- On-site disposal of all MEC items containing or suspected to contain energetic materials.
- Transporting MEC scrap and “cleared” hard targets to a holding area for later disposal.
- Generating and maintaining an inventory of MEC, MEC-related scrap, and non-MEC-related scrap.
- Remapping, reacquisition, and clearance to depth of selected areas.
- Management of a geographic information system (GIS) tracking system.
- Preparation of removal action reports.

MES will provide management and oversight of the necessary labor, equipment, materials, supplies, and subcontractors associated with the project in accordance with applicable Federal, state, and local regulations and JPA requirements.

1.2 Project Location

McClellan occupies 18,929 acres in the City of Anniston, in Calhoun County, Alabama. To the west of McClellan are the areas known as Weaver and Blue Mountain and to the north is the City of Jacksonville. The Talladega Forest is located east of McClellan. The portions of McClellan to be addressed in this PWP are the Alpha and Bravo MRAs, which lie in the north-central portion of the installation, immediately adjacent to the main cantonment area. The Alpha MRA's northern border is also the northern boundary of the installation and it extends south to Bains Gap Road. The Bravo MRA is south and west of Alpha and comprises the remainder of the redevelopment area. The Choccolocco Mountains and the Choccolocco Corridor comprise the remainder of the installation east of the Alpha and Bravo and are called Charlie. Figure 1-1, presented in Appendix A, shows the location of McClellan and the four MRAs covered by this document.

1.3 Site History

McClellan has documented use as a military training area since 1912, when the Alabama National Guard used it for artillery training. However, the Choccolocco Mountains may have been used for artillery training by the units stationed at Camp Shipp in the Blue Mountain Area during the Spanish American War as early as 1898. The 29th Infantry Division used areas of McClellan for training prior to being ordered to France during World War I. In 1917, Congress authorized the establishment of Camp McClellan, and in 1929, the camp was officially designated as Fort McClellan. Prior to World War II, the 27th Infantry Division assembled at McClellan for training, and during the war, many other units used the site for various training purposes. Following World War II, in June 1947, McClellan was put in inactive status. McClellan was reactivated in January 1950 and the site was used for National Guard training and was selected as the site for the Army's Chemical Corps School.

The history of McClellan, as described in the Archives Search Report (ASR) Findings [U.S. Army Corps of Engineers (USACE) 1999a] and ASR Conclusions and Recommendations (USACE 1999b), includes training activities and demonstrations that used conventional weapons (i.e., mortars, anti-tank guns, and artillery pieces). McClellan was recommended for closure under the 1995 BRAC Program and was officially closed in September of 1999.

1.4 Site Description

The Alpha and Bravo MRAs are predominantly heavily to moderately wooded with mixed pines and hardwoods, with some open areas that were cleared for various activities during the active operation of the installation. Numerous paved and unpaved secondary roads are present, along with occasional structures, many of which are no longer used. The Alpha MRA surrounds two active facilities, the Army's former Chemical Decontamination Training Facility (CDTF) and the Military Operations in Urbanized Terrain (MOUT). The CDTF is now referred to as the COBRA (Chemical, Ordnance, Biological and Radiological) Facility and has been transferred to the United States Department of Homeland Security. The MOUT is currently owned by the Alabama National Guard.

1.4.1 Topography and Features

The topographic gradient at McClellan generally increases toward the south and east of the main installation. Local relief on McClellan is in excess of 1,320 ft. The lower elevations [700 ft above mean sea level (MSL)] occur along Cane Creek, near Baltzell Gate Road, while the maximum elevations (2,063 ft above MSL) occur on Choccolocco Mountain, which traverses the area in a north/south direction, with the steep easterly slopes grading abruptly into Choccolocco Valley. The western slopes are more continuous with the southern extension, maintaining elevations up to 900 ft above MSL near the western boundary. The northern extension

decreases in elevation in the vicinity of Reilly Airfield. The central portion of McClellan is characterized by flat to gently sloping land. Topography consists of gentle to moderately sloped rolling hills, with intervening, relatively flat-lying valleys. Elevations range from approximately 800 ft above MSL along the western edge of the Alpha Area to 1,088 ft above MSL at the highest point. Surface drainage is predominantly to the west by way of Cave Creek and Cane Creek and their tributaries.

1.4.1.1 Hydrology

Few hydrogeological assessments of regional groundwater flow patterns have been conducted in the area surrounding McClellan. Aquifers in the area are developed in residual soil derived from weathering of bedrock (saprolite), within fractured bedrock, along fault lines, and within karstic units. Groundwater flow is generally toward major surface water features. However, because of differential weathering, variable fracturing, and the potential for conduit flow, topography as an indicator of groundwater flow direction must be used with caution. Groundwater intersecting the ground surface has resulted in numerous springs, which act as important sources of discharge and water supply in the area (SAIC 1999). Precipitation is the primary source of recharge to groundwater in Calhoun County and thrust fault-zones form conduits for groundwater movement. Points of discharge are springs, effluent streams, and lakes. Shallow groundwater on McClellan occurs principally in the residuum developed from Cambrian sedimentary bedrock units of the Weisner Formation, part of the Chilhowee Group and locally in Ordovician carbonates. Bedrock permeability may be locally enhanced by fracture zones associated with thrust faults and by solution of limestones. Surface water movement into sinkholes provides another source of groundwater recharge and locally has facilitated the formation of caves (SAIC 1999).

1.4.1.2 Geology

McClellan is situated near the southern terminus of the Appalachian Mountain chain. All but the easternmost portion of the former Main Post lie within the Valley and Ridge Province of the Appalachian Highlands. The portion of McClellan east of Choccolocco Creek lies within the Piedmont Province. The age of consolidated sedimentary and metamorphic rocks range from Precambrian to Pennsylvanian. On a large scale, most of the rocks have been intensely folded into an aggregate of northeast-southwest trending anticlines and synclines with associated thrust faults. The shallow geology in the area is characterized by colluvial deposits. The presence of metamorphic rocks, as well as iron-bearing cements within the sedimentary rocks, increases the potential for minerals such as magnetite and other associated magnetic minerals.

1.4.1.3 Climate

Calhoun County sits on 611 square miles in the foothills of the Appalachian Mountains in northeastern Alabama. Its western border is the Coosa River. The mean annual temperature is 61 degrees Fahrenheit, with seasonal averages of 38 in January and 80 in July. The average annual precipitation is 65 inches and the elevation is 721 ft above sea level.

2.0 TECHNICAL MANAGEMENT PLAN

The following Technical Management Plan states the project objective; describes key personnel, specific project approach, methods, and operational procedures; and presents the deliverables that will be used to perform MEC operations at McClellan.

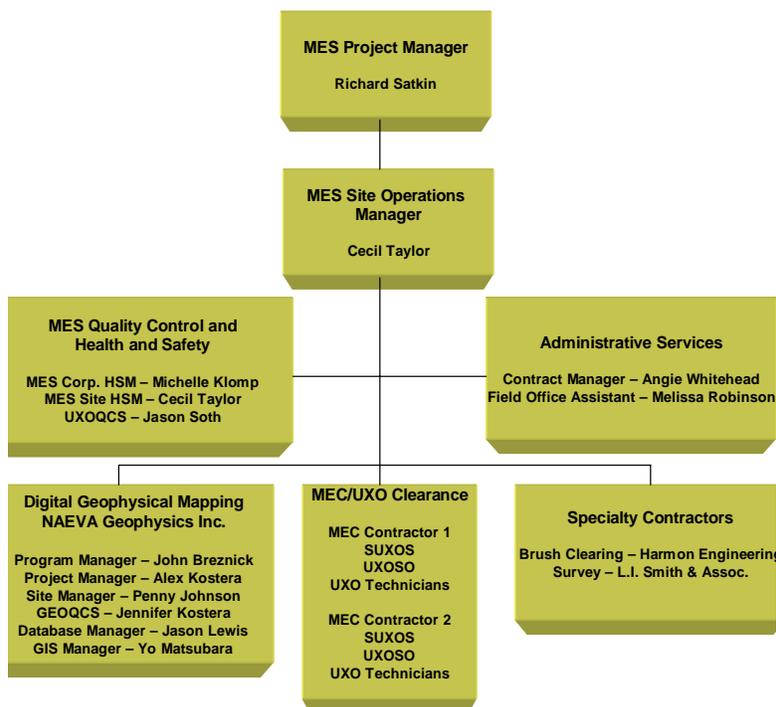
2.1 Project Objectives

The primary objective of this project is to conduct MEC clearance activities in order to gain concurrence of no further action at each MRS. To meet this objective, the UXO Contractor will use the unexploded ordnance (UXO) industry's current Standard of Care but not be strictly limited to USACE guidelines of conducting MEC remediation.

2.2 Qualified Project Personnel

All key project personnel are qualified, possessing the level of technical knowledge and experience to execute assigned project tasks and responsibilities. The organizational chart presented in Figure 2-1 identifies the general organization and reporting chain-of-command. A list of Points of Contact is in Appendix B.

Figure 2-1. Project Organization



The key MES, UXO and Geophysics Contractor project positions and a brief list of responsibilities for each follow:

MES Program Manager (PgM)

- Ensure contract, SOW, and plan conformance.
- Sponsor team partnering.
- Monitor safety and quality control (QC).

MES Project Manager (PM)

- Sequence work and resources.
- Approve and implement work plans.
- Manage to schedule and budget.
- Negotiate SOW and manage subcontractors.
- Approve all project purchases, labor, and other direct costs (ODCs).
- Select Units of Production (UoP).

MES Site Operations Manager (SOM)

- Sequence work flow on-site and manage on-site specialty subcontractors.
- Establish exclusion zones.
- Report daily performance.
- Apply lessons learned or corrective actions.
- Conduct on-site training.

MES Health and Safety Manager (HSM)

- Review and approve the Accident Prevention Plan.
- Approve any changes to the Site Safety and Health Plan (SSHP).
- Provide support to Contractor UXO Safety Officer (UXOSO) on all safety matters.

MES UXO Quality Control Specialist (UXOQCS)

- Conduct routine QC audits of MEC operations.
- Ensure compliance with the quality control plan (QCP).
- Monitor dig results.
- Coordinate QC activities of subcontractor during post excavation.
- Prepare daily QC reports.
- Certify scrap.

Geophysics Project Manager

- Review and approve QC procedures.
- Conduct routine QC audits of geophysical operations.
- Approve plans and reports.
- Provide support for the Geophysics Quality Control Specialist (GeoQCS).

Geophysics Site Manager

- Provide oversight for GeoQCS.
- Audit data quality/completeness.
- Provide support to GeoQCS.

Geophysics Quality Control Specialist (GeoQCS)

- Implement geophysical prove-out (GPO) and deploy seed items.
- Conduct QC audits.
- Observe and monitor Geo team performance.
- Review Geo data daily for completeness/precision.
- Accept/reject field methods.

MEC Contractor Senior UXO Supervisor (SUXOS)

- Point of Contact for MES.
- Responsible for Contractor's MEC operations.
- Identify MEC and report to MES SOM.
- Certify scrap.
- Manage UXO Team.

MEC Contractor UXO Safety Officer (UXOSO)

- Ensure compliance with Contractor SSHP.
- Conduct surveillance of UXO Teams.
- Maintain medical and training certifications.
- Conduct on-site training and daily safety briefings.

2.3 Project Communication and Reporting

The Contractor Project Managers communicate closely with the JPA and Matrix Environmental Services, LLC (MES) project team (JPA/MES) to ensure that project requirements are met, and to keep all personnel informed of any technical or administrative issues that may impact the project schedule, budget, or technical approach. Any communication that has the potential to impact the project, schedule, or budget will be discussed and confirmed via written correspondence between the Contractor and JPA/MES.

The UXO and Geophysics Contractors will provide daily production reports and pertinent field information to JPA/MES and applicable stakeholders via an FTP site. The information included in the daily production reports will include, but not be limited to:

- Daily personnel rosters.
- Daily production rates.
- Daily geophysical survey production.
- Updated GIS maps.
- Results of intrusive investigations MEC disposal operations conducted.
- Results of safety and QC audits performed.
- Standardized forms anticipated for use at McClellan are included in Appendix D.

2.3.1 Meetings, Regulatory Interaction and Stakeholder Support

MES will hold weekly teleconferences with JPA, Alabama Department of Environmental Management (ADEM) and the Geophysics Contractor. This close interaction will allow team staff to share vision and implementation strategies, explain work plans and the rationale in activity sequencing, and describe how the work effort will progress. These meetings provide the management staff time to develop work practices and communication styles that increase productivity.

MES will work closely with ADEM and stakeholders to affirm expectations, stay informed of regulations, and to facilitate thorough but fair reviews and acceptance of work plans, technical deliverables, and site closure plans in time cycles that do not impact forward progress. When beneficial, MES will brief ADEM and other stakeholders, as to the status of ongoing and proposed site work. MES will coordinate any regulator and public awareness efforts.

2.3.2 Information Management

The DGM and MEC clearance activities will generate large volumes of data. Among these are raw and processed geophysical data, positional (survey) data, target lists and dig sheets, MEC logs, UXO disposition summaries and photographs, inventories of explosives in storage, MEC frag and MEC scrap disposition logs, and all daily production, QC logs, weekly and monthly

status reports, and technical deliverables. Beyond the traditional hardcopy and routine email attachments, data will also be made available via a file transfer protocol (FTP) site.

To accommodate public interest, MES will either export files to the JPA's website or provide access to information authorized by JPA for general release.

The Geophysics Contractor will manage raw and processed geophysical data, database, and GIS shape files using the FTP site. This allows JPA/MES direct access to technical data once verified. Data transfer by FTP is more efficient than browser interface for sharing large volumes of data spanning multiple directories. Geophysics Contractor project management files/deliverables will be placed on the FTP site.

2.4 Project Execution

The project execution strategy for completing MEC remediation actions is presented in the following sections. This strategy reflects operational experience in conducting MEC remediation actions including geophysics, location, identification, clearance, disposal, quality control, and data collection utilizing time-proven procedures, team member relationships, and local subcontractors. This plan discusses the field elements necessary to mobilize to the site and complete work at the Northern Alpha, Southern Alpha, MRS-1 and MRS-2 MRSs, which features all of the munitions response services necessary to complete anticipated future tasks. Site-specific work plans (SSWPs) for future munitions response work will be included as addenda to this work plan. Differing approaches or additional SOPs will be included in the SSWPs where necessary.

As alternative approaches/technologies are identified that will shorten the schedule or improve efficiency through site-specific experience, they will be employed where feasible to complete remaining work. A general process flow chart relating to all activities that may be required is presented in Figure 2-2 in Appendix A and each significant element is discussed in the following sections of text.

2.4.1 Pre-mobilization and Mobilization

During this phase of work the project planning documents (Explosives Safety Submission and Work Plans) are created and approved. The mobilization phase to McClellan commences upon approval of the planning documents and notice to commence field operations is received. Key personnel start arriving at the site to perform specific functions to aid in the procurement of equipment, hiring of local resources, perform site training and orientation. Table 2-1 identifies some of the tasks associated with these phases of work.

Table 2-1. Pre-Mobilization and On-Site Mobilization Startup Activities

PRE-MOBILIZATION	MOBILIZATION
Work Plan and Sub-plans	Site Set Up
<ul style="list-style-type: none"> • Explosives Safety Submittal • Work Plans <ul style="list-style-type: none"> — Quality Control Plan — Geophysical Prove-out plan — Geophysical Work Plan — Location Surveying and Mapping Plan — Environmental Protection Plan — Accident Prevention Plan & SSHP 	<ul style="list-style-type: none"> • Internet • Safety survey • Utilities installation (phone, electric) • Signage • Grass maintenance • Survey of security fencing • Clean/secure magazines, check electrical grounding • Office and storage/maintenance facilities repairs
Assign Personnel (non-“key” employees)	Site Orientation
<ul style="list-style-type: none"> • UXO Technicians (I, II and III) • Administrative Office Support 	<ul style="list-style-type: none"> • Emergency routes • Facility rules and regulations
Local Hires	Team Training
<ul style="list-style-type: none"> • Labor and Services as required • UXO Technicians 	<ul style="list-style-type: none"> • Job-specific duties and responsibilities • Mechanical equipment
Subcontracts and Vendor accounts	Site Specific Equipment Training
<ul style="list-style-type: none"> • Finalize Subcontracts: <ul style="list-style-type: none"> — Land Surveyor — Brush Cutting/Grubbing — Demilitarization/recycling • Establish vendor accounts for supplies and materials <ul style="list-style-type: none"> — Explosives for demolition/disposal — Rental equipment — Utilities and lodging 	<ul style="list-style-type: none"> • Site-specific training (UXO, Safety, other site hazards) • Explosives transportation and handling • Personal hygiene stations • Use of power tools • Communications • Hand-held geophysical instruments
Liaison with local authorities	Geophysical Prove-Out
<ul style="list-style-type: none"> • Fire, police, EMS, Hospital and Local Employment Office 	<ul style="list-style-type: none"> • Establish GPO and Function Check Area

2.4.2 Site Preparation

Each MRS will be prepared to facilitate surface clearance and DGM. This preparation consists of boundary surveying, surface sweep, selective brush removal, and establishing grid corners. Contractors conducting this work will be provided with UXO escorts consisting of qualified UXO Technicians performing UXO avoidance support. If MEC is discovered on the surface during these UXO avoidance support operations, the item will be visually inspected, characterized, and flagged. MEC will be consolidated at the intentional detonation area for disposal, or stored in an ATF Type II portable magazine to await disposal. Any items unacceptable to move will be marked for blow-in-place (BIP) procedures at the end of each day as described in Section 2.5.6.

2.4.2.1 Boundary Surveying

An Alabama licensed professional land surveyor will be retained to survey the site boundaries relative to an existing first-order benchmark using traditional land surveying techniques or, where possible, differential GPS. All survey data will be delivered in Alabama East Zone, State Plane coordinates using U.S. survey feet for incorporation into the site GIS. Boundary marking may occur simultaneously with brush cutting providing that two operations are separated by at least 200 ft to maintain a safety buffer between the operations. The surveyors will be escorted by a UXO safety technician who will work in front and conduct a visual and hand-held detector-aided surface search for MEC. A 200-foot buffer will be maintained between the surveyors/escorts and other simultaneous operations.

2.4.2.2 Surveying of the Grid Corners

As the brush cutting is completed within a site footprint, 100 ft x 100 ft grids will be established across the site. Each southwest grid corner will be surveyed and the grid identified by a unique

number on the corner stake. Grid corners will be utilized by geo teams to facilitate data collection and target reacquisition. As described above, all survey data will be delivered in Alabama East Zone, State Plane coordinates using U.S. survey feet for incorporation into the site GIS. A 200-foot buffer will be maintained between the surveyors/escorts and other simultaneous operations. If an anomaly is discovered at a grid corner location, the stake and survey pin will be offset in a north-south or east-west direction, with the offset marked on the corner stake.

2.4.2.3 Brush Cutting

Clearance of brush and undergrowth (grubbing) will be performed by a Brush Cutting/Grubbing contractor. A surface sweep will be performed in advance of brush cutting as described in Section 2.5.2. All brush cutting work will also be supported by a UXO escort. The UXO escort will walk ahead of brush cutters and perform a visual and hand-held detector-aided search as required.

The Brush Cutting Contractor will coordinate all brush cutting evolutions with the MES Site Operations Manager and/or the MES UXO QA. Particular attention will be applied to areas containing the protected mountain longleaf pine (*Pinus palustris*) trees. These trees will not be trimmed or thinned unless they negatively impact the removal of MEC, and then trimming will be closely coordinated with MES. All other trees 3 inches in diameter or less will be cut, as needed, to facilitate site work. Tree thinning and brush clearance will be accomplished by mechanized equipment and hand clearing. The clearance team includes equipment operator(s) and on-ground laborer(s) with chain saws and hand tools. The areas that are not accessible by the mechanized equipment will be cut and cleared via manual means. Based on prior experience at McClellan, the preferred mechanized equipment for this project will include:

- **Hydro Ax with a Fecon grinder** – This is a large rubber-tired tractor unit capable of grinding brush, trees, downfall, etc., on flat to gently sloping ground. The resultant mulch will be spread on the forest floor to return nutrients and organic matter to the soil and aid in erosion control.
- **Kobelco trackhoe with Fecon grinder and auxiliary power unit** – This assembly will work from the road, reaching into roadside ditches and up roadside slopes.
- **Tractor with a rotary mower** – This equipment will be used for grassy areas along the roadside and relatively open areas with small shrubs and grasses. Brush from the Kobelco trackhoe unit and hand clearing areas will all be mulched and spread.

2.5 Production

MEC production activities include surface sweep in advance of brush cutting, aggressive surface/near surface clearance, clearance to 1-foot, DGM, intrusive clearance to depth of detection, MEC disposal, post-excavation activities, step-out procedures, scrap (MEC and non-MEC) hard target processing and disposal, and GIS data management which are all described in the following sections.

2.5.1 PDAs

The UXO Contractor will be responsible for entering team surface and intrusive data into Personal Digital Assistants (PDAs). The PDAs will be Dell Axim X51v or Hewlett Packard IPAQ hx2795 PDAs. The PDAs will have a drop-down menu to ensure all UXO personnel utilize consistent terminology. The Log Forms located in Appendix D, contain the type of information that will be collected on the PDAs. The UXO Contractor shall immediately replace any PDA that is not properly functioning. Programming of PDAs, loading with initial daily data and downloading of field data collected at the end of each day will be performed by the Geophysics contractor. PDA data will be downloaded and placed in the site database/GIS system.

2.5.2 Surface Sweep in Advance of Brush Cutting

A UXO team led by a UXO Tech III (Team Leader) will conduct a surface sweep of each grid to remove MEC, MEC scrap, and non-MEC scrap in advance of the grubbing crews. MEC will be consolidated within the grid for disposal and items unacceptable to move will be marked for BIP procedures at the end of each day. All scrap will undergo an initial inspection to ensure it is explosives-free and then staged along the boundary of the grid in one of two areas designated by the Team Leader in each grid. Area No. 1 will be for scrap identified as MEC scrap to include re-inspected MEC scrap resulting from UXO disposal operations, that is subsequently determined to be explosives-free. Area 2 will be for non-MEC scrap. MEC scrap will be kept segregated from non-MEC scrap through final disposition. MEC scrap and non-MEC scrap will be re-inspected for subsequent pickup and transported to a temporary holding area for QC and QA inspection, certification and final disposition at an approved facility as described in Section 2.5.8.1.

If any MEC is detected during surface sweep operations, only authorized UXO personnel will be permitted to take actions to minimize risks. Other team personnel will use the three “**R**’s” - **R**ecognize the item as potential MEC, **R**eport the item’s location to the UXO Technician, and **R**etreat to a safe location as designated by UXO personnel.

The UXO Contractor will take actions to protect the safety of the personnel on site, the public, and the environment. All UXO personnel are aware that if suspect chemical warfare material (CWM) is discovered, they will ensure that all personnel withdraw immediately from the work area to an area upwind of the suspect CWM item and report the item to the MES Operations Manager. The suspect item will be secured by the UXO Contractor’s UXO personnel until relieved by appropriate authority, such as Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel. See Section 14 for the Recovered Chemical Warfare Material Plan.

2.5.3 Aggressive Surface/Near Surface Clearance

A UXO team led by a UXO Tech III (Team Leader) will conduct an aggressive surface /near surface clearance to a depth of approximately 6 inches in each grid to identify, remove and/or dispose of as much MEC, MEC scrap, and Non-MEC scrap as possible. The team will establish controlled lanes approximately 5 feet in width and use magnetometers to assist in detection of metal objects. During aggressive surface/near surface clearance, intrusive excavation procedures in Section 2.5.6 apply. The ultimate goal of the effort is to identify and remove as much metallic clutter within approximately 6 inches of the ground surface so it does not interfere with subsequent DGM activities. MEC will be consolidated within the grid for disposal and items unacceptable to move will be marked for BIP procedures at the end of each day. All scrap will undergo an initial inspection to ensure it is explosives-free and then staged along the boundary of the grid in one of two areas designated by the Team Leader in each grid. Area No. 1 will be for scrap identified as MEC scrap and MEC frag, to include re-inspected MEC scrap resulting from UXO disposal operations, that is subsequently determined to be explosives-free. Area 2 will be for non-MEC scrap. MEC scrap and MEC frag will be kept segregated from non-MEC scrap through final disposition. MEC scrap/MEC frag and non-MEC scrap will be re-inspected for subsequent pickup and transported to a temporary holding area for QC and QA inspection, certification and final disposition at an approved facility as described in Section 2.5.8.1.

If any MEC is detected during the aggressive surface/near surface clearance operations, only authorized UXO personnel will be permitted to take actions to minimize risks. MEC discovered during the surface clearance will be photographed, identified, and documented as to type, condition, and location. Other team personnel will use the three “**R**’s” - **R**ecognize the item as potential MEC, **R**eport the item’s location to the UXO Technician, and **R**etreat to a safe location as designated by UXO personnel.

The UXO Contractor will take actions to protect the safety of the personnel on site, the public, and the environment. All UXO personnel are aware that if suspect chemical warfare material (CWM) is discovered, they will ensure that all personnel withdraw immediately from the work area to an area upwind of the suspect CWM item and report the item to the MES QA. The suspect item will be secured by the UXO Contractor's UXO personnel until relieved by appropriate authority, such as Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel. See Section 14 for the Recovered Chemical Warfare Material Plan.

The UXO Contractor will be responsible for entering summary data from the aggressive surface/near surface clearance into their PDAs. Total non-MEC and total MEC scrap weights for each grid and additional positional and location data should a MEC item be recovered during the near surface clearance will be entered into the PDA. The PDAs will have a drop-down menu to ensure all UXO personnel utilize consistent terminology.

2.5.4 Clearance to One foot Depth

A UXO team led by a UXO Tech III (Team Leader) will conduct an aggressive instrument-aided MEC clearance to a depth of 1 foot. The clearance teams shall utilize standard mag and dig clearing techniques such as establishing control lanes approximately 5 ft wide and use of hand held magnetometers and all metal detectors to assist in detection of MEC and MEC-like metal objects. During 1 foot clearance, intrusive excavation procedures in Section 2.5.6 apply.

MEC will be consolidated within the grid for disposal and items unacceptable to move will be marked for BIP procedures at the end of each day. All scrap will undergo an initial inspection to ensure it is explosives-free and then staged along the boundary of the grid in one of two areas designated by the Team Leader in each grid. Area No. 1 will be for scrap identified as MEC scrap and MEC frag, to include re-inspected MEC scrap resulting from UXO disposal operations, that is subsequently determined to be explosives-free. Area 2 will be for non-MEC scrap. MEC scrap and MEC frag will be kept segregated from non-MEC scrap through final disposition. MEC scrap/MEC frag and non-MEC scrap will be re-inspected for subsequent pickup and transported to a temporary holding area for QC and QA inspection, certification and final disposition at an approved facility as described in Section 2.5.8.1.

If any MEC is detected during 1 foot clearance operations, only authorized UXO personnel will be permitted to take actions to minimize risks. MEC discovered during the surface clearance will be photographed, identified, and documented as to type, condition, and location. Other team personnel will use the three "**R**'s" - **R**ecognize the item as potential MEC, **R**eport the item's location to the UXO Technician, and **R**etreat to a safe location as designated by UXO personnel.

The UXO Contractor will take actions to protect the safety of the personnel on site, the public, and the environment. All UXO personnel are aware that if suspect chemical warfare material (CWM) is discovered, they will ensure that all personnel withdraw immediately from the work area to an area upwind of the suspect CWM item and report the item to the MES QA. The suspect item will be secured by the UXO Contractor's UXO personnel until relieved by appropriate authority, such as Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel. See Section 14 for the Recovered Chemical Warfare Material Plan.

The UXO Contractor will be responsible for entering data from the clearance into their PDAs. Total non-MEC and total MEC scrap weights for each grid and additional positional and descriptive data should a MEC item be recovered during the clearance will be entered into the PDA.

2.5.5 Digital Geophysical Mapping

Upon completion of the aggressive surface/near surface clearance, DGM will be conducted to locate subsurface metallic anomalies. A detailed discussion of geophysical methods and equipment are presented in Section 6.

2.5.6 Intrusive Operations - Clearance to Depth of Detection

Intrusive operations in support of MEC clearance to depth of detection involves excavation of subsurface anomalies identified by DGM and, where necessary in areas not accessible to DGM, handheld instruments. All non-DGM areas, including a 2-foot radius around tree clusters (more than 1 tree) are to be verified as cleared by the intrusive excavation team with hand held metal detectors. The Vallon (model VMH3CS) EM-based detection sensor has proved to be the most reliable hand held detector. When compared to the various other handheld detectors that were evaluated, the Vallon detected the most GPO blind seed items. The Vallon will be used to locate geophysical anomalies in areas not covered by the EM61-MK2. During this search, if additional anomalies are located by the intrusive team, these anomalies will be excavated and the findings recorded in the team's PDA. These records shall include the number of individual excavations, MEC scrap weight, and non-MEC scrap weight. If MEC items are found, unique target identifiers will be assigned to these items along with their positions. These records will be uploaded for inclusion in the overall site database. Upon completion of this task of verifying that the subsurface in a 2-foot radius around trees are free of metal, the intrusive excavation teams will mark the north side of those tree clusters cleared with biodegradable paint. The paint marks will allow QC and QA to identify that the trees have been cleared. In addition, the QC team will inspect a random selection of trees with analog metal detectors in each grid to verify that the areas around the trees have been cleared by the intrusive dig teams. The UXO team leader will initial all non-DGM areas indicated on the grid maps provided to indicate that these areas have been cleared.

Intrusive work is only performed by qualified UXO Technicians. The intrusive teams will consist of seven EOD-qualified persons and include at least one UXO Tech III (team leader) and one UXO Tech II. UXO Technicians will be responsible for hand digging anomalies that are 12 inches or less while, at the same time, two technicians will be responsible for excavating suspected MEC that are deeper than 12 inches assisted by a mini-excavator. The mini-excavator will be used to excavate overburden from target anomalies that are deeper than 12 inches. Equipment operators who are not UXO-qualified may operate the mini-backhoe, but only when supervised by a UXO Tech III. All excavations will be performed by carefully digging to the side of the suspected MEC item until a positive identification is made. Excavation operations, whether by hand or using the mini-backhoe, will employ a layered approach, meaning that soil will be removed in lifts of 6 inches or less. Under no circumstances will any excavation be made directly over suspected MEC items. Once the mini-excavator team is within 12 inches of the suspect item, they will use hand excavation techniques only. After the MEC item is exposed, debris/dirt will be cleared only enough to permit positive identification of the item. Dig results will be recorded on PDAs using drop-down menus and then incorporated into the site GIS/database daily. MEC items that are acceptable to be moved will be consolidated within the grid for subsequent disposal. MEC items identified as unacceptable to move will be marked for BIP disposal operations. Disposal activities will be conducted daily to dispose of all MEC recovered for that day. Blast and fragmentation protective measures may be necessary depending upon the location of the item(s) relative to inhabited buildings and other infrastructure in accordance with a Department of Defense Explosives Safety Board (DDESB)-approved ESS. The USACE, HNC-ED-CS-5-98-7 of August 1998, ***“Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation***

of Munitions” will be used as the reference for all blast mitigation procedures. MEC items that cannot be positively identified as explosive-free will be disposed of in the same manner.

The dig teams will inspect the grid maps and re-acquisition notes for the grid such that any anomalies or mark outs larger than the 2.5-ft clearance radius are identified. Anomalies larger than the 2.5 ft radius will be cleared to the extent of footprint/mark out. If any pin flags are missing, or the dig team has questions about the grid map, the dig team leader will contact the Site Operations Manager to get the Re-acquisition team to replace the flags or clarify anomalies/grid maps as needed.

To facilitate dig clearance operations, spoils will be piled 2 ft away from the dig holes, as practical. Upon completion of each dig the dig anomaly flag will be bent and replaced at the dig location to visually indicate that the dig has been completed. If "hot" spoils are left in the grid (spoils containing nails, SAA, large concrete blocks, etc.) the hot pile will be flagged with a white pin flag, with the known cause of the metallic material written on the flag.

All scrap will undergo an initial inspection to ensure it is explosives-free and then staged along the boundary of the grid in one of two areas designated by the Team Leader in each grid. Area No. 1 will be for scrap identified as MEC scrap and MEC frag, to include re-inspected MEC scrap resulting from UXO disposal operations, that is subsequently determined to be explosives-free. Area 2 will be for non-MEC scrap. MEC scrap and MEC frag will be kept segregated from non-MEC scrap through final disposition. MEC scrap/MEC frag and non-MEC scrap will be re-inspected for subsequent pickup and transported to a temporary holding area for QC and QA inspection, certification and final disposition at an approved facility as described in Section 2.5.8.1.

Areas geophysically mapped and determined to consist of dense, overlapping subsurface anomalies that make prosecuting individual targets impractical will be identified as Saturated Response Areas (SRAs). SRAs may be related to non-MEC fill materials (such as construction debris, trash dump sites, road fill, etc.), or to utilities, above-ground structures, or below-ground structures. The SRAs will be primarily prosecuted by backhoe excavation - to the extent possible without undermining or endangering structures to be retained. The intention is that SRAs will be cleared in their entirety unless alternate methods are authorized by the MES Operations Manager or PM. When these areas are encountered, an effort will be made to clear and QC the adjacent point targets first, to minimize the impact of large amounts of spoils generated from the SRA excavations.

Following the intrusive investigations, each area excavated will be QC checked for the source removal using the same geophysical instrument used for the DGM surveys (EM61-MK2). To facilitate the QC effort, all excavations will be temporarily left open after initial prosecution by the dig teams. A trained EM operator assisted by the UXOQCS or designee will maneuver the instrument over the open hole while monitoring the data logger for any residual anomaly. If the instrument response indicates the anomaly has been removed, the dig will be considered complete and holes will be backfilled. Excavation QC is discussed in greater detail in Section 10. For locations where an elevated residual response remains, corrective actions will be initiated by UXOQCS.

2.5.6.1 Step-Out Approach

If a MEC item is identified and removed along boundaries of the MRS, a step-out will be performed until there is a 200-foot buffer free and clear of MEC. The step-outs will be conducted in those areas where no future MEC remediation is planned either because 1) the area is pending a No Further Action from ADEM; 2) the area has received a No Further Action from ADEM; 3) the area will be remediated in the future; 4) the area is outside of a suspected

MEC area (offsite or in the main cantonment). As targets are intrusively investigated, dig results will be uploaded to the database which is then geo-spatially represented in the GIS. If a MEC item is found during the intrusive investigation, the distance between the MEC item and the initial boundary of the area will be measured using the GIS. If that distance is greater than 200 ft, then no additional investigation is necessary. If the distance between the MEC item and the initial site boundary is less than 200 ft, then the area of investigation will be expanded by to an area comprising a 200-foot radius circle around the item. Areas not previously cleared within this circle will be cleared in the same manner as the original site, including any needed surveying, brush removal, geophysics, reacquisition and excavation, MEC disposal, QC check and backfilling. This process will continue until no more expansion grids are required (i.e., no additional MEC is found).

2.5.6.2 GIS

Geophysical, target and dig data will all be stored within an Environmental Systems Research Institute (ESRI) Arcview-based GIS for the site using the same reference coordinate system as the survey. These input and output data will be used to graphically represent work progress and produce graphics for project status updates and removal action reports. Grid data will be updated daily to reflect the current status of a grid with regard to progress through the MEC clearance process. The GIS will also be used to facilitate the step-out process. The Geophysics Contractor will manage the site database and GIS system used to store, manage and produce graphics. Daily updates will be posted such that stakeholders can access the data.

2.5.7 Removal Action Report

A Removal Action Report (RAR) will be prepared for each MRS at McClellan for subsequent submission to ADEM for review and approval. Each RAR will describe methods and findings at the MRS and present all raw and processed data from the field. QC and QA findings will be included along with GIS maps of the site showing grids, MEC items found, no-finds and cultural features. Deviations from the work plan and records of work plan modification will also be included in RARs.

2.5.8 MEC Disposal

The MES demolition team will conduct disposal operations in the event that MEC is encountered. For safety and control, disposal will be accomplished by using either electrical or non-electric means. The donor charges will consist of jet perforators, cast boosters, or other approved donor charges that are available. In situations where there is a static electricity or an electromagnetic radiation hazard, non-electric initiation will be utilized. All disposal operations will be conducted in accordance with the Demolition SOPs (Appendix E) and all applicable safety publications. Upon completion of demolition operations, the area will be inspected to ensure complete destruction, munitions scrap will be collected for further processing and all resultant holes will be backfilled.

2.5.8.1 MEC Scrap, MEC Frag and non-MEC Scrap Collection and Disposal

MES will pre-position lockable scrap metal containers located in an area reserved for scrap collection, segregating, and final inspection. This area will be located in the magazine area. One container(s) will be designated "*Scrap Metal*" and will be used to collect non-MEC scrap such as C-ration cans, barbed wire, construction debris, metal roofing, and or other metals not associated with munitions or range targets. The other container(s) will be marked "*MEC Scrap*" and will be used to collect MEC scrap and MEC frag (ordnance/munitions related scrap metal such as target material, fins, empty projectile casings, ordnance frag and other metal components) that do not contain any explosives or energetic materials).

Collection procedures begin at the time the metal item is discovered by the UXO technician in the grid. The UXO technician makes a preliminary screening as to the classification of the item. If the item is identified as MEC scrap containing energetic material or scrap that cannot be positively identified, it will remain in the grid and be flagged for disposal (demolition). If the item is positively identified as non-MEC scrap metal, it is placed in a non-MEC scrap bucket located on the boundary of the grid being worked. If the item is identified as MEC scrap (not containing energetic material) or MEC frag material it will be placed in the appropriately labeled scrap buckets. This initial screening is the first step in the sorting, inspection and segregation of the scrap.

After completing clearance operations within a grid, or at the end of the day if the grid is not completed, the Team Leader will perform a 100% inspection by sorting and separating all recovered scrap items. If any questionable scrap is found, it is moved to the MEC scrap bucket for treatment. The segregated scrap will then be taken directly to the scrap processing area. At the scrap processing area, the UXOQCS will conduct a 100% re-inspection of all recovered scrap. The non-MEC scrap will then be placed with like materials in labeled lockable containers. The MEC scrap and MEC frag will be staged for disfigurement, as required. All MEC scrap and MEC frag will be stored in labeled lockable containers to prevent any co-mingling of non-MEC and MEC scrap.

In preparation for transportation to the disposal facility, Matrix UXO QA will also perform an inspection of the scrap, certify it as non-hazardous, and seal the containers. The scrap manifest will be signed and the seal numbers recorded. All MEC scrap and MEC frag will be disposed of at a foundry or recycler where it will be processed through a shredder, smelter or furnace (remelt) before resale or release. MES will require that all MEC scrap containers remain segregated from all other scrap and sealed until such time as it will be immediately processed (shredded and/or smelted). All MEC scrap is to be rendered unrecognizable as munitions-related debris/scrap, disposed of safely and permanently, and tracked from point of origin to final disposition. A signed DD Form 1348-1 will be required to track all scrap as well as a certificate of destruction signed by the disposal facility. These documents will become part of the permanent record for submittal with the final report.

2.5.8.2 Hard Target Processing and Disposal

The processing of hard targets such as tanks, armored personnel carriers, jeeps and other vehicles requires a skill set quite different from the normal scrap handling capabilities described above. Disassembly of armored tanks and armored vehicles requires heavy equipment that is not available at all locations. In the event that armored vehicles are encountered, all precautions will be incorporated and the equipment needed for the job will be mobilized at the end of the project to enable dismantling all armored vehicles at the same time for reasons of efficiency. The processing of one or a few hard targets is not efficient due to the specialized labor required for cutting operations, screening for radiological dials and gauges, draining fluids, and removing rubber wheels and tires. Therefore, MES will work all target vehicles, tanks and heavy structures used as targets at the same time.

After the hard target has been surveyed and placed in the GIS, the process will start with a thorough inspection for MEC and any other reactive hazards to be cleared as each target vehicle is staged in an area(s) of the range until the end of the project.

Hard targets may have MEC, MEC scrap, and MEC frag, as well as other hazardous components associated with them. Prior to disposition, the targets will undergo a thorough inspection for MEC, MEC scrap, and MEC frag as well as inspecting dials and gauges with a radiometer for indications of low level radioactive waste (LLRW). If needed, fluids will be drained, collected, and disposed of in accordance with local environmental policies. Rubber

tires and tracks will also be removed and disposed of in accordance with laws and local regulations. In the event that hard targets are found that do contain radium dials, MES will conduct an appropriate survey and manage the removal and disposal of such dials. These surveys will be conducted with portable radiological monitoring equipment to identify the presence, or verify the absence, of LLRW. In the event that the radiological survey indicates the presence of LLRW from gauges, these items will be handled in accordance with local, state, and Federal regulations. Because of the nature of the targets utilized at many ranges, there is also a potential to encounter small quantities of RCRA-regulated materials. These materials could include batteries, antifreeze, oil and/or fuels. If found the materials will be identified and collected, containerized, and transferred to an established on-site accumulation point awaiting proper disposal. MES shall be responsible for recommending to the JPA alternative methods and locations for the proper storage, treatment and disposal and prepare any necessary manifests or related documents.

2.6 Munitions Response Sites

As stated previously, this work plan covers munitions response activities at four MRSs. Each MRS is described in the following sections. Background information on munitions and past land use along with corresponding explosives safety information at each MRS is also discussed. Previous work at McClellan consists of Engineering Evaluation/Cost Analysis (EE/CA) work conducted by the Department of the Army in the Alpha, Bravo and Charlie MRAs. There has also been several removal actions conducted in the Bravo and Charlie MRAs. The table shown below lists the three MRSs along with the corresponding Army designation from the EE/CA work. Also shown is the Munition with the Greatest Fragmentation Distance (MGFD) at each MRS which was selected based on data presented in EE/CA reports. Explosives safety issues concerning site operations at each MRS is discussed in Section 4.

Table 2-2. MEC Removal Areas

MRS	Army-designated Sector(s)	MGFD	Clearance Acreage
Northern Alpha	M6-1L Suspect Area-I/AR	Grenade, Rifle, M9	14
Southern Alpha	M5-1L (South)-PR M5-1L I	Projectile, 75mm, HE, M48 Grenade, Practice, M2	132
MRS-1 (includes Bains Gap Road and part of Industrial Access Road)	M4-1H Mixed Use Area-PR	Mortar, 81mm, HE, M43	113
MRS-2 (includes part of Industrial Access Road)	M4-1H Mixed Use Area-PR A1 Reconnaissance Area-D M3-1L Suspect Area 1-PR M3-1L Mixed Projectile Area-PR	East-Mortar, 81mm, HE, M43 West-37mm HE Mk II	525

2.6.1 Northern Alpha

The Northern Alpha MRS will be cleared to depth, it consists of 14 acres in the northern portion of the Alpha MRA and is comprised of the Army designated sector M6-1L Suspect Area-I/AR. Past land use at the site consisted of bivouac and general training. No impact areas are expected at the site.

During previous site characterization work conducted by the Army, two MEC and six MEC scrap items were found, primarily on the surface and at shallow depths, the maximum depth observed being 14 inches for one MEC scrap item. The following types of MEC and MEC scrap items were found (detailed list in Alpha EE/CA, TTFWI 2003):

- Hand grenade debris, smoke.
- Mine, antitank, practice, M12.
- Rifle grenade, M9.
- Grenade, hand, practice.
- Signal, ground, illumination.

Based on these data, the MGFDD selected for this site is the M9 Rifle Grenade. Figure 2-3 in Appendix A shows the site and corresponding EZ for intentional detonations.

2.6.2 Southern Alpha

The Southern Alpha MRS will be cleared to depth. It is 132 acres and is comprised of two Army designated sectors, M5-1L-I and M5-1L (South)-PR. Figure 2-4 in Appendix A shows the Southern Alpha MRS and corresponding EZs for intentional detonations.

M5-1L-Industrial consists of 19 acres and is the triangular-shaped area located along the southwestern border of the Alpha Area. During the site characterization conducted by the Army, one MEC item and seven MEC scrap items were found on the surface, as follows (detailed list in Alpha EE/CA, TTFWI 2003):

- Signal, ground, illumination.
- Grenade, practice, M2.
- Livens, projector, FM smoke, Mk1.
- Smoke pot.

M5-1L (South)-PR consists of 113 acres along the southern border of the Alpha Area. During the site characterization conducted by the Army, 3 MEC items were found on the surface, and 16 MEC scrap items were found on the surface and at a maximum depth of 5 inches. Parsons performed intrusive sampling in nine 100-foot by 100-foot grids in this sector as part of the chemical warfare EE/CA and is documented in the Final Chemical Warfare Materiel (CWM) EE/CA Fort McClellan, Alabama (Parsons, June 2002). Parsons' sampling uncovered 22 MEC scrap items in this sector at depths ranging from 6 to 24 inches. Within this sector, the following MEC and MEC scrap items were found (detailed list in Alpha EE/CA, TTFWI 2003):

- Projectile, 3.8 in., shrapnel.
- Mortar debris, 4.2 in., white phosphorus, M2A1.
- Projectile, 75 mm, HE, M48 not fired.
- Shrapnel round pusher plate, 75 mm, MK 1.
- Signal, ground, illumination.
- Fragmentation, projectile, 75 mm, HE, M48.
- Mortar fuze, Stokes, MK 1.
- Mortar 4 in., white phosphorus, MK 2.

Based on the data collected, the MGFDD selected for the Southern Alpha MRA is the M2 Practice Grenade in M5-1L Industrial area and the M48, 75mm HE Projectile in M5-1L (South)-PR.

2.6.3 MRS-1

The Bravo MRA MRS-1 will be cleared to depth. It is approximately 113 acres in size and is located along the northeastern Bravo boundary. MRS-1 includes the JPA's portion of Bains Gap Road (8.5 acres) and a portion of the Industrial Access Road (IAR) right-of-way (3.4 acres). MRS-1 extends 1395 feet south of Bains Gap Road - which is the exclusion zone for the

munitions with the greatest fragmentation distance (MGFD) based on an 81 mm HE mortar that was recovered during the Army's Bravo EE/CA.

MRS-1 includes portions of the Army EE/CA sector M4-1H Mixed Use Area-PR. The northern portion of Water Tank Construction Site C is located within MRS-1 and a Clearance to Depth was completed by the Army at this site to prevent conflicts or delays with the construction of a water tower. During the Army's Bravo EE/CA (Tetra Tech, FW Inc., December 2004), 33 UXO items were identified on the surface, at shallow depths, and at a maximum depth of 21 inches. Recovered UXO items ranged in size from a Practice Hand Grenade with a live fuze up to an 81mm HE Mortar.

This area lies within the Army designated sector M4-1H Mixed Use Area-PR which consists of approximately 623 acres in the northeastern portion of the Bravo Area. Grids and delineation transects were previously used to characterize MEC contamination in this area. Several MEC items were identified on the surface, at shallow depths, with the maximum depth of 21 inches observed during intrusive activities. A large quantity of MEC scrap was found at varying depths. The following types of MEC and MEC scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

- Rocket, 2.36 in M6.
- Rocket, 2.36 in M7.
- Projectile, 40 mm practice, MKII.
- Projectile, 75 mm shrapnel, MKI.
- Projectile, 37 mm, practice, MKII A1 w/LE charge.
- Mortar, 81 mm HE, M43.
- Grenade, hand, practice, M69.
- Mortar, 60 mm practice, M69.
- Grenade, 40 mm.
- Grenade, rifle, smoke.
- Mortar, 3 in Stokes, practice, MK1.

Based on these data, the MGFD selected for this area is the M43, 81 mm HE Mortar. Figure 2-5 in Appendix A shows the MRS-1 corresponding EZ for intentional detonations.

2.6.4 MRS-2

The Bravo MRA MRS-2 (approximately 525 acres) includes approximately 50 acres of the IAR described in the original approved ESS and an additional 475 acres comprising a 1395 foot right-of-way east and a 980 foot right-of-way west of the planned IAR in order to clear the exclusion zone for the IAR area so as to prevent future road closures from ongoing MEC clearance activities.

The portions of MRS-2 not designated as part of the McClellan Park System will be cleared to depth of detection. The portions of MRS-2 designated as portions of the McClellan Park System will be cleared to one foot using mag/dig methods. The McClellan Park System (future land use designation) will be a wildlife habitat/conservation area and signage will be posted prohibiting digging.

MRS-2 includes portions of the Army EE/CA sectors M4-1H Mixed Use Area-PR, A1 Reconnaissance Area-D, M3-1L Suspect Area 1-PR, and M3-1L Mixed Projectile Area-PR. Water Tank Construction Site B is located within MRS-2 and a clearance to depth was completed at this site. During the Army's Bravo EE/CA, nine UXO were recovered in A1 Reconnaissance Area-D, 14 UXO were recovered in M3-1L Suspect Area 1-PR and one UXO was recovered in M3-1L Mixed Projectile Area-PR. UXO were recovered on the surface to a

maximum depth of 15 inches. UXO items ranged in size from a 37mm HE Projectile to a 155 Shrapnel Projectile.

Grids and delineation transects were previously used to characterize MEC contamination in this area. Multiple MEC items were identified on the surface, at shallow depths, with the maximum depth of 15 inches observed during intrusive activities. A large quantity of MEC scrap was found at varying depths. The following types of MEC and MEC scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

Based on these data, the MGF D selected for this MRS-2 east of the IAR is the M43, 81 mm HE Mortar. The MGF D for the MRS-2 west of the IAR will be the 37mm HE MK II projectile. Figure 2-6 in Appendix A shows MRS-2 and corresponding EZs for intentional detonations.

- Projectile, 75 mm shrapnel, MKI.
- Projectile, 3.8 in., shrapnel.
- Projectile, 37mm, practice, MKII.
- Mortar, 81 mm HE, M43.
- Grenade, hand, practice, M69.
- Mortar, 60 mm smoke, WP, M302.
- Grenade, 40 mm.
- Grenade, rifle, smoke.
- Mortar, 3 in. Stokes, practice, MKI.

2.7 Construction Support

The Golden Triangle area at McClellan is likely the location where construction will occur first and the JPA is responsible for providing “on-call” construction support. The likelihood of encountering MEC in this area is deemed to be “Low” since this area has already been cleared by the U.S. Army (*Site Specific Final Report M1.01 Parcel and M3 Miscellaneous Property Fort McClellan, Alabama*, March 2003 and *Draft-Final Site Specific Final Report Eastern Bypass “Y” Area Junction Fort McClellan, Alabama*, January 2004 both prepared by Foster Wheeler Environmental Corporation). If during construction significant MEC items are found, a reassessment of the previous work will be conducted, this may result in the need for “on-site” construction support which is discussed below.

Other areas at McClellan where construction occurs in the future may require on-site construction support as defined by the Department of Defense Explosives Safety Board (6055.9 Chapter 12, DDESB-approved on 14 December 2004). On-site construction support areas require the removal of explosive hazards in the construction footprint prior to conducting any intrusive activities. An amendment to the approved ESS will be submitted for any site classified as having a “Moderate to High” likelihood of encountering MEC per DoD 6055.9. ESS amendments will be structured such that they meet the planning stipulations contained in Chapter 3 of the USACE’s engineering pamphlet EP 75-1-2 titled, “Unexploded Ordnance (UXO) Support during Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities.” Operationally, the means of removing the explosive hazards will be similar, if not exactly the same, as those used for the MEC remediation in this work plan.

This work plan along with the guidance provided in EP 75-1-2 will serve as guidance for both types of construction support. A construction support work plan will be prepared and submitted to ADEM for future projects that may require construction support. ESS amendments will be provided to DDESB through USATCES. Formal approval of ESS amendment is not likely to be required prior to starting support operations in areas where procedural changes and the MEC encountered is similar to those provided in this work plan, however, DDESB approval will be

required if significantly different MEC items are encountered that effect the maximum fragmentation distance (MFD) or where different detection/clearance procedures are used.

3.0 EXPLOSIVES MANAGEMENT PLAN

This Explosives Management Plan provides details for the control and management of explosives at McClellan. MES recognizes the critical nature of properly managing the explosives required for the project. This Explosives Management Plan details the procedures to manage the explosives for this project in accordance with the following policies and local, state, and Federal laws and regulations:

- 2003 International Fire Code, Chapter 33 as adopted by the City of Anniston.
- 27 CFR Part 555, Commerce in Explosives.
- 29 CFR 1910, General Industry Standards.
- 29 CFR 1926, Construction Standards.
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation.
- Applicable sections of EPA, 40 CFR Parts 260-299, Protection of Environment.
- AR 200-1, Environmental Protection and Enhancement.
- AR 385-10, The Army Safety Program.
- AR 385-16, System Safety Engineering and Management.
- AR 385-64, Ammunition and Explosives Safety Standards.
- ATFP 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations.
- DA PAM 385-64, Ammunition and Explosives Safety Standards.
- DoD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives.
- DoD 4160.21-M, Defense Reutilization and Marketing Manual.
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards.
- TM 60 Series Publications as applicable.
- TM 9-1300-200, Ammunition General.
- TM 9-1300-214, Military Explosives.
- USAESCH EM 385-1-1, Safety and Health Requirements Manual.
- USAESCH ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions.
- USAESCH Safety Considerations for UXO.

3.1 Licenses/Permits

MES will maintain a copy of the following documents on-site. These documents will be made available, upon request, to any authorized local, state, or Federal authority.

- Bureau of Alcohol, Tobacco, and Firearms (ATF) User of High Explosives License; License Number 1-AL-015-33-9D-00484 (expiration date: April 1, 2009).
- State of Alabama Blasting Contractor License, Permit Number C-01205.
- State of Alabama Blaster Certificate, Number B-07056, issued to Cecil Taylor, the MES Operations Manager.

3.2 Acquisition

3.2.1 Description and Estimated Quantity of Explosives

The initial explosives requirement estimate for the project is noted in Table 3-1. Replacement explosives will be re-supplied to maintain the inventory based upon rate of use.

Table 3-1. Estimated Explosives Requirements

Description	Class/Division	Quantity	NEW	Storage Compatibility Group
Jet Perforators (shape charges)	1.4S	500 each	26 lb	D
Detonation Cord (80 gr/ft)	1.4D	4,000 ft	46 lb	D
1/3-lb Pentolite Boosters	1.1D	84 each	63 lb	D
NONEL Shock Tube 2,000'	1.4S	10 each	<1 lb	B
NONEL Caps	1.1B	300 each	<1lb	B

3.2.2 Acquisition Source

The explosives vendors for explosive materials are:

Mr. Steve Windsor, Birmingham Powder, 2804 Cherry Avenue, Birmingham, Alabama. Cell 205-999-8643 Off: 205-674-5641 and Mr. Mike Peveto, Jet Research Center, A Division of Halliburton, 8432 South I-35 West, Alvarado, Texas. 1-800-451-5403 or 817-761-2155.

3.2.3 Storage of Explosives

The storage of explosives has been approved by DDESB in pre-existing earth covered magazines which have current inspections on file with the local Fire Marshal; these magazines are designated Buildings 4425 and 4426 as described in Table 3-2.

Table 3-2. Explosives Storage Data

Magazine Number	Type Explosive	Magazine Type	Maximum Explosive wt.	Inter Magazine Distance to 4426	Intraline Distance	Required Distance
4425	1.1	Earthen covered	45,000	101	580	570
	1.4	Earthen covered	capacity	101		50
Magazine Number	Type Explosive	Magazine Type	Maximum Explosive wt.	Inter Magazine Distance to 4425	Intraline Distance	Required Distance
4426	1.1	Earthen covered	65,000	101	670	660
	1.4	Earthen covered	capacity	101		50

3.2.3.1 Procedures for Receipt

The MES Responsible Person or Employee Possessor will inventory, initiate, and maintain all documentation concerning the demolition material upon receipt. The MES Responsible Person or Employee Possessor will assume accountability for the material by signing the receipt documents.

The MES Responsible Person or Employee Possessor will conduct a 100% inventory of the incoming explosives. The quantities annotated on the receiving document will match the quantities actually inventoried. If these quantities do not match, the MES Responsible Person or Employee Possessor will contact the originator of the receipt documentation. MES Responsible Person or Employee Possessor will only sign for the actual quantity of material received, as reflected by the inventory. Receipt documentation will be changed to reflect the correct quantities prior to acceptance. These procedures will be followed throughout for each delivery. Upon receipt, the receiving quantity will be added to the Master Magazine Data Cards and Magazine Data Cards.

3.2.3.2 Procedures for Transporting Explosives

MES will be responsible for transporting explosives for demolition operations from the storage magazines to disposal locations within the Munitions Response Sites. Transportation of explosives and initiators will comply with all federal, state, and local regulations. For transportation of explosives and initiators on-site, MES will comply with the following procedures and general safety precautions:

- Vehicle operators transporting explosives will be UXO Technicians II and above and have a valid CDL driver's license with HAZMAT Endorsement and a current Medical Examiner's Certificate.
- Vehicle operators will be trained and informed of the explosive hazards involved with their cargo.
- Initiating explosives, such as blasting caps, will remain separated from high explosives at all times. Blasting caps may be transported in the same vehicle as long as they are in an ATF approved portable day box container and secured away from all high explosives.
- Explosives will remain covered in a waterproof and spark proof container at all times, except when loading or unloading.
- Vehicle engine will not be running when loading/unloading explosives.
- Vehicle wheels will be chocked.
- The loaded explosives will be, blocked, braced, tied down, or otherwise secured in the vehicle to prevent movement.
- Prior to transport, the vehicle operator will visually inspect the explosive laden vehicle to ensure the load is properly secured and safe-to-move.
- Explosives will not be transported in the passenger compartment of a vehicle.
- Personnel will not ride in the cargo compartment with explosives.
- Smoking within 50 feet of vehicles transporting explosives is prohibited.
- Refueling of vehicles will not be accomplished with explosive cargo.
- Explosive laden vehicles will not be left unattended.
- Vehicle operators transporting explosives will comply with posted speed limits and will not exceed 25 mph on unimproved roads.

3.2.3.3 Explosive Vehicle Requirements

- MES will have a designated vehicle for transporting explosives. It will be in safe working condition and meet the following requirements:
- Vehicle will pass the standards of the Explosive Vehicle Inspection Sheet and will be properly placarded.
- Bed of vehicle will have a wooden liner or box, chocking material or sandbags to brace and protect the explosives from contact with the metal bed.
- Vehicles transporting explosives will have a first aid kit, two 10-lb BC rated fire extinguishers, and communications capability.

3.2.3.4 Key Control Procedures

The keys to the magazines will be locked in a safe at the MES Field Administration Office, located at 951 Berman Road. All personnel having access to the safe and magazine keys will be identified in writing by the MES Project Manager as key custodians. A sign out log will be located inside of the safe, requiring the date, time of issue, time of return and signature of custodian using magazine keys.

3.2.4 Inventory and Loss Procedures

The follow two sections describe the procedures for inventory and for the steps to be taken in the case of losing explosives.

3.2.4.1 Inventory of the Magazine

MES personnel that are designated as Responsible Persons or Employee Possessors will perform at a minimum a weekly physical inventory of the stored explosives to reconcile the actual quantities with the quantities annotated on the Master Magazine Data Cards and the corresponding Magazine Data Cards. Any discrepancies will be immediately reported to the MES Operations Manager, who will initiate an audit to determine the source of the discrepancy.

3.2.4.2 Lost, Stolen, or Unauthorized Use of Explosives

Upon discovering lost, stolen, or unauthorized use of explosives, the Operations Manager will report the circumstances to the Project Manager. Loss, theft, or unauthorized use of explosives shall be reported as required by 27 CFR 555.30. Completion and submission of ATF Form 5400.5 to the ATF must be accomplished within 24 hours of a reportable event. The Project Manager will notify:

- JPA – (256) 236-2011 (within 1 hour).
- ATF – 1-800-800-3855 (immediately upon discovery).
- Anniston Police Department – (256) 238-1800 (within 1 hour).
- ADEM – Governmental Hazardous Waste Branch – (334) 270-5646.

3.2.4.3 Return to Storage of Unexpended Explosives

The Demolition Supervisor will return unexpended explosives to the storage magazines at the end of the work day and record the transaction as a receipt on the appropriate Magazine Data Cards and Master Magazine Data Cards.

3.2.4.4 Disposition of Remaining Explosives at the End of Site Activities

During MEC remediation operations, MES will minimize the explosives inventory. Upon completion of all MRS remediation activities, the remaining explosives will be destroyed on site.

4.0 EXPLOSIVES SITING PLAN

This plan provides explosives safety criteria for the planning and siting of safe explosives operations for selected MRSs at McClellan. This plan is written in accordance with the requirements of DID MR-005-04 and is based on the specific details given in the ESS with 2 amendments, approved by the U.S. Army Technical Center for Explosives Safety (USATCES) and the DDESB; as changes occur to the ESS this plan will be updated accordingly.

4.1 Munitions Response Areas

This plan addresses work in the Alpha and Bravo MRAs. These areas generally comprise the western half of the former Fort McClellan. The Charlie MRA was transferred to the U.S. Fish and Wildlife Service (USFWS) and is not addressed in this plan.

4.2 Munitions Response Sites

Specific MRSs within the Alpha and Bravo MRAs have been designated by ADEM as requiring MEC remediation in order to allow for a specific reuse of the site. Information about selected MRSs is included in this plan, as additional MRSs are identified the ESS will be amended accordingly and any additional details regarding explosives siting operations will be addressed in site specific work plans prepared for each site. Table 4-1 shows the designation, size, and response action currently planned for the identified MRSs.

Table 4-1. Munitions Response Actions Summary

MRS	Area (Acres)	Munitions Response Action
Northern Alpha	14	Clearance to Depth
Southern Alpha	132	Clearance to Depth
MRS-1 (including Bains Gap Road and northern portion of Industrial Access Road)	113	Clearance to Depth
MRS-2 (including Industrial Access Road)	384 141	Clearance to Depth Clearance to 1'

4.3 Type of MEC

Table 4-2 lists the MEC identified during EE/CA work in each MRS.

Table 4-2. Type of MEC Recovered

MRS	MEC found during EE/CAs
Northern Alpha	<ul style="list-style-type: none"> • Hand grenade, debris, smoke • Mine, anti-tank, practice, M12 • Rifle grenade, M9 • Grenade, hand, practice • Signal, ground, illumination
Southern Alpha	<ul style="list-style-type: none"> • Grenade, practice, M2 • Livens, projector, FM smoke, MKI • Smoke pot • Projectile, 3.8 in., shrapnel • Mortar debris, 4.2 in., white phosphorus, M2A1 • Shrapnel round pusher plate, 75mm, MKI • Signal, ground, illumination • Fragmentation, projectile, 75 mm, HE, M48 • Mortar fuze, Stokes, MK 1 • Mortar, 4 in., white phosphorus, MK 2

MRS	MEC found during EE/CAs
MRS-1 (including Bains Gap Road and northern portion of Industrial Access Road)	<ul style="list-style-type: none"> • Rocket, 2.36 in., M6 • Rocket, 2.36 in., M7 • Projectile, 40 mm practice, MKII • Projectile, 75 mm shrapnel, MKI • Projectile, 37mm, practice, MKII A1 w/LE charge • Mortar, 81 mm HE, M43 • Grenade, hand, practice, M69 • Mortar, 60 mm practice, M69 • Grenade, 40 mm • Grenade, rifle, smoke • Mortar, 3 in. Stokes, practice, MKI
MRS-2 (including Industrial Access Road)	<ul style="list-style-type: none"> • Projectile, 75 mm shrapnel, MKI • Projectile, 3.8 in., shrapnel • Projectile, 37mm, practice, MKII • Mortar, 81 mm HE, M43 • Grenade, hand, practice, M69 • Mortar, 60 mm smoke, WP, M302 • Grenade, 40 mm • Grenade, rifle, smoke • Mortar, 3 in. Stokes, practice, MKI

4.4 Minimum Separation Distances

The Minimum Separation Distances (MSDs), which are the distances that must be maintained between project personnel working in an area and non-project personnel, are based on the DDESB-approved ESS for this project and will be implemented and enforced during munitions response field operations. The MSD is also called an exclusion zone (EZ).

For work at McClellan, the Munition with the Greatest Fragmentation Distance (MGFD) will be used as the MSD where possible. In areas where inhabited buildings are within the MGFD distance, the MSD will be 150% of the DDESB-approved Range to No More Than 1 Hazardous Fragment per 600 square feet (1/600) distance. Table 4-3 shows the MGFD and 1/600 distances for each of the MGFDs identified at the MRSs. Distances shown in Table 4-3 were taken from the ESS, since MSD calculations were not used to develop the MSDs, they aren't shown here. The DDESB-approved Fragmentation Database described in DDESB Technical Paper 16 was utilized. Information on munitions not in the database were taken from other sources and referenced in the ESS. During the course of this munitions response, if a munition with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with the 'Fragmentation Database' and an amendment to the ESS submitted for approval.

Table 4-3. Minimum Separation Distances

MRS	MGFD	MSD	
		MGFD Distance (ft)	1/600 Distance (ft)*
Northern Alpha	Grenade, Rifle, M9	351	300
Southern Alpha*	Projectile, 75 mm, HE, M48	1,701	351
	Grenade, Practice, M2	200	NA, use 200
MRS-1 (includes Bains Gap Road and part of Industrial Access Road)	Mortar, 81 mm, HE, M43	1395	345
MRS-2 (East)	Mortar, 81 mm, HE, M43	1395	345
MRS-2 (West)	Projectile, 37mm, practice, MKII	980	300

*Note: The 1/600 distance shown here is actually 1.5 times the DDESB-approved 1/600 distance and has been increased to be more protective than the approved distance.

The MSD restrictions from MEC areas to non-project personnel will be applied during all surface and subsurface MEC removal actions. Preliminary site work such as surveying, laying grid lanes and anomaly detection do not require the establishment of an MSD. Project personnel are defined as those on-site personnel required to participate in the MEC investigation/removal/sampling, along with all authorized visitors.

Team separation distances (TSDs) apply to project personnel working within an MRS. Applicable TSDs from the ESS are shown below in Table 4-4.

Table 4-4. Team Separation Distances

MRS	MGFD	Net Explosive Weight (lbs)	TSD (ft)
Northern Alpha	Grenade, Rifle, M9	0.25	200
Southern Alpha	Projectile, 75mm, HE, M48 Grenade, Practice, M2	1.47 0.002	200 200
MRS-1 (includes Bains Gap Road and part of Industrial Access Road)	Mortar, 81mm, HE, M43	1.29	200
MRS-2 (East) MRS-2 (West)	Mortar, 81 mm, HE, M43 Projectile, 37mm, practice, MKII	1.29 0.053	200 200

4.4.1 Exclusion Zone Control

Prior to initiation of on-site MEC operations, all nonessential personnel will be moved to a location outside the EZ. Once intrusive operations commence, positive control of the EZ will be maintained and only essential personnel and authorized visitors will be allowed inside the EZ. Essential personnel are those personnel necessary for the safe and efficient completion of field work conducted in the EZ. Positive control of the EZ, based on the MSD, will be maintained at all times when MEC operations are being conducted. Prior to beginning intrusive operations, the Site Health and Safety Manager (SHSM) will ensure there are no non-essential personnel and authorized visitors within the EZ and that this area remains clear of such personnel throughout the MEC operations.

Exclusion zones will also be minimized through the use of DDESB-approved engineering controls such as miniature open front barricades for unintentional detonations (see HNC-ED-CS-S-98-8) in cases where operations take place within the 1/600 distance listed in Table 4-3.

Engineering controls for intentional detonations (demolition shots) will be used as described in the *Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions*, HNC-ED-CS-S-98-7, dated August 1998 or in the *Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions*, HNC-ED-CS-S-00-3, dated September 2000. These controls will be applied as appropriate to mitigate fragmentation and blast hazards created during demolition operations. A copy of HNC-ED-CS-S-98-7 and HNC-ED-CS-S-00-3 will be available on-site when these engineering controls are to be used. If and when residents or workers are within the EZ of the current day's work area, each resident or worker will be provided protection by evacuation or the use of engineering controls. The roads within the EZ of the day's work area will be closed and barricaded at the EZ distance while intrusive work is conducted.

4.4.2 Intrusive Investigation

Only UXO technicians and UXO-qualified personnel will perform excavation and investigation of anomalies. UXO technicians will perform intrusive operations under the supervision of UXO-

qualified personnel. To gain access to a subsurface anomaly, excavation will be initiated to the side of the anomaly and will not be conducted directly over the anomaly until such time as the depth of the anomaly can be ascertained. Additional excavation will be conducted with care using small hand tools only. A detailed accounting of all MEC located at each site will be made and maintained in the project database. A log entry will be made for each MEC item indicating the date the item was recovered, team that recovered the item, unique target identification, description of the item, grid location (x, y, and z measurements) and final disposition.

4.4.3 Disposal Shots

During MEC disposal operations all nonessential personnel will be evacuated from the EZ and the number of personnel on-site will be kept to the minimum required to safely accomplish the disposal. Nonessential personnel will remain outside the EZ until all MEC disposal operations are completed. The SHSM will ensure that all required notifications of an impending demolition shot are made prior to detonation. The SHSM will be responsible for ensuring all personnel have been accounted for and that the area is secure prior to authorizing the detonation of explosive charges. Authority to initiate demolition operations will rest solely with the Operations Manager.

All MEC items requiring detonation will be marked and secured pending disposal. All explosive operations will be supervised by the demolition supervisor and coordinated with the Matrix Operations Manager. All explosive operations will follow the procedures outlined in TM 60A-1-1-31 and the EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, dated 29 June 2001. Demolition operations will be performed as required.

4.5 Planned or Established Demolition Areas

Disposal activities will be conducted within each grid or at the approved intentional detonation area.

4.6 Footprint Areas

The following three sections describe the footprint areas for this project.

4.6.1 Blow-in-Place

The MSD for BIP operations designated for intentional detonations are shown in Table 4-3.

4.6.2 Collection Points

The intentional detonation area will be used to consolidate and dispose of items that are safe to move. In addition, an ATF Type II portable magazine for up to 100 pounds net explosive weight will be used for storage of MEC that is safe to move and awaiting disposal. The location of the intentional detonation area and portable magazine is shown in Figure 4-1.

4.6.3 In-Grid Consolidated Shots

MEC deemed acceptable to move may be placed within the search grid in a location designated by the Demolition Supervisor pending destruction at the end of the day. Consolidated shots will be conducted in accordance with the USACE publication, *Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, dated March 2000. A copy of this report will be available on-site.

4.7 Explosives Storage Magazines

Explosives storage magazines and demolition materials are discussed in this section.

4.7.1 Types of Magazines Used

All demolition material will be stored in existing earth-covered magazines previously used at McClellan. Initiating caps will be stored in one magazine while shaped charges and cast boosters will be stored separately in the other. These two magazines were previously sited for 1.2 Ammunition; additional information about the two magazines is presented below:

- Magazine 4425 – Standard Earth Covered Magazine rated at 45,000 lbs net explosive weight (NEW).
- Magazine 4426 – Standard Earth Covered Magazine rated at 65,000 lbs NEW.

Each magazine is 25 ft wide and 60 ft long with a ceiling height of 13.5 ft at the center. Walls are constructed of 18-inch thick steel-reinforced concrete with an 18-inch earth cover at the top and over 35 ft of cover to each side and the rear of the magazine. The doors are made of 7-inch thick steel and each is 10 ft tall with a rail glider for opening/closing. Locking mechanisms required long-hasps ATF-certified locks. Each magazine has a current grounding certification.

No more than 150 lbs of demolition explosives will be stored in either magazine. At no time will MEC items be placed in these magazines.

4.7.2 Explosives Data

Expected demolition materials are shown in Table 3-1.

5.0 GEOPHYSICAL PROVE-OUT PLAN

GPO test plot(s) will be used to test and confirm equipment and operator system performance across all work elements including sensor, positioning, personnel, data processing, and quality control. Before and throughout the field work, performance will be demonstrated at GPO test plot(s) to confirm and certify that Contractor personnel and procedures can meet the project goals and that the detection and navigation systems are operating within expected parameters. Geophysical field teams will not begin production work until the equipment and operator system performance is determined to be acceptable. Any uncertified personnel or new or modified equipment will also require performance validation and certification prior to performing production work. See Section 10.7.3.1.2 for additional GPO information as related to QC Step 1.

In addition to the digital geophysical instruments, the UXO Contractor will demonstrate and test other hand-held EM-based analog instruments (including the Vallon VMH3CS, Minelab Explorer II, and Fisher All Metals) in the GPO to determine which instrument(s) prove most functional, reliable and consistent at McClellan. Testing will be conducted by the GeoQCS and the instrument selected will then be used by UXO dig teams during intrusive operations to gauge completion of a dig. (We recognize that the EM61-MK2 will be used to QC digs, however, our dig teams must also use an analog instrument in order to efficiently prosecute and finalize digs.) Further, it is anticipated that there may be limited areas that are inaccessible to DGM methods due to extreme terrain or obstructions and will therefore require the use of hand-held analog instruments (ML-1 or Schonstedt magnetometer, Minelab Explorer II or Vallon). UXO dig teams will also be required to demonstrate proficiency in use of the analog instruments selected. They will utilize the selected analog instruments in the GPO to demonstrate their ability to locate and reacquire MEC items with the selected instruments. Follow-up certification of the UXO team members for proficiency with sweep instruments will be supervised by the UXO QCS.

5.1 Geophysical Prove-Out Site

This GPO plan was developed in accordance with the plans and specifications of the USACE. The anticipated tasks to be performed during the project include DGM and intrusive investigations to remove surface and subsurface MEC hazards at the site. As such, a GPO test site will be designed and constructed to reflect the field conditions and survey geometry that will be utilized. The former GPO test site, constructed by URS for the Alpha Supplemental EE/CA in a flat relatively open area, was determined to be insufficiently representative of the removal action areas and will be removed. A new GPO test plot will be constructed in the former Ammunition Supply Point (ASP) area of McClellan (near the southern Alpha MRA boundary), to test the collection of DGM data over grids located in heavily wooded areas on difficult terrain representative of the majority of the Alpha and Bravo MRAs. The GPO test site is not envisioned as an unchanging entity. The GPO test plot may be changed or augmented, or additional test plots constructed, in order to better evaluate the performance of geophysical equipment and methodologies reflective of the encountered site conditions, MEC items, or burial depths.

5.1.1 GPO Plot Design

The data quality objectives (DQOs) pertaining to the GPO are presented in Section 10 of this Work Plan. The elements outlined in the following subsections describe the GPO plot design and procedures associated with the GPO. The specifics of the seed items, burial locations, and burial depths will be released on an as-needed basis by MES. While control points and “known” seed items depths and locations will be released to the UXO and Geophysics Contractors for use in QC and for optimizing survey parameters and anomaly selection criteria, the retention of

“blind” seed item locations and depths allows for consistent evaluation of the inter- and intra- Contractor GPO DGM and sensor testing results.

5.1.2 GPO Size and Location

The GPO site is located in the former ASP area of McClellan. The GPO test plot will be constructed as a 100 ft by 100 ft grid which includes geology, soil types, wooded conditions, and topography representative of the Alpha and Bravo MRAs.

5.1.2.1 Seed Items

The frequency and burial depths of the MEC items recovered during the previous investigation of the Alpha and Bravo MRAs, as documented in the EE/CA reports for these areas, were used to develop the initial seeding strategy for the GPO test plot construction. DQOs pertaining to the GPO are presented in Section 10. The planned seed items, recovery depths, and burial depth ranges are listed in Table 10-2. The seed items range in size from (inert) grenades and 37mm projectiles to 155mm projectiles and AT mines and are intended to 1) include representative items expected from the Alpha and Bravo MRAs; and 2) to meet the DQOs for the removal actions. The overall plan is for the GPO test plot to remain useable for field activities beyond the current project scope.

The GPO seed items, which will be inert ordnance items painted blue and affixed with waterproof label tags, will be buried by MES and the UXO Contractor in random order at various depths, orientations, and locations. The seed items in the former URS test plot will be recycled here as is practical. The locations of all seed items will be surveyed by a professional land surveyor at the time of burial to document their horizontal and vertical positions as well as depth below ground surface. A master tabulated list containing the items, identification numbers, and final orientations and X, Y, and Z locations will be maintained and kept confidential by MES. Therefore, the specific placement of seed items is not illustrated in this document.

5.1.2.2 Site Preparation

The UXO Contractor will prepare the GPO test plot site for seeding, including removal of small tress and brush and UXO avoidance support for the installation of control points. An aggressive surface clearance will be performed to remove pre-existing metallic contacts and to ensure that other metallic contaminants/anomalies are not present which would interfere with the detection of the seed items.

5.1.2.3 Location Surveying

The location of the GPO plot corners and seed items will be surveyed by a professional land surveyor to a horizontal accuracy of +/- 1 inch and a vertical accuracy of +/- 2 inches. The location, orientation, and depth of each target will be recorded and used for the GPO validation process. Target markings in the GPO grid will be removed prior to the geophysical surveys, and the grid will be returned as near as possible to its natural condition.

5.1.2.4 Pre- and Post-Seeding Geophysical Mapping

Prior to and after emplacement of the seed items in the new test plot, geophysical mapping will be conducted by the UXO Contractor or Geophysics Contractor using EM61-MK2. This survey will provide baseline response data, and confirm the suitability of the GPO site(s).

5.1.3 Function Check Area

A function check area (FCA) will be constructed near the GPO to allow geophysical and UXO personnel to test sensor functionality and detection. A line of items will be buried and their location and depth will be known to field crews so that they can calibrate instruments each day prior to use. Installation of the FCA will be completed by the GeoQCS and UXOQCS.

Temporary FCAs may also be established in the production areas using standard test items to facilitate operational efficiency.

6.0 GEOPHYSICAL INVESTIGATION PLAN

This chapter provides the geophysical investigation plan for this project.

6.1 UXO Safety

UXO Technicians will conduct visual surveys for surface ordnance prior to the geophysical survey crew entering the areas of investigation. A metal detector will be used to ensure that the survey points are anomaly-free prior to the crew setting monuments or driving stakes. In the event that MEC is encountered, personnel will secure the immediate area, and notify the SUXOS.

6.2 Personnel Qualifications

Geophysical data will be acquired by an experienced two-person crew that is overseen by a qualified site geophysicist. A Geophysical Quality Control Specialist (GeoQCS) will be responsible for the quality control of the geophysical operations. The qualified geophysicist and the GeoQCS will each have a degree in geology, geological engineering, or a closely related field and a minimum of 5 years of directly-related geophysical experience.

6.3 Geophysical Investigation Plan Outline

The following sections detail the geophysical investigation plan to be followed for this project.

6.3.1 Geophysical Mapping Tasks

Geophysical operations will include the following tasks:

- Acquisition of geophysical data at the GPO. This data will be used to validate the proposed DGM procedures, the anomaly selection criteria, and to finalize DQO metrics for the production data.
- Data will be collected in the GPO by each field team prior to production mapping in the same manner as will be used during the field mapping. This data will be used to certify personnel and equipment prior to their collection of production data. The GPO will be maintained throughout the life of the project to allow the testing of new personnel and replaced or repaired equipment.
- Digital geophysical mapping in the Alpha and Bravo MRAs.
- Output of geophysical grid data packages including target maps and target lists.
- Reacquisition of all targeted anomalies using the same instrument that was used for the geophysical mapping.
- Post-intrusive QC checks of selected target locations using the same instrument that was used for the geophysical mapping to confirm removal of the source material.

6.3.2 Geophysical Site Conditions

This section of text describes physical site conditions that may affect the performance of geophysical instruments and/or personnel using these instruments.

6.3.2.1 Past, Current, and Future Uses

Past land uses at the MRSs include use as military field operations training areas, bivouac areas, and ranges. The land is currently not being utilized due to past use for military operations. Planned future land uses within the MRSs covered by this Work Plan include Industrial at Northern Alpha, Business/Office and McClellan Park at Southern Alpha, Residential, Mixed Use and McClellan Park at MRS-1, and Residential, Mixed Use and McClellan Park at MRS-2.

6.3.2.2 Anticipated UXO, Type, Composition, and Quantity

MEC items discovered during previous EE/CA work for each MRS are shown on Table 4-2. The MEC density anticipated for the work at Northern Alpha is low to moderate since the area is not within an impact area. Density could be higher in Southern Alpha, MRS-1, and MRS-2 since these areas are within the footprint of former WWII artillery impact areas. The future will likely include discovery of high density areas which may require modifications to the methods of geophysical investigation contained in this plan. These modifications will be addressed in site-specific work plans.

6.3.2.3 Depth Anticipated

Previous EE/CA results show that over 95% of MEC items are found at the surface or within 2 feet of the surface.

6.3.2.4 Topography

The topography of the site consists primarily of flat to rolling ground. Locally steep topography may preclude the use of digital geophysics in small areas, particularly in MRS-2. These areas will be cleared by UXO dig teams using hand-held analog instruments or deemed inaccessible and documented with the concurrence of MES QA personnel.

6.3.2.5 Vegetation

Vegetation at McClellan consists primarily of moderately thick to heavy woods. Each MRS will be cleared of brush smaller than 3 inches in diameter prior to the geophysical investigation.

6.3.2.6 Specific Geologic Conditions

The Alpha and Bravo MRAs are located within the Valley and Ridge province of the Appalachian Highlands. The Northern Alpha Area is underlain by the Conasauga Formation consisting of limestone and dolomite with locally interbedded shale. Bedrock beneath Southern Alpha and Bravo Areas ranges in age from early Ordovician to Mississippian and includes the Newala and Little Oak Limestones and the Floyd and Athens shale units. Southern Alpha also includes significant portions of the Cambrian Shady Dolomite.

6.3.2.7 Soil Conditions

Major soil associations found at McClellan include Stony Rough Land, the Anniston-Allen-Decatur-Cumberland Association, and the Rarden-Montevallo-Lehew group. Descriptions of each follow:

- Stony Rough Land is comprised of shallow, steep, and stony soils underlain by sandstone, limestone, and Talladega slate. Characterized by stony or rough land, high water runoff, and slopes over 25 percent, this soil association does not lend itself to construction without proper erosion management practices. These soils are generally unsuited to cultivation. Typical uses include woodlands, wildlife management and grazing.
- The Anniston-Allen-Decatur-Cumberland association is found in the northern and west-central portions of the cantonment area. This series is composed of deep, well-drained, level to moderately steep soils in valleys underlain by limestone and shale. The soils range from gravelly loam to silty clay loam. These soils are suitable for cultivation, but depending upon slope, may need careful management to prevent erosion. Cumberland and Decatur soils are dark reddish-brown gravelly loam developed from limestone saprolite source (SAIC, 1995a).
- The Rarden-Montevallo-Lehew group is composed of moderately deep or shallow soils on ridge tops and steep slopes and in local alluvium on foot slopes or in draws. This soil group is found in the northwestern and western portions of the cantonment area. Soils developed

from the residuum of shale and fine-grained, micaceous sandstone. These soils are typically reddish-brown to dark gray brown to yellow brown silt loam, clay, or silty clay (SAIC, 1995a).

Soils are generally colluvial or residual in origin. This derivation of soils lends itself to reflecting the parent rock's mineralogy and chemistry. As such, magnetite and other ferrous cementations from the parent rock can result in localized areas of significant electromagnetic susceptibility and/or a high magnetic background.

6.3.2.8 Shallow Groundwater Condition

Shallow groundwater conditions at this site may exist in creeks/drainages on a localized level, but are not expected to interfere with DGM work.

6.3.2.9 Site Utilities and Other Man-made Features

Subsurface utilities are not expected to be regularly encountered at this site.

6.3.2.10 Site Specific Dynamic Events

There are no known dynamic events associated with the MRSs aside from afternoon thunderstorms which are common in the summer months.

6.3.2.11 Accessibility

Remote portions of Alpha and Bravo MRAs may only be accessible by foot or using All-Terrain Vehicles.

6.3.2.12 Potential Worker Hazards

Potential hazards that may exist onsite are addressed in the Accident Prevention Plan in Appendix C.

6.3.3 Geophysical Investigation Methods

6.3.3.1 Survey Type

The Geophysics Contractor will collect geophysical data using parallel survey lines spaced no more than 2.5 ft apart using a grid-based geometry.

6.3.3.1.1 Equipment and Navigation and Mapping System

The Geophysical Contractor will conduct geophysical operations at McClellan as a subcontractor to JPA and will be directly managed by MES. The Geophysical Contractor will use an EM61-MK2, 1.0 x 0.5 meter coil to collect geophysical data over all accessible portions of each survey area. Due to dense tree canopy, traditional tape and rope methods are anticipated to be the primary method used to provide accurate data positioning. Alternate navigational/positioning techniques may be accepted if proven in the GPO. Survey data will be collected along parallel lines spaced no greater than 2.5 ft apart. The EM61-MK2 will be operated on wheels with the coils oriented with the 1-meter axis perpendicular to line direction. An odometer wheel will trigger instrument readings at 20 cm or less intervals. Marked survey ropes will be placed laterally across each survey grid at 25-ft intervals and will be referenced to grid corner stakes surveyed on 100-ft centers. Alternating colored marks on the ropes will aid the geophysical field teams in the collection of geophysical data in straight-lines and will also identify locations for the placement of fiducial marks within the recorded data. The geophysical and local positional data will be logged and stored in a data logger.

A professional land surveyor will establish 100 ft x 100 ft grid corners over each of the survey areas prior to the start of geophysical mapping. All local coordinates will be referenced to surveyed grid corner stakes and converted to State Plane coordinates during post processing.

6.3.3.1.2 Electromagnetic Sensor

The EM61-MK2 is a high-resolution time domain electromagnetic induction sensor that is capable of detecting both ferrous and non-ferrous metallic objects. In comparison with other metal detectors and magnetometers, it is much better suited for work in close proximity to buildings, vehicles, metal fences, and underground utilities. The EM61-MK2 system typically consists of two air-cored coils, a digital data recorder, batteries, and processing electronics. The EM61-MK2's transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. These eddy currents are measured by the receiver coil. Secondary voltages induced are measured in millivolts (mV) at four separate time gates. The typical arrangement of the receiver coil is such that there is a vertical separation of 40 cm from the ground surface to the coil. At a minimum, geophysical data collected using the EM61-MK2 will be recorded at a rate of no less than one reading every 20 cm in wheel mode.

6.3.3.1.3 Data Processing

Data will be transferred from field data loggers to a field computer to assess data quality and initial editing. Data will then be transferred to The Geophysical Contractor's office for further processing and analysis using Geosoft's Oasis Montaj software.

6.3.3.2 Procedures

The following procedures will be accomplished during each work day of geophysical investigations:

- Morning health and safety brief.
- Equipment setup and warm up.
- Mechanical and electrical setup.
- All equipment will be warmed up for at least 5 minutes before use.
- Mobilize to survey area/grid.
- Morning QC checks and tests
- Acquire morning survey data and QC repeat data for each survey area/grid.
- Download morning survey data with initial QC check and lunch.
- Change batteries as required.
- All equipment will be warmed up for at least 5 minutes before use following lunch.
- Acquire afternoon survey data and QC repeat data for each survey area/grid.
- Afternoon QC checks and tests.
- Survey QC line.
- Download afternoon data with initial QC checks.
- Equipment breakdown and put batteries on chargers.

6.3.3.3 Personnel

Geophysical data will be acquired by an experienced two-person crew that is overseen by a qualified site geophysicist. A GeoQCS will be responsible for the quality control of the geophysical operations. The qualified geophysicist and the GeoQCS will each have a degree in geology, geological engineering, or a closely related field and a minimum of 5 years of directly-related geophysical experience.

6.3.3.4 Production Rates

The proposed work week consists of four 10-hour days. It is estimated that 1 acre will be geophysically surveyed per team, per work day. Reacquisition of targeted anomalies has been estimated at the rate of 150 targets per team, per work day. QC of intrusively investigated targets will be performed at a rate dictated by the progress of the dig teams.

6.3.3.5 Data Spatial Density

Sample spacing along-path will be ≤ 20 cm (0.33 ft) in wheel mode. Across-path line spacing will be ≤ 2.5 ft.

6.3.3.6 Instrument Standardization

Geophysical instruments used will be field-tested daily in the FCA, or at temporary FCAs established in the production areas, to ensure that they are operating properly. Instrument standardization will generally follow the guidelines established in DID MR-005-05 Attachment B. If the standard response cannot be attained, the instrument will be re-calibrated, repaired, or replaced. The following procedures will be conducted each day:

- Warm-up time (a minimum of 5 minutes).
- Ensure personnel tests do not exceed 2.5 mV peak to peak in the third time gate or 3.5mV peak to peak in the second time gate, as appropriate.
- Perform cable shake test each time the sensor is assembled, typically in the beginning of each survey day. Monitor sensor signals for shake-induced data spikes. If data spikes are evident, a root cause analysis will be conducted by the geophysical subcontractor. Once the problem has been identified and corrected, the cable shake test will be repeated. Once the problem has been verified to have been corrected, geophysical operations may resume.
- Conduct a static background and static spike test at the beginning and end of each day, during which readings will be collected for 1 to 3 minutes. Evaluate the data from the static test for consistency and repeatability. Perform a standard spike test using a standardized metallic test item (e.g., a 2-inch tow ball or equivalent). This spike test entails the placing of the metallic item in the center of the EM61-MK2 coil using a jig to ensure repeatability. Static background data will not vary more than 2.5 mV peak to peak in the third time-gate or 3.5mV peak to peak in the second time gate, as appropriate, and the response to the known target does not exceed +/- 20 percent after background correction.
- Identify, using a line over at least one test item in the GPO plot, FCA, or temporary FCA, for morning and evening geophysical sensor and positioning system checks. During the initial GPO surveys, this line may be established outside the test plot. The data from this line will be compared to previously collected data over the same line. Sensor response amplitudes do not exceed +/- 20 percent in amplitude and positional accuracies do not exceed +/- 20 cm for each data collection team.

Consistent with the instrument standardization metrics listed above, the DGM teams will generally perform instrument standardization and QC tests at temporary FCAs established in the production areas as follows:

- Static tests will be performed before beginning data collection for the day. The EM61-MK2 operators will identify and mark, to the best of their ability, a location free of subsurface geophysical response in or around the area where data collection is to be performed. They will then collect at least one minute of data in a stationary position, insert a standard response object in the center of the coil (using a jig to standardize the item position) and continue data collection for at least one minute, then remove the object and collect at least an additional minute of data. Performing this test in the field areas offers the added ability to document the local geophysical conditions for the associated adjacent survey grids.

- Latency tests will be performed utilizing the grid corners (control points) that are marked in the field with metal survey nails. A 50-foot length line will be established centered on the control point nails. Before beginning data collection for the day, the team will collect two data profiles along the line in opposite directions ensuring that the odometer wheel is in the “6 o’clock” position at the start of the line. This test will also be repeated at the end of the day, not necessarily using the same grid corners.

6.3.3.7 Data Processing, Correction, and Analysis

6.3.3.7.1 Initial Field Processing

Initial evaluation of digital geophysical data will be performed in the field by the geophysical team using Geonics software for downloading and viewing of profile lines. Data will be reviewed for complete coverage and good data quality. Data will then be exported to an ASCII format to allow contouring and processing. Once the data has been prepared and evaluated to ensure its integrity, it will be electronically transferred to the Geophysics Contractor’s office for final processing and QC evaluations.

6.3.3.7.2 Standard Data Analysis

The primary geophysical data processing and interpretation software will be the Geosoft® data processing software with the UX-Detect module. Geophysical data processing will include the following procedures:

- Conversion to State Plane Coordinates.
- Lag corrections.
- Normalization or leveling (removal of background).
- Gridding of data.
- Digital filtering and enhancement.
- Selection of anomaly picks (above an appropriate mV threshold).
- Preparation of geophysical maps, target maps, and target lists.

6.3.3.7.3 Advanced Data Processing

No advanced data processing is anticipated at this time.

6.3.3.7.4 Anomaly Selection and Decision Criteria

The anomaly selection criteria will be established using the mV responses that were previously recorded over the GPO targets as a guide. A target threshold will be selected that maximizes the number of seed items detected while minimizing the number of background and system noise anomalies. Targets will be selected from these maps initially by running the data through Geosoft’s UX-Detect module. Each of the anomalies selected by Geosoft as a target will be analyzed by trained geophysicists, and evaluated as to their validity and position. Targets found to be invalid or incorrectly located will be removed or adjusted. Additionally, anomalies that were not selected by the UX-Detect module, yet deemed to represent a potential UXO target, will be manually selected.

The criteria for selecting and locating anomalies for the anomaly (or target) list include the following items:

- The maximum amplitude of the response with respect to local background conditions.
- The lateral extent (width) of the response.
- The three-dimensional shape of the response.
- The location of the response with respect to the edge of the survey area, unsurveyable areas, land features, cultural features, or utilities within or adjacent to the survey area.

- The shape and amplitude of the response with respect to the response of known targets buried in the GPO test plot.
- The shape and amplitude of the response with respect to relevant anomalies encountered in previous MEC removal grids.

There may be areas of very strong and overlapping geophysical responses present in the production areas due to permanent structures, utilities, burial pits/trenches, reinforced concrete, former impact areas, etc. where it is not appropriate to target individual anomalies and which may require an alternative clearance methodology. These areas will be referred to as saturated response areas (SRAs). This designation is not intended to cover areas of lower amplitude overlapping anomalies (nailbeds and the like) or very strong anomalies of restricted areal extent. Proposed SRA boundaries and justification will be supplied to the UXO Contractor and MES for concurrence prior to finalizing the grid target list.

6.3.3.8 Target List Development

The anomalies selected as targets will be exported to a Microsoft Excel file labeled target list. This file will generally conform to the *Geophysical Anomaly Dig Sheet and Target History*, as described in Attachment C of DID MR-005-05. However, the target list will be in electronic format. Targets will be identified with a unique identification that includes the survey grid ID as part of the ID. Appropriate comments or data flags will be placed on the target lists for targets which appear to be associated with surface metal noted in the grid or with obvious cultural features (structures, utilities, manholes, fence posts, survey nails, etc.) or which may be associated with data artifacts or geologic response. Initial target lists will be sorted by peak amplitude response. Targets which are located in special case areas (SRAs, under pavement, in archeological sites, etc.) will be placed at the bottom of the target lists with the appropriate comments or data flags.

6.3.3.9 Anomaly Reacquisition

Reacquisition will be performed over all targeted anomalies using the EM61-MK2. Targeted x-y locations (in local coordinates relative to each grid) will be read directly from the dig sheet. The field team will then place a PVC pin flag labeled with the unique target ID at the target location. Once all the targets in a grid have been flagged, the EM61-MK2 will be slowly maneuvered over each location in two perpendicular directions, while monitoring the readings for the peak response. The maximum response will be recorded and the flag will be moved to the new location, noting any offset (distance and direction) from the original target.

If multiple distinct peaks are encountered within the search radius, the field team may add daughter targets to the dig list (as *target/DA*, *target/DB*, etc.), placing a labeled pin flag at the peak location of the daughter target and recording the peak amplitude of the anomaly. If distinct targets can not be discriminated, a boundary (mark out) of the area of elevated response will be marked with spray paint.

The reacquisition team will also locate and mark with spray paint the boundaries of any non-DGM areas (*not* including single-tree gaps) such as unmapped steep slopes, creek beds, SRAs, and archaeological areas.

6.3.3.10 Feed-Back (Comparison of Dig-Sheets with Dig Results)

Following excavation of each anomaly, the UXO contractor will record results of the intrusive investigation (i.e., scrap/ordnance type, actual location, depth, orientation, and condition) on the PDAs. Reviews of dig results will be supervised by the GeoQCS in an effort to better refine target selections and to ensure the appropriateness of the recovered objects.

6.3.3.11 Internal Quality Control

All QC processes and procedures conducted independently, both in the field, and in the Geophysics Contractor's office during the geophysical investigations, will be fully documented and made available upon request. The QC documentation will also be included in the final reporting. While site-specific requirements may dictate site-specific processes and procedures, the following will be adhered to in all investigations:

- All personnel conducting specific QC tasks will have the appropriate training and understanding of their responsibilities. Additionally, these personnel will have the authority to stop work and the organizational freedom to identify, evaluate, initiate, recommend or provide solutions, and approve corrective actions to ensure all work complies with stipulated contractual requirements. The GeoQCS or designee will be responsible for oversight of geophysical quality control checks during fieldwork. A daily log will be maintained by the Geo Team leader(s) that will serve to document any instrument malfunction or other conditions that may adversely affect data quality. Using the format described in Attachment A of DID MR-005-05 as a guide, field notes will be recorded during data collection in an effort to identify cultural items and grid specific data, in addition to any other pertinent information, in an effort to aid the off-site geophysical processor. Field notes /logs will be recorded on PDAs where possible. The Geophysical Contractor will be responsible for management and oversight of all QC data associated with post processing and deliverables.
- To assure proper positioning and data integrity (repeatability), 3 percent of all lines collected in a survey area will be repeated. If any significant discrepancies exist in the positioning or repeatability of the data, the problem will be identified and corrected. Following the corrective action, the grid will be resurveyed. Additionally, an experienced geophysicist will carefully evaluate all geophysical data for potential problems including, but not limited to, abnormal data spikes or inconsistent background values. All problems will be documented and resolved.
- A QC test line in the GPO, FCA, or temporary FCA containing seeded ordnance items or standard test items will be collected at the start and end of each day for each geophysical instrument to be operated. This exercise ensures repeatability, positional accuracy, and documents any instrument drift and functionality variations that might have occurred throughout the day. The geophysical profiles will be immediately examined and compared to data collected previously. Should any significant deviations or problems in the geophysical data be recognized, the geophysical subcontractor will immediately notify the PM and conduct a root cause analysis to identify the source of the error. The results of this root cause analysis will be brought to the attention of the PM and any areas that require rework will be discussed immediately.
- Internal QC procedures will be conducted during data processing to ensure data integrity.

A detailed description of the Contractor QC program is included in Section 10.

6.3.3.12 Corrective Measures

If any significant discrepancies exist in the positioning or repeatability of the data, the problem will be identified, resolved, and documented.

6.3.3.13 Records Management

The Geophysics Contractor will track and account for each data file from acquisition through delivery and final reporting. All raw and processed survey data will be archived daily on the Geophysics Contractor's server and backed up on a regular basis

6.3.3.14 Interim Reporting

The Geophysics Contractor will report status of geophysical mapping to the project manager in sufficient time for inclusion in the weekly progress report.

6.3.3.15 Map Format

All delivered maps will conform to the format specified in DID MR-005-05.

6.3.4 Geophysical Investigation Performance Goals

The following three sections describe the performance goals of the geophysical investigation.

6.3.4.1 MEC Detection

The depth of detection for MEC items will be in accordance with Table 10-2 found in Section 10.

6.3.4.2 Horizontal Accuracy

Horizontal accuracy is discussed in the Quality Control Plan presented in Section 10.

6.3.4.3 False Positives

The false positive rate is expected to be less than 15 percent. Unique geologic conditions at the site, described earlier, may result in real, repeatable geophysical response to non-metallic objects. While not truly “false positives” every effort will be made to eliminate targets that do not correspond to subsurface metallic objects. If there are more than 15 percent false positives (calculated as a running average for a sector), a re-evaluation of the data and detection methods will be performed. Any and all corrective action(s) will be documented in daily QC logs.

6.3.5 Geophysical Mapping Data

The following sections describe the management of the geophysical mapping data.

6.3.5.1 Geophysical Data and Map Packages

After collection, the geophysical field data shall be provided in delineated fields as x, y, z, v(1), v(2), etc., for delivery upon request. After completion of survey and processing activities, all final geophysical maps, dig-sheets, and supporting geophysical interpretations shall be produced for delivery and posted to the project ftp site. Anomaly dig sheets in Microsoft Excel format generally following the format specified in DID MR-005-05. Maps that display the geophysical anomalies and identified physical features shall be delivered in both a .jpg and a spatially referenced format - either in a Geosoft packed .map format or an ESRI ArcView (8.x) ArcView Tiff format as appropriate.

6.3.5.2 Geophysical Target Lists for Reacquisition

The Geophysics Contractor will provide grid target maps and anomaly dig sheets in electronic format on PDAs for the reacquisition teams generally following the format specified in DID MR-005-05. These will include any additional targets specified during QA/QC review and any relevant comments associated with the targets. Final dig list data will be uploaded to the project database and QC'd.

6.3.5.3 Anomaly Reacquisition and Marking

Information collected during reacquisition (peak mV response and offset, daughter anomalies) will be added to the dig sheets. The reacquisition data will be uploaded to the project database and QC'd.

7.0 GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS

This chapter provides information on geospatial information and electronic submittals. The project GIS will be used to support planning, field activities, data analysis, and reporting requirements for the project.

7.1 General

The GIS will include a database repository using Microsoft (MS) Access, Environmental Systems Research Institute (ESRI) ArcGIS Desktop licenses to access and manipulate tabular data and map geometries. GIS processing and management will be performed at the Geophysical Contractor's main office.

The geospatial data created for this project GIS will conform to the computer-aided design & drafting (CADD)/GIS Technology Center Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) and the MEC-GIS data layers to the fullest extent possible. Metadata will be created in accordance with the Federal Geographic Data Committee (FGDC) standards.

7.1.1 Data Sources

Data will be gathered from various sources. It is anticipated that the majority of the data related to the installation will be provided by MES. Data, such as sector boundaries and aerial photographs will be gathered from the project team, U.S. Geological Survey, or other information sources. These data will be integrated to develop a standard base map for the project. The base map will include detailed planimetric features such as roads, above ground utilities, building and structures, jurisdictional boundaries (i.e., city and county), historic military operations and training, and other data sets (e.g., schools, hospitals, fire stations, etc.).

7.1.2 Data Management

Information for selected applicable Operation Types will be recorded (i.e., for Vegetation Removal, Surface Clearance, Geophysical Operations, MEC Operations, etc.), as appropriate.

During geophysical field activities, the geophysical team leader will record geophysical survey information (i.e., geophysical team personnel, lane spacing and data gap information due to cultural items, data files, etc.) in a field logbook. Raw geophysical data collected during the geophysical surveys will be stored independent from the database but will be accessible for review. Actual processed geophysical data and resultant XY target locations with instrument responses will be stored in the database. Target lists of anomalies will be derived from these processed data. Items that are recovered during routine geophysical operations will be recorded by the UXO teams either electronically via a handheld data storage device or in their team logbook. This data will ultimately be digitally stored in the project database. Data will initially be input into a set of interim field project database tables to ensure consistency and ease of loading into the master database. These interim tables will be provided to the project database administrator who will incorporate these data into the master project GIS database. Data will be verified for accuracy, consistency, standardization and completeness. All QC operations will be tracked in the master database.

Files that are submitted to QC and QA will be tracked in the database. A database module has been established to track QC and QA to the table and record level. Relevant project files will be tracked in the database. The project database will be incrementally backed-up daily; with a full back-up occurring each Friday night during the course of the project activities.

Following completion of the field effort, the data will be used to support mapping, analysis, report preparation and community relation's functions. During this process, all applicable map geometries will be processed in ESRI shapefile format, ESRI coverage's, ASCII data file, or

other appropriate data formats, as defined in the MEC GIS format. File naming conventions will be consistent with the latest version of the SDSFIE; and/or the MEC GIS, as appropriate.

7.1.3 GIS Hardware

The GIS hardware for the project will consist of the following:

- Field workstations.
- Office Server.
- GIS workstations.
- Large-format color inkjet plotter (e.g., HP 755CM, or equivalent).

All of the GIS data, map files, and metadata will be stored on the server. The server will have a tape backup system, a CD archive, and an uninterruptible power supply to ensure maximum data protection and safety. The GIS workstations will be high-end computers with large monitors designed for the map rendering. The inkjet plotter will be capable of high-speed plotting of up to E-size (34 inch by 44 inch) maps.

The operating system of the server will be Windows 2000™ Server, which provides a high level of security for the system and database. Database management will be accomplished on workstations having adequate random access memory and processor speeds to handle the database tasks.

7.1.4 GIS Software

The following software will be used specifically for the Project GIS:

- ESRI ArcGIS Desktop (with appropriate extensions).
- AutoCad Map™.
- MS Access.
- GPS data processing software (e.g., Trimble Pathfinder).
- Oasis Montaj.

Maps generated for the project will be created and stored in the latest version of ArcGIS Desktop. Vector GIS data will be created, modified, and analyzed using ArcGIS Desktop (and its extensions). AutoCad Map™ will be used in the process of converting historical GIS files, which may be in AutoCad™ .dwg files. Any GPS data processing software used will correspond to the appropriate GPS hardware provider (e.g., Leica, Trimble).

7.1.5 File Formats and Requirements

GIS vector data for the project will be stored in ArcGIS Desktop shapefiles. Raster files, such as orthophotography and geophysical pseudocolor maps, will be stored as TIFF (.tif) files with .tfw world files defining the geospatial location and resolution of the image. All GIS files and orthophotography maps will be registered to NAD 83 State Plane Coordinates, Alabama East Zone, in U.S. Survey Feet.

7.1.6 Metadata Requirements

Metadata for each coverage and shape file are generated using the metadata generator in the ArcGIS™ ArcCatalog module. This software creates an XML file, which will be available for viewing in ArcCatalog or in any web browser. FGDC metadata will be maintained for all final GIS data files, and will be included with the data when it is distributed. A metadata template will be created to store default information that will apply to all shape files. The default information will be populated for a subset of the metadata catalog fields, including: General Tab (Access Constraints, Use Constraints, Data Set Credit); Contact Tab (Person, Organization, Position,

Contact Voice Telephone, Contact Email Address, Address, City, Postal Code, Country); Keywords Tab (Theme Key Words- up to four, Place Keyword - up to three, Thesaurus set to unknown); Security Tab (Security Classification); Entity Attribute Tab (Definition Source); Distribution Tab (Resource Description, Contact Person, Organization, Position, Contact Voice Telephone, Contact Email Address, Address, City, Postal Code, Country, Ordering Instructions); Metadata Reference Tab (Metadata Standard Name, Metadata Standard Version, Metadata Access Constraints, Metadata Use Constraints, Classification, Contact Person, Organization, Position, Contact Voice Telephone, Contact Email Address, Address, City, Postal Code, Country, Contact Instructions).

Other metadata fields will be auto-populated using ArcCatalog including: ESRI Terms Description for feature type, topology, feature counts, spatial index, linear referencing, point and vector object type, Entity Type, Entity Attribute Label, and Definition. Selected other fields may be populated accordingly.

Fields that will be specifically populated relative to each unique shapefile will include: Identification Tab (Abstract, Purpose); Data Quality (Accuracy Report – Vertical and Horizontal, Process Description, Process Software and Version, Process Date).

7.1.7 GIS Data Directory Structure and Spatial Data Standards

The GIS data directory structure will generally follow the standards set forth by the CEHNC GIS. The following directory tree depicts this structure:

- ../McClellan.
- GIS_Project (Location of Arcview .apr and ArcInfo .mxd map files).
- Graphics (Location of logos, raster images and plot files).
- Master_Coverage (Location of all final vector GIS data files).
- Working_Files (Location of vector GIS data files that are not finalized).

The directory structure under Master_Coverage has been established based on the current CADD/GIS Technology Spatial Data Standards (SDS). Any modifications to the primary GIS directory structure will be coordinated with MES, if necessary. Data will be converted to the SDTS format at the completion of the project.

7.1.8 Data Distribution

Updates made to the primary coverages and shape files in the Master_Coverage directory will be submitted to MES in accordance with the deliverable schedules established for this project. Additionally, updates to these files received from MES will be incorporated into the project GIS upon receipt. Data transfer to and from MES will be accomplished electronically via e-mail, FTP, compact disc (CD), or other mutually agreed upon media format, depending upon the size and format of the data.

7.1.9 General Map Requirements

Maps will be created in a variety of sizes (e.g., 8-1/2 inches by 11 inches, 11 inches by 17 inches, 22 inches by 34 inches, 34 inches by 44 inches), depending upon the cartographic requirements to present the chosen data. Each sheet/set will have a size/type standard border, revision block, title block, complete index sheet layout (if set), scale bar, legend, and north arrow, date, author, (initials) and name of map document (.apr or .mxd). This variety of sizes and layouts will be used to best present and describe the data and/or analysis included.

7.1.10 Documentation

GIS documentation will consist of three documents: (a) GIS Data Dictionary (details of the database tables and fields used to store the project related information); (b) a brief guide to loading and using the project database; and (c) a list containing all final map exhibits created during the course of the project.

7.1.11 GIS Project Tracking

GIS projects (e.g., .apr and .mxd files) used for maps will be tracked in a list. The name of the project file, requestor, creator, date of creation, most recent date of modification, and map content will be tracked. This will facilitate the modification and update of maps at a later date, possibly by other users. This tracking file will be regularly updated, and as requested, sent to JPA/MES.

7.1.12 GIS Staffing

The GIS project staff will consist of a GIS Manager located in the Geophysical Contractor's main office.

7.1.12.1 GIS Manager

The GIS Manager will be responsible for high-level management of the overall GIS and database program. A person with a broad knowledge of GIS applications, capabilities, and overall system requirements fills this position. Specific duties include the day-to-day management responsibilities of GIS projects, staff, and budget. The GIS Manager coordinates project GIS needs with the Project Manager, Field Operations Manager, Project Geophysicist, and other project staff as necessary. The GIS Manager coordinates regularly with the MES PM. The GIS Manager also oversees the Database Administrator, and provides high-level oversight of the development of the database users, structure, and applications.

7.2 Database and Information Management

The following paragraphs describe the database structure and management of information for this project.

7.2.1 Structure and Design

The database structure will provide a broad capability to capture activities, operations, recovery/removal and QA/QC related to the MEC remediation work. At a minimum, a subset of key tables from the database will be provided to and utilized by the field operation team to store field-collected data. The data is then transmitted to the master project database at the Geophysical Contractor's main office. The database will form the core of the overall GIS.

7.2.1.1 MMRP Database

The Military Munitions Response Program (MMRP) database will provide a common repository for data collected from MMRP investigation or removal efforts. The MMRP database will be maintained on a computer system that provides secure data access. This database shall be used to catalogue MMRP actions in an organized fashion so that reporting and querying will be easily attained. The database will be submitted to the MES PM in accordance with agreed upon schedules after completion of field activities, or as requested.

7.2.2 Data Distribution

Updates made to the database will be submitted in accordance with project schedules after completion of the fieldwork, or as requested. As with the GIS updates, data transfer to and from JPA/MES will be accomplished electronically or on CD.

7.2.3 Staffing

Primary staffing of database activities will consist of a Database Manager located on-site at McClellan. Additional data entry staff may be required, depending upon the project workload. The responsibilities of these individuals are described below.

7.2.4 Database Manager

The Database Manager will oversee and coordinate database activities on the project. The Database Manager will have significant database experience, and will perform routine database functions such as user management, table creation and modification, query development, form creation, report design, and synchronization with hand-held field computers. The Database Manager will also train and supervise the Data Entry Specialist (if necessary) and oversee all database modification activities.

7.2.4.1 Data Entry Specialist

The Data Entry Specialist will enter data into the database. This will be accomplished by the following methods: (a) Manual data entry from hardcopy forms; and (b) Digital import of data from the field data tables or other data sources. The Data Entry Specialist will check for errors and problems in the data during the entry and import process.

7.2.5 Database User Administration

The Database Manager will be responsible for the administration of database user accounts. Each user will be given the appropriate level of permissions within the database, such that only authorized personnel can make changes to database values. Read-only permissions will be assigned to users that need to review the data, but who are not authorized to make changes.

7.2.6 Database Backup Routines

Database backup routines will be established. These routines will be set up for daily and weekly backups. These backups will be used to restore data to the database in the event of database corruption or other events requiring the restoration of the data. The Database Manager will be responsible for these backups. A log of database backups will be generated and maintained.

7.2.7 Digital Image Catalog

While not explicitly part of the database itself, it is noted here that a catalog of digital images (photographs) acquired during the course of the project will be maintained. The catalog will include, at a minimum, a listing of the image names, date taken, location taken, subject matter, and photographer- as available. This catalog will be submitted to MES after completion of fieldwork or as requested.

7.3 GIS Quality Management

The GIS Manager will maintain the project GIS in NAD83 State Plane coordinates, Alabama, East Zone, in U.S. survey feet. Subsequent to this, all field work and all data processing will be performed in this single projection/coordinate system.

- As data are collected in the field, they will be integrated into the GIS.

Data will be maintained as “incoming” (copies of data as provided to GIS), “working” (incoming data manipulated to review, analyze, or create GIS products), and “final” (ready to be transmitted to MES).

- File maintenance/naming conventions will be used as follows and coordinated with MES:

- Logical directory structures (Windows “folders”) will be established and maintained throughout the project.
- Interim files will be named by data type and general location (i.e., by field reconnaissance area, sector, grid, or other unit as applicable).
- Ad hoc files (e.g., to support map graphics creation) will be maintained in a separate location from formal data.
- Files for formal transmittal will follow SDSFIE/MEC-GIS naming conventions to the fullest extent possible.

GIS data will be maintained on a desktop computer in the Geophysical Contractor’s main office. Commercial-off-the-shelf software (ESRI suite of products) will be used for all GIS processing activities. Data will be backed up to secondary media (i.e., digital linear tapes, writeable CD-ROM, or secured FTP site) daily to minimize data loss. Data will be transmitted to the Geophysical Contractor’s office daily (or as required) to enable support by off-site personnel and to ensure data security.

7.3.1 GIS Quality Control

The GIS Manager will be responsible for QC and validation of the GIS data. Survey data (geophysical and positional) received from the field will be checked against existing survey points for accuracy and completeness. The data will also be checked to ensure that labeling is correct and follows the project standard set for the features surveyed.

The GIS Manager will oversee spatial accuracy of new GIS data, which will be checked against known locations using existing survey data and/or digital orthophotography. Additionally, a comparison of the ArcCatalog metadata and the GIS data file will be made to ensure that the metadata are correct.

7.3.2 Database Quality Control

QC of data will be performed during data acquisition, data processing, data analysis, and data reporting stages. The Database Manager will be fully responsible for performing and documenting all database QC. The GIS Manager will supervise the Database Manager in these activities. It should be noted that these are the fundamental QC steps for information management, and that individual project sites and scopes may specify additional QC requirements. The basic database QC steps at the project, along with the parties responsible for performing the QC, are presented below.

Table 7-1. Database QC Action and Responsibilities

QC Action	Performed By	Overseen By
Daily Backup	Database Manager	GIS Manager
Field Data Quality Checks	Database Manager	GIS Manager
Data Entry Checks	Database Manager	GIS Manager
Weekly Data Checks	Database Manager	GIS Manager
Data Deliverable Checks	Database Manager	GIS Manager

The Geophysical Contractor will perform QC of the data before delivery to MES and JPA, and will include checks and reviews of the digital data deliverables. Specific checks will include data completeness, quality, and format checks, which will be entered in the database QC log. QC checks will be applied to each step of data processing, from data entry forward. Overall, these QC checks will help to ensure that any grid surveys and their included grids are entered properly, headers are attached to data files, and that scanned field or digitally transferred forms are included with their corresponding data files. If at any point during this process the data are

found to be deficient, the Geophysical Contractor will take corrective action regarding the data in question. Automated checking procedures and other timesaving yet quality assuring measures may be developed throughout the course of this project.

8.0 WORK, DATA, AND COST MANAGEMENT PLAN

This chapter describes how work and data will be managed and costs controlled.

8.1 Project Management Approach

MES has evaluated the work requirements for this MEC remediation and has developed a comprehensive approach for meeting the project objectives. MES's project management procedures are designed to effectively execute multitask projects using multiple contractors that are able to continually demonstrate quality workmanship with adherence to cost and schedule.

MES and JPA will select a group of key subcontractors to establish master service agreements. As projects and tasks are identified, the McClellan project management team will divide these tasks into manageable portions and select one or two subcontractors to provide a cost and schedule for issuing a task ordering agreement, where fixed unit pricing and production rates are stipulated. Separate work authorization letters will be issued to subcontractors for work at each MRS as they are sequenced into the program.

8.2 Schedule

MEC remediation in Southern Alpha MRS and MRS-1 was initiated in May 2006 and field work was substantially completed in June 2007. Field work for MRS-2 is anticipated to begin in September 2007 and be complete by April 2009 (19 months).

8.3 Recurring Deliverables

Monthly project status reports will be posted to the Project FTP site. These reports will contain quality control, production and safety information along with projected work for the next month. There will also be weekly quality control conference calls with ADEM, JPA/MES, and other critical team members, as necessary, to discuss work progress and facilitate necessary work plan modifications.

9.0 PROPERTY MANAGEMENT PLAN
NOT REQUIRED.

10.0 QUALITY CONTROL

This section addresses the QC methods and procedures associated with MEC removal operations at McClellan. The overarching goals of the QC Program are to ensure that:

- Data are of known and documented quality and suitable for their intended use.
- Data collection meets the stated requirements.

Ultimately, the benefit of adherence to the quality program will be an enhanced accountability and public confidence in the MEC remediation. The MEC QC program meets the spirit and intent of the Uniform Federal Policy for Implementing Environmental Quality Systems, (EPA/DoD/DOE, 2005).

10.1 Introduction

This section establishes procedures that ensure all work meets or exceeds the project specifications and conforms to the contract requirements and applicable regulations. Specifically, this QC section:

- Identifies QC objectives and procedures for specific project elements.
- Identifies the project QC organization, defines authorities, responsibilities, and qualifications.
- Defines project communication, documentation, and record-keeping procedures.
- Describes a continuous inspection program to examine the quality of materials, maintain standards of workmanship, identify and correct deficiencies, and provide finished products that meet or exceed contract requirements.
- Describes procedures for the management of deficiencies, nonconforming conditions, and FCRs.
- Defines procedures for project submittals and/or recordkeeping.

Contractors will only consider this plan to be in effect after receiving formal written acceptance from the ADEM through Anniston-Calhoun County Fort McClellan Development JPA or its designated MES Project Coordinator.

10.2 Project Organization

The following paragraphs describe the entire organizational structure of the MES Quality Management Team and their responsibilities during operations at McClellan. Project personnel contact numbers and organizational charts for each Contractor are presented (by task) in Appendix B. See Table 2-1 for the general project organization.

10.2.1 Program Manager

The Program Manager (PgM) will monitor planning, performance, and safety compliance and will serve as the primary point of contact on all programmatic matters during the project planning, execution, and post-execution phases. The PgM is responsible for the following:

- Responds to JPA and ADEM requirements and ensures that the required QC elements are addressed in the Programmatic and Site-Specific Work Plans.
- Reviews and approves the Programmatic and Site-Specific Work Plans.
- Provides resources and oversees project management of the funding, personnel, and equipment necessary to safely conduct McClellan removal action operations.
- Maintains liaison with MES SHSM to ensure proper attention is focused on safety and health matters related to conducting MEC removal operations.

10.2.2 Project Manager

The Project Manager (PM) will be responsible for the following:

- Manages overall contract conformance to JPA requirements and specifications, with respect to technical, cost, and schedule issues.
- Reviews all required submittals.
- Allocates sufficient and appropriate resources to ensure successful completion of the scope of work.
- Manages all field activities including directing project staff and contractors in accordance with the Contract requirements.
- Tracks proposed changes to the project requirements.
- Communicates directly with Contractors regarding project execution and accountability.
- Coordinates with the MES Operations Manager, UXO Quality Control Specialist (UXOQCS) and GeoQCS to ensure compliance with standard protocols and procedures and implementation of all project plans.
- Coordinates with the SHSM and MES Operations Manager to ensure implementation of the SSHP.
- Resolves project quality issues.
- Procures equipment, materials, and supplies necessary for project performance.

10.2.3 Site Operations Manager

The Site Operations Manager will report directly to the PM. The Site Operations Manager will coordinate QC operations with the Project Manager. The Site Operations Manager duties include oversight of the following:

- Ensures compliance with the work plan.
- Schedule task assignments and contractor personnel.
- Provide oversight to contractor data collection and reporting efforts.
- Performs oversight of project data.
- Ensures there are no deviations from SOPs or the scope of work.
- Documents and maintains MES personnel qualification and training.
- Ensures contractors perform their assigned tasks.
- Acts as primary spokesperson on QC matters when interfacing with external organizations/agencies.
- Coordinates with the SHSM to ensure the quality and safety of all field activities.

10.2.4 UXO Quality Control Specialist

The UXOQCS reports directly to the Site Operations Manager on matters pertaining to QC. The UXOQCS has the authority to act independently of the Site Operations Manager in all QC matters. The UXOQCS and QC staff have the authority to stop work if operations are found to be out of compliance with contract requirements and/or specifications. UXOQCS duties include oversight of the following:

- Supervisor over all QC personnel and procedures.
- Ensures quality compliance with contract plans and specifications as defined in this Work Plan.
- Ensures there are no deviations from SOPs or the scope or work.
- Ensures QC oversight of project plans.
- Ensures QC oversight of project data.
- Tracks and maintains corrective actions until they are resolved.
- Ensures contractors perform their assigned tasks.

- Conducts and documents daily QC inspections utilizing the 3 phase inspection of quality control.

10.2.5 Geophysics Contractor

The Geophysics Contractor will provide geophysical mapping, anomaly reacquisition, geophysical QC, and data and GIS support (see Section 6).

10.2.5.1 Geophysics Program Manager

The Geophysics PgM is responsible for the following:

- Responds to MES, JPA, and ADEM requirements and ensures that the required QC elements are addressed in the Programmatic and Site-Specific Work Plans.
- Reviews and approves the Programmatic and Site-Specific Work Plans.
- Provides resources and oversees project management of the funding, personnel, and equipment necessary to safely conduct McClellan geophysics and data support for the MEC removal action operations.
- Maintains liaison with MES to ensure proper attention is focused on safety and health matters.

10.2.5.2 Geophysics Project Manager

The Geophysics PM will be responsible for the following:

- Manages overall contract conformance to JPA requirements and specifications, with respect to technical, cost, and schedule issues.
- Reviews all required submittals.
- Allocates sufficient and appropriate resources to ensure successful completion of the scope of work.
- Manages all field activities including directing project staff and contractors in accordance with the Contract requirements.
- Tracks proposed changes to the project requirements.
- Communicates directly with MES regarding project execution and accountability.
- Coordinates with the MES Operations Manager, UXOQCS, GeoQCS and Geophysics Site Manager to ensure compliance with standard protocols and procedures and implementation of all project plans.
- Coordinates with the field team to ensure implementation of the SSHP.
- Resolves project quality issues.
- Procures equipment, materials, and supplies necessary for project performance.

10.2.5.3 Geophysics Quality Control Specialist

The Geophysics Quality Control Specialist (GeoQCS) reports directly to the Geophysics Program Manager. The GeoQCS has the authority to act independently of the Geophysics Program Manager in all geophysical QC matters. The GeoQCS and QC staff have the authority to stop geophysical work if operations are found to be out of compliance with contract requirements and/or specifications. The GeoQCS or his/her designated assistant will be on-site during the initial startup of the project and as required thereafter to ensure that operations are in accordance with project plans and specifications. The GeoQCS has stop-work authority and is responsible for the following:

- Ensures quality compliance with the geophysical aspects of the WP.
- Ensures project compliance with the work plan – paying particular attention to the technical aspects.

- Performs QC oversight of project plans.
- Performs QC oversight of project data.
- Performs QC oversight of the project database and GIS.
- Ensures there are no deviations from SOPs or the scope or work.
- Ensures the geophysical contractor performs their assigned tasks in accordance with the Work Plan and SOPs.
- Approves geophysical corrective actions to ensure all work complies with stipulated contractual requirements.
- Conducts and documents QC inspections both on- and off-site.

10.2.5.4 Geophysics Site Manager

The Geophysics Site Manager will be responsible for overall project day-to-day operation of geophysical operations and logistics in the field. He/she has overall stop-work authority and duties include:

- Working with the MES PM, MES Operations Manager, and the Geophysics Project Manager to plan day-to-day site activities.
- Allocating and scheduling Geo teams.
- Coordinating daily GIS and data support for the Geo teams and UXO teams.
- Serving as a resource for the Geophysics PM.
- Maintaining daily contact with MES QA personnel.
- Providing project status meetings locally at the request of JPA/MES.
- Developing project plans, reports and associated documentation.

10.2.5.5 Data Manager

The Geophysics Data manager will be responsible for overall project day-to-day geophysical data management and operation of the on-site GIS. His duties include:

- Maintaining the geophysical database and database.
- Ensuring all data is entered/uploaded to the project database and GIS.
- Supporting and synchronizing the Geo and UXO team PDAs.
- Developing project data reports, maps, and associated documentation.
- Producing GIS and data status maps and reports.

10.2.6 Contractors

All contractors will report to the MES Site Management Team and will provide all personnel, equipment, and materials required for their assigned tasks. Although it is expected that contractors ensure the quality of their own work, the Site Management Team will be responsible for site supervision, inspection, and approval of all contracted work. All contractors shall agree to adhere to the procedures identified in the project plans and to follow the procedures and QC protocols designated therein.

10.2.6.1 GIS Contractor

The Geophysics Contractor will provide GIS and data management services both on and off site (see Section 7).

10.2.6.2 Scrap Metal Removal Contractor

MEC-related scrap will be sorted and disposed of by trained UXO personnel. A local Recycling contractor will be responsible for the demilitarization and recycling of MEC, scrap metal, and hard targets.

10.2.6.3 Vegetation Removal Contractor

The Brush Cutting and Grubbing Contractor, will provide vegetation removal as necessary.

10.2.6.4 Land Surveying Contractor

An Alabama licensed professional land surveyor(s), will provide land surveying services.

10.3 Personnel Qualifications and Training

Project staff shall be qualified to perform their assigned jobs. This will be accomplished by establishing and enforcing minimum qualification requirements for key positions, verifying initial and continued proficiency, and implementing a formal training program. Personnel training requirements are presented in the following paragraphs.

10.3.1 Project Personnel Training

Minimum qualification requirements for key positions on this project have been established through the review of contractual and other project-related requirements as well as use of DID OE-025.01 as a general guide. Project personnel will not be assigned to a position or job for which they do not meet the minimum qualifications. If additional assignments are made on this project, the qualifications of the assigned personnel will be evaluated and documented as prescribed herein.

Senior technical staff shall provide on-the-job training to newly assigned technical staff related to their job requirements and techniques and with particular emphasis on problem prevention. Prior to conducting operations, all personnel will sign the Work Plan Signoff Sheet (Appendix D, Forms). Work performed by newly assigned staff will be monitored by the senior staff. The frequency of the monitoring will depend on the individual's demonstrated proficiency to perform assigned duties.

On-site training at McClellan will include such topics as (but not limited to) work plan review, unique site-specific safety hazards, first aid, operation of communication equipment, and the types of ordnance expected to be found at McClellan.

The Site Operations Manager will maintain records of site-specific and routine training for MES personnel and will monitor certification expiration dates to provide advance warning to the Project Manager as to when employees will require refresher training or other requirements (i.e., physical). All contractor site personnel records and training will be located in an on-site file and will be documented on a qualification/training log that will be completed at the beginning of the project and will be updated and maintained by the contractor UXOSO and GeoQCS, as appropriate.

10.3.1.1 Geophysical Team Training and Certification

A QC test grid that has geologic and topographic characteristics similar to the areas to be geophysically investigated will be installed at McClellan. This GPO will be used to test each geophysical team as a unit (equipment and operators) to ensure that proper equipment operation and survey techniques are employed and that each team is capable of achieving the required performance standards with their assigned equipment. Determination of the adequacy of the level of training of assigned staff is the responsibility of the Geophysics Program Manager and GeoQCS. For a full description of the GPO process see Section 10.7.3.1.2 below.

10.3.1.2 UXO Team Member Training and Certification

A portion of the GPO test grid described above may be used to test UXO personnel to ensure that proper search techniques are utilized and that each person is capable of achieving the required performance standards with their assigned equipment. Determination of the adequacy

of the level of training of assigned staff is the responsibility of the Site Operations Manager and UXOQCS. For a full description of the GPO process see section 10.7.3.1.2 below.

10.3.1.3 Data Management Personnel Training

All project personnel involved in data entry, data management, or data QC shall be trained for the specific activities for which they are responsible. Determination of the adequacy of the level of training of assigned staff is the responsibility of the Geophysics Project Manager and GeoQCS for geophysics personnel and the Site Operations Manager and UXOQCS for UXO personnel.

10.3.1.4 Entire Process Hands-On Training

At the startup of operations, and as needed as new personnel are integrated, all personnel associated with the collection and recording of DGM, reacquisition, or dig results data will go through a hands-on training session. All geophysical, UXO, and QC personnel involved with data management will participate in these hands-on training and practice sessions where the data collection, data flow process, and data recording procedures will be walked through. For DGM personnel, this will include the collection of a sample geophysical data set, and recording of data collection notes and completion of data collection forms on the PDAs. Reacquisition teams will reacquire a target data set and record the reacquisition data on their PDAs. UXO dig team personnel will undergo a hands-on training including grid geophysical map interpretation and PDA familiarization, operations, and dig results data entry.

10.3.1.5 New Personnel/Equipment

Throughout the project duration, new personnel and/or equipment may be assigned to either the geophysical or UXO team(s). Prior to team integration, new personnel and/or equipment require certification via GPO testing before integration into team operation. New personnel will not be allowed to commence operations until the GPO data have been reviewed and approved by MES QC personnel. Previously certified personnel may be rotated to different teams without recertification.

10.3.2 Contractor Qualifications

The Project Manager is ultimately responsible for verifying that employees and contractors possess the required qualifications prior to procurement. The QC staff is responsible for verifying contractor compliance with this WP and SOPs.

10.3.3 Health and Safety Training

Health and safety training requirements for on-site project personnel have been established in accordance with Federal and state requirements, Occupational Safety and Health Administration (OSHA) requirements for hazardous site workers (29 CFR 1910.120), and MES policies and procedures as specified in the Health and Safety section of this work plan. At a minimum, any site worker or visitor who may encounter hazardous wastes shall have completed the OSHA Hazardous Material Site Worker Training (40-hour initial training and 8-hour annual refresher). Site Supervisors must have completed the OSHA Hazardous Material Site Worker Training and 8-hour Supervisor Training. The 40-hour OSHA training may be waived for infrequent site visitors at the discretion of the project SHSM. A minimum of two field office staff and one member of each survey/investigation team shall have first aid/cardiopulmonary resuscitation (CPR) training. McClellan-specific safety training will be conducted on-site for all personnel working on UXO-related activities. Daily safety briefings (morning tailgate meetings) will be conducted and are described in the accident prevention plan (APP) in Appendix C.

10.3.4 Documentation

The review and verification of Contractor personnel qualifications will be documented on the Personnel Qualification Verification Log (attached). This Personnel Qualification Verification Log will be maintained on-site by the contractor UXOSO along with copies of all pertinent training certificates. This information will be available for periodic review by the MES Site Operations Manager or designee.

10.4 Definable Features of Work

The overall project objective of this project includes a number of specific activities that are considered the definable features of work for the project. The Definable Features of Work are listed in Table 10-3 with the associated inspection points and QC actions.

10.5 Data Quality Objectives

DQOs for this project focus on specific elements of the geophysical survey and the intrusive investigation. The following is a list of the DQOs:

- Survey/positional accuracy – Equipment Performance Criteria
 - Due to canopy cover, conventional survey methods (total station) will be used to survey in grid corners/boundaries. Accuracy of these systems shall be within +/- 1 inch (survey grade).
- Geophysical Equipment Performance Criteria
 - Target Detection System. The geophysical contractor must find 95% of all seed items in the GPO test grid in order to certify equipment and personnel as having successfully passed the GPO.
 - Target Positional Accuracy. The geophysical contractor must be able to accurately position an anomaly within a critical radius (Rcrit) of 2.5 ft.
- UXO Aggressive Surface/Near Surface Clearance Team Performance Criteria
 - Target Detection System. Each UXO surface clearance team must perform a daily instrument functional check at the FCA to verify that the instruments are working properly.
- Geophysical Data Integrity
 - Daily functional checks of the geophysical instruments must be within tolerances described in Section 6.3.3.6.
 - Continuous recording of geophysical data (i.e., no unexplained instrument data gaps).
 - Continuous recording of positional data (i.e., no unexplained positional data gaps).
- Operational Verification of Equipment
 - All hand-held detectors and data collection and positioning systems will perform daily performance checks in accordance with SOPs or manufacturer's specifications at the FCA.
- Intrusive Investigation
 - Field inspection and interrogation of a pre-determined number of targets with an EM61-MK2 within each Unit of Production (UoP), after all the targets in the UoP have been excavated, will be performed to verify that all anomaly locations have been intrusively investigated and properly cleared by the UXO teams. The percentages listed in Table 10-4 will be the minimum criteria used.
 - 100% QC reacquisition and EM61-MK2 interrogation will be performed on all no-find locations.
- Ordnance Identification
 - Positively identify 100% of MEC items as to type, fuze, condition, and filler based on knowledge/training/reference material.

- The UXOQCS will verify the identification of 100% of all MEC items.
- Geophysical Data Processing
 - As UoPs are completed, a minimum of one grid out of each UoP will be reprocessed by the QC staff to produce a target map of anomalies and their coordinates. These QC targets will be compared with the geophysical contractor’s targets. Discrepancies will be investigated and a root cause analysis will be conducted to find the extent of the potential problem (see Section 10.7.3.3 – QC Step III).
- Geophysical Confirmation Remapping
 - At the discretion of JPA/MES, approximately 10-30% of areas that have been geophysically surveyed and excavated will be remapped. Specific areas and percentages to be remapped will depend upon target density and whether MEC was present. Should discrepancies (i.e., additional targets) exist, the QC Team (the GeoQCS, UXOQCS, or their designees) will conduct a root cause analysis to find the extent of the potential problem and recommend corrective action.
- Database Management
 - Daily geophysical/positional data will be collected and stored in a data logger and subsequently downloaded to a personal computer. All geophysical data will be backed up daily and a copy transferred off-site for storage in accordance with the geophysical contractors’ standard data protocols. MEC identification and intrusive investigation data will also be digitally recorded and backed up.

The DQOs for clearance depth are shown in Table 10-1 below.

Table 10-1. MEC Clearance Depths

Munition	Clearance Depth Range
Mk II Hand Grenade	0 – 14 in.
37mm Projectile	0 – 14 in.
M9 Rifle Grenade	0 – 18 in.
2.36-in. Rocket	0 – 24 in.
3.5-in. Rocket	0 – 24 in.
75mm Projectile	0 – 30 in.
3-in. Stokes Mortar	0 – 32 in.
60mm Mortar Projectile	0 – 24 in.
81mm Mortar Projectile	0 – 30 in.
3.8-in. Projectile Shrapnel	0 – 24 in.
4.2-in. Mortar Projectile	0 – 36 in.
105mm Projectile	0 – 36 in.
155mm Projectile	0 – 48 in.
AT Mine	0 – 6 in.

10.6 Equipment Calibration/Maintenance Requirements

Equipment will be inspected and calibrated (if required) according to manufacturer’s requirements prior to field use. Field equipment calibration will be documented and records kept on-site by the UXOQCS or GeoQCS, as appropriate. All equipment inspections and calibrations will be conducted by persons with specific training and experience in the operation of that equipment. Calibration will not be performed for instrumentation which is calibrated by the manufacturer and is not intended for manual calibration in the field. Equipment found to be inoperable, damaged, or out-of-calibration shall be tagged, segregated, and not used until the discrepancy has been corrected and the acceptable condition of the equipment is verified by a member of the QC staff. A copy of the instrument manuals will be located on-site.

10.7 Inspections and Communication

The QC staff is responsible for verifying compliance with this QC section through the implementation of the three phases of control. This phased QC process ensures that all project activities comply with approved plans and procedures. The specific QC monitoring requirements for each Definable Feature of Work (DFW) are described in Section 10.4. This section specifies the minimum requirements that must be met and to what extent QC monitoring shall be conducted by the QC Staff. Although QC inspections of DFWs will be conducted by the QC staff, the main focus of QC inspections and audits will be on geophysical and intrusive operations as they relate to UoPs.

10.7.1 Three Phases of Control

The QC staff will implement the three-phase control process for specific DFWs (Table 10-3). Due to the importance of the geophysical and intrusive operations QC check sheets will be used by the QC Team to audit these operations that are specific to each DFW (see below). Execution of each phase of control is critical to ensure quality performance; however, the preparatory and initial inspections are of particular value in the identification and prevention of discrepancies before they become problematic. Production work will not be performed on specified DFWs until a successful preparatory and initial phase inspection has been completed and documented.

10.7.2 Units of Production

A UoP is a contiguous number of grids that are grouped together into a manageable unit that can then be tested by the QC process. The size of a UoP will be variable and may depend on a variety of factors such as the number of targets in the area (target density), end land use, environmental characteristics including topography, vegetation, noise, personnel, detection instrument used, area investigated by which UXO team(s), etc. It is preferable for QC that, where practical, distinct teams should be associated with each UoP. It is anticipated that a UoP will consist of two to ten-grids that are 100 ft x 100 ft in size (except for partial grids).

The UoPs will initially be grouped together based on their location to one another with the overriding factor being their end land use. However, this initial grouping may be modified as other factors described above and the number of targets in each grid (and surrounding grids) may override the initial “best guess” as to how to group the grids together. Therefore, final UoP grouping will be done by the Project Manager and GeoQCS only after the end land use and the number of targets in the entire area is known. The initial UoPs for Northern Alpha, Southern Alpha, MRS-1, and MRS-2 are shown in Appendix A. Changes to the initial UoPs and their rationale will be documented in Removal Action Reports prepared for each MRS.

10.7.3 UoP Certification Process

10.7.3.1 QC Step 1, (FCA, GPO, Preparatory & Initial QC Inspection)

10.7.3.1.1 Functional Check Area (FCA)

The purpose of the FCA is its use as the place where the UXO and geophysical teams perform their daily function checks of their analog detectors and the EM61-MK2s prior to commencing field operations (Section 10.6). The FCA is also used to for practical demonstration of detection thresholds for buried seed items. The FCA will be constructed in close proximity to the field office or adjacent to the area of investigation. The FCA will be comprised of approximately five to ten inert items, each placed at a depth not to exceed that listed in Table 10-1. If inert items are not available, then substitute items such as cut pipe/rebar that have a mV response similar to items of interest will be used instead. Temporary FCAs may also be established in the

productions area using standard test items, at the discretion of MES, in order to increase operational efficiencies and reduce congestion at the FCA.

10.7.3.1.2 *Geophysical Prove-Out*

Each geophysical and UXO team will be tested through a GPO prior to commencing field operations. The GPO is discussed in more detail in Section 5. The purpose of the GPO is to demonstrate and document the site-specific capabilities of the proposed survey platform, sensors, navigation equipment, data analysis, data management and associated equipment and personnel to operate as an integrated system capable of meeting DQOs specific to that team.

The GPO will test and validate the following capabilities of the geophysical detection system process:

- Geophysical team data collection capabilities.
- Transfer and post processing of data.
- Target sheet development (target selection and location).
- Target re-acquisition.

The GPO will test and validate the following capabilities of the UXO team:

- UXO team member's ability to successfully operate the equipment.
- UXO team member's ability to successfully locate items of interest in the GPO.

The anticipated tasks to be performed during the project include DGM and intrusive investigations to remove surface and subsurface MEC hazards at the site. As such, a GPO test site will be designed and constructed to reflect the field conditions and survey geometry that will be utilized. The former GPO test site, constructed by URS for the Alpha Supplemental EE/CA in a flat relatively open area, was determined to be insufficiently representative of the removal action areas and will be removed. A new GPO test plot was constructed in the former Ammunition Supply Point (ASP) area of McClellan (near the southern Alpha MRA boundary), to test the collection of DGM data over grids located in heavily wooded areas on difficult terrain representative of the majority of the Alpha and Bravo MRAs. The GPO test site is not envisioned as an unchanging entity. The GPO test plot may be changed or augmented, or additional test plots constructed, in order to better evaluate the performance of geophysical equipment and methodologies reflective of the encountered site conditions, MEC items, or burial depths.

The type of seed items and depth of burial were determined by previous investigation of the Alpha and Bravo Areas, as documented in the Final EE/CA Alpha Area of the Redevelopment Fort McClellan, Alabama (Tetra Tech, FW Inc., September 2003) and Draft EE/CA Bravo Area of the Redevelopment Fort McClellan, Alabama (Tetra Tech, FW Inc., December 2004). Information provided in the Tetra Tech, FW Inc. Final Alpha Area EE/CA Report (September 2003) and Draft Bravo EE/CA Report (December 2004) includes the recovery depths of various MEC items found during the EE/CA investigations. This site-specific data has been used to establish the proposed depths of seed items to be placed in the GPO (Table 10-2).

Table 10-2. GPO Construction Information

Munition	Expected Typical Maximum Detection Depths^a	EE/CA Investigation Alpha and Bravo areas Maximum Recovery Depths^b	Proposed GPO Depth Range
Mk II Hand Grenade	24 in.	6 in.	0 – 14 in.
37mm Projectile	15.6 in.	5 in.	0 – 14 in.

M9 Rifle Grenade	24 in.	2 in.	0 – 18 in.
2.36-in. Rocket	26.4 in.	18 in.	0 – 24 in.
3.5-in. Rocket	38.4 in.	2 in.	0 – 24 in.
75mm Projectile	32.4 in.	20 in.	0 – 30 in.
3-in. Stokes Mortar	33 in.	24 in.	0 – 32 in.
60mm Mortar Projectile	26.4 in.	14 in.	0 – 24 in.
81mm Mortar Projectile	34.8 in.	21 in.	0 – 30 in.
3.8-in. Projectile Shrapnel	41.8 in.	15 in.	0 – 24 in.
4.2-in. Mortar Projectile	46.8 in.	0 in.	0 – 36 in.
105mm Projectile	45.6 in.	N/A	0 – 36 in.
155mm Projectile	67.2 in.	N/A	0 – 48 in.
AT Mine	N/A	N/A	0 – 6 in.

Legend

^aTypical expected maximum detection depth for geophysical instrumentation is a theoretical value based on USACE DID OE-005-05.01 and EM 1110-1-4009 (USACE, 2000). The empirical formula used to derive the maximum detection depth is $\log(d) = 1.002 / \log(\text{dia}) - 1.961$, where d=the actual depth to the top of buried MEC (in meters) and dia=the diameter of the minor axis of MEC (in mm). For items that are not specifically listed in the USACE table, detection depths are estimated based on 11 X their diameter (as referenced in USACE DID OE-005-05.01).

^bRecovery depths from the Final Alpha Area EE/CA Report (Foster Wheeler, 2003) and Final Bravo Area EE/CA Report (Foster Wheeler, 2004).

Grid corner survey control points for the GPO test plot will be established by an Alabama licensed professional land surveyor. The locations of all seed items will also be surveyed by a professional land surveyor at the time of burial to document their horizontal and vertical positions as well as depth below ground surface. The southwest grid corner will be designated as the origin point (0, 0) for a local coordinate system in feet, and the local coordinates for all buried items will also be calculated and tabulated. Due to dense canopy cover in the McClellan MRSs, GPS instrumentation is generally not usable; and it is anticipated that GPO data will generally be collected and positioned using standard tape measure, cone, and fiducial methodologies. Alternate positioning systems, such as robotic total stations, may also be used provided that they can demonstrate acceptable data quality at the GPO.

The Geophysical Contractor will perform equipment detection and positioning tests (i.e., wheel mode and fiducials) at the FCA over known target items, location, and site conditions prior to first entering the GPO to assist in developing an initial mV threshold for targeting items in the GPO. The GeoQCS will process one geophysical team at a time through the GPO test plot.

The detection performance assessment for the geophysical detection system process will be evaluated based on the geophysical survey contractor's ability to accurately detect at least 95 percent of the targets in two dimensions (x, y), within a Critical Radius (Rcrit) of 2.5 ft.

Each geophysical mapping team will be evaluated based on the following criteria:

- If a targeted anomaly position is greater than 2.5 ft from the ground truth location of the target, that target will be recorded as a “no-go.” Ninety-five percent of the ground truth targets must be “go” to pass.
- If a team fails to achieve the minimum requirement, retraining may be necessary, and the geophysical team may be allowed to retake the GPO.
- No-finds or false-positives will be recorded, but will not be part of the scoring procedure.
- Only those targets that lie within in the GPO grid will be scored or become part of the evaluation process.
- Anomalies that may be present, but were not seeded in the GPO grid by the QC staff, will not be part of the scoring process.
- The team will successfully enter and document the survey collection and data acquisition parameters on the team's PDA.
- A GPO report will be generated that will contain the following information:

- As-built drawing of the GPO plot.
- Pictures of the seed items during GPO installation.
- Summary of each team's procedures and GPO results (including geophysical maps and target lists).

Each geophysical reacquisition team will be evaluated based on the following criteria:

- If a reacquired anomaly target position is greater than 2.5 ft from the ground truth location of the target, that target will be recorded as a "no-go." Ninety-five percent of the ground truth targets must be "go" to pass.
- Targeting and re-acquisition parameters (anomaly strength, location, daughter targets) will be successfully documented using the team PDAs.
- If a team fails to achieve the minimum requirement, retraining may be necessary, and the geophysical team may be allowed to retake the GPO.

Geophysical mapping operations may commence "at risk" in advance of the GPO report, pending approval of the GPO results by MES, JPA and ADEM. Intrusive findings will be continually reviewed by the GeoQCS during the duration of the project to verify that the depth of seed placement (in the GPO or blind seed items) as well as target mV thresholds are representative of site conditions. The GPO Report is not a static document - it will be updated or amended periodically as new information or results are added to it.

10.7.3.1.3 Preparatory Phase Inspection

The Preparatory Phase of the geophysical QC inspection checklist will be used during the pre-operational training step of project geophysical operations and will be performed by the QC Team. This QC checklist will be used by the GeoQCS (or designee) to document that all pre-operational actions (delineated in the geophysical investigative section of the work plan) have been met and that each field team is properly prepared to conduct geophysical operations. Punch list items of deficiencies will be documented on the checklist and reported to the MES PM and geophysical contractor for immediate attention. Completed QC checklists and QC surveillances will be uploaded onto the FTP site on a regular basis. The above-mentioned checklists can be found at the end of this section of the WP. Note that these inspection checklists may be customized to fit a specific feature of work and/or site conditions.

Work plans and operating procedures will be reviewed by the MES PM to ensure they describe pre-qualifying requirements or conditions, equipment and materials, appropriate sequence, methodology, and QC provisions. The QC staff will verify the following:

- All plans and submittals have been prepared and approved, and are available to field personnel.
- Appropriate field equipment is available, functional, and properly calibrated.
- Responsibilities have been assigned and communicated.
- The job hazards in Appendix C, Accident Prevention Plan, have been communicated and the necessary safety measures are in place.
- Field personnel have the necessary knowledge, expertise, and information to perform their duties.
- Field personnel have demonstrated acceptable performance in the GPO, if required, prior to starting in the production areas.
- Arrangements for support services have been made and the prerequisite site work has been completed.
- Discrepancies between existing conditions and approved plans/procedures will be resolved and corrective actions taken for unsatisfactory and nonconforming conditions identified

during the preparatory phase inspection. This will be verified by the PM, prior to granting approval for work to commence. Preparatory phase inspection results will be documented in the preparatory inspection checklist and/or summarized in a Daily Quality Control Report/Contractor Production Report.

10.7.3.1.4 Initial Phase Inspection

An initial phase inspection will be performed by the QC Team the first time selected DFWs are performed. This inspection will:

- Check the preliminary work for compliance with procedures and contract specifications.
- Verify inspection and testing.
- Establish the acceptable level of workmanship.
- Check and upgrade safety compliance.
- Review the Preparatory Phase inspection to ensure that any required changes have been incorporated into site activities.
- Check for omissions and resolve differences in interpretation.
- The MES PM and QC staff will ensure discrepancies between site practices and approved specifications that have been identified are resolved before granting approval to proceed. The initial phase inspection results will be documented in the Initial Inspection Checklist and summarized in the Daily Quality Control Report/Contractor Production Report.

10.7.3.2 QC Step 2, Follow-up QC Inspection

Follow-up QC inspections and/or surveillance will be performed on specific DFWs periodically during operations. This inspection ensures continued compliance and workmanship quality. Inspection and/or surveillance points and sampling frequency for each selected DFW are shown in Table 10-3. The QC staff will monitor the practices and operations and verify continued compliance with approved project plans.

Sampling frequencies in Table 10-3 are at a normal state and may be tightened or relaxed based on a variety of factors such as team performance, project duration, geophysical and intrusive investigative results, etc. If different QC Sampling frequencies are required than those described below, approval of different QC sampling frequencies must first be approved by JPA, MES, and ADEM before being implemented.

A Deficiency Notice Report (DNR) will be completed and issued if if nonconforming or deficient practices or results are detected. A Stop Work Order may also be issued depending on the severity or recurrence of the defect. Items that have been “red flagged” will be investigated using a root cause analysis by the QC staff; the results of which will be used to design the most appropriate corrective action. Discrepancies between site practices and the approved plans/procedures will be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices will be verified by the QC staff prior to granting approval to continue work. Follow-up phase inspection results will be documented in the MES QC Surveillance Report.

10.7.3.3 QC Step 3, Geophysical Data Reprocessing

Using the geophysical data collected by the geophysical contractor, the GeoQCS will initially reprocess the geophysical data and generate a geophysical target map and a target list for the first five grids (or data sets) collected by each geophysical field team (at least one data set for each team must include a seed item). These QC maps and target lists will then be compared with the geophysical target map and target list generated by the geophysical data processor. If discrepancies between the maps and target lists exist, the GeoQCS and the Geophysical Data Processor will compare processing techniques. This initial duplicative process will ensure that

geophysical interpretation techniques are correct and will, potentially improve whenever differences arise in an effort to exceed performance standards.

Once all the geophysical data for a UoP has been collected, the GeoQCS will then randomly select and reprocess the data from one of the grids that make up the UoP. This grid will be reprocessed by the GeoQCS who will select targets and compare those targets to the original anomalies identified by the Geophysics Contractor. If the GeoQCS finds targets that have not previously been selected, then a root-cause analysis will be conducted. Following that analysis, QC staff will analyze potential solutions (corrective actions) to determine which remedy (if required) is most effective in adjusting the process.

It is understood that minor discrepancies in target selection will exist due to the very interpretative nature of geophysical target selection; however, should major discrepancies occur, or seed items be missed, the GeoQCS will immediately notify the Site Operations Manager, UXOQCS and MES PM. Upon notification, a root cause analysis will be conducted by the QC Team. It is anticipated that the root cause analysis will be used to pinpoint exactly when and where the problem occurred. Work that has been conducted up to the point where the problem occurred will be accepted. Once corrective actions have been taken, if necessary, work should only be redone starting at the point where the problem occurred.

10.7.3.4 QC Step 4, Blind QC Seeds

QC seed items will be placed by the QC team throughout the site at a minimum density of one seed item per UoP to monitor the Aggressive Surface/Near Surface Clearance Operations. A subsequent set of QC seeds will also be installed at a minimum density of one seed item per UoP to monitor the One Foot and Clearance to Depth Operations.

The blind QC seeds are used to evaluate the overall quality of the clearance operations. Geophysical detection of the blind seeds confirms that the mapping team covered the area and the data was appropriately processed and targeted. Recovery of the blind seeds confirms that these items were appropriately reacquired, and that the intrusive team cleared the anomaly and properly documented their findings. The QC criteria is to recover 100% of the blind seeds. Upon finding a failure (i.e., missed seed item), the QC staff will issue a DNR and conduct a root cause analysis to determine the extent of the failure and why it occurred. All the factors will be evaluated and corrective action will be based on the root cause analysis. Rework (if required) will be done from the point at which the problem occurred, as identified through the root cause analysis. Additional details on the blind seeding program in discussed in Sections 10.7.4.3 and 10.7.4.4.

Table 10-3. Definable Features of Work – QC Inspection Points/Frequency

Definable Feature of Work	Inspection/Surveillance Point	Attribute	QC Action	Sampling Frequency	Red Flag Criteria
Prepare Plans and Reports	Review Draft/Draft/Draft Final/Final	Quality and implementation of technical approach, clarity of text, addressing of all scope items, and compliance with guidance and procedures	Internal review of document attributes and resolution of comments	Document submissions	Rejection or non-concurrence of plan, excessive comments, or critical technical comments
GPO Establishment	Seed item installation	Survey accuracy and mV response of items before and after placement	Internal technical review	All items in GPO GeoQCS	Seed items < the performance depth can not be detected or a locational discrepancy
GPO Certification (Geophysical and UXO Teams)	Target Detection	Detect seed targets within GPO	Review GPO data	Every GPO GeoQCS	Pass = 95% of GPO targets are detected and located within the 2.5 ft RCrit.
	Target Positioning	Meet positioning criteria	Review GPO data	Every GPO GeoQCS	Pass = 95% of GPO targets are detected and located within the 2.5 ft RCrit
	False Alarm Rate	False alarm targets (anomalies identified other than seed items)	Review GPO FAR data	Every GPO GeoQCS	Metric to be established based on GPO results however, individual site conditions and geology are to be taken into account
UXO surface sweep prior to vegetation removal	Removal of surface MEC / MEC scrap / Non-MEC scrap prior to vegetation removal	Quality of surface sweep	Three-Phase QC Inspection	Periodically during surface sweep operations UXOQCS	Missing MEC item
Brush Clearing	Throughout	Accommodate geophysical survey	Three-Phase QC Inspection	Periodically as grids are cleared GeoQCS and UXOQCS	Vegetation cut to acceptable levels as deemed appropriate by the GeoQCS and UXOQCS.
UXO Surface and Near Surface Clearance after vegetation is removed	Removal of MEC and Seeded items	Quality of surface clearance operation	Three-Phase QC Inspection, place seed items (minimum of one per UoP)	Results reviewed as grids are completed UXOQCS	Missing a MEC item or QC surface seed
Surveying	MRS Border and corner stake positioning	Meet positioning criteria	Three-Phase QC Inspection based on contractor's SOPs	As datasets are received GeoQCS	Verify that internal QC procedures are being followed and that tie lines/points are being recorded (including the amount of deviation)
UXO Surveyor Support	Border and corner stake placement	Check for subsurface anomalies/off-set procedures	Three-Phase QC Inspection	Periodically during survey operations UXOQCS	Not avoiding anomalies when placing stakes/pins

Definable Feature of Work	Inspection/ Surveillance Point	Attribute	QC Action	Sampling Frequency	Red Flag Criteria
Geophysical Investigation / Confirmation Remapping	Daily Instrument Static, Latency check	Instrument response to known standards and velocity	Review QC data	Daily GeoQCS	Within $\pm 20\%$ of initial FCA mV responses and linear positions
	Positioning	Position within RCrit of target	Review positional data	Geophysical data to be re-analyzed during QC Step III. A minimum of one grid will be sampled per UoP. If possible, the grid to be re-analyzed will contain a seed item GeoQCS	Positioning of seed items found to be within RCrit (2.5 ft) of known location
	Anomaly Selection	Anomalies chosen by data interpreter	Identify target anomalies	Geophysical data to be re-analyzed during QC Step III. A minimum of one grid will be sampled per UoP. If possible, the grid to be re-analyzed will contain a seed item. GeoQCS	One anomaly selection difference at or above the minimum mV response threshold established at the FCA and GPO will be cause a root cause analysis and possible failure of the UoP – which would then require reprocessing
	Linear Data Density	Distance between linear data points	Measure linear data density	Geophysical data to be re-analyzed during QC Step III. A minimum of one grid will be sampled per UoP. GeoQCS	Minimum linear data density of 2 data points per ft
	Blind Seeds	Identify blind seed items	Place blind seed items (minimum of one per UoP)	Seed items placed in 100% of UoPs GeoQCS	Detect and Target 100% of the seed items
	Anomaly Reacquisition	Reacquire anomaly within 2.5 ft RCrit	Review reacquisition data	Data to be reviewed as UoPs are completed. GeoQCS	95% of all items within 2.5 ft Rcrit

Definable Feature of Work	Inspection/Surveillance Point	Attribute	QC Action	Sampling Frequency	Red Flag Criteria
Intrusive Investigation	Daily Instrument FCA test	Instrument response to known standards	Three-Phase QC Inspection	Daily Check UXOQCS	Within $\pm 20\%$ of initial FCA mV responses and linear positions
	Excavations within a UoP	Target anomaly presence/absence	Interrogate and sample (minimum) % of completed excavations per UoP per Table 10.4	As UoPs are completed (QC Step V) UXOQCS	The finding of a metallic item that has a mV response above that which was established at the FCA and GPO within a 2.5 ft radius of the original target location
	Investigate data gaps 2 ft around tree clusters in grid	Verify that trees are investigated and appropriately marked	Three-Phase QC Inspection	During post investigation QC hole checks UXOQCS	Missing a MEC item, QC seed or a Non-MEC metallic item of critical weight and mass within 2 ft of tree cluster
	Seeded items	Excavate blind seed items	Verify blind seed items have been excavated	Verification that seed items have been located and removed will be checked as UoPs are completed GeoQCS	Recover 100% of the seed items
MEC-Related Scrap Inspection/Certification	MEC-related scrap inspection and certification	Prior to disposal	Three-Phase QC Inspection	Daily UXOQCS	No MEC or energetic material
Data Management	Intrusive investigation data	Verify that intrusive investigation data sets are complete for each of the targets prosecuted	Three-Phase QC Inspection	Variable GeoQCS	Data sets are complete and accurate
	Intrusive data recording and data transfer with PDA (if used)	Verify that intrusive investigation data files are present and completed for each of the targets prosecuted	Three-Phase QC Inspection	Variable Database Data Manager.	Successful data transfer
	Data backup and storage	Verify files to be backed-up are present on backup media/FTP site	Three-Phase QC Inspection	Variable Data Manager.	Data to be placed onto FTP site and /or backed up on separate medium (CD/DVD)
Backfill and Site Restoration	Each grid as they are completed	Flagged anomalies and excavations	Verify holes are properly backfilled and flags removed	As grids are completed GeoQCS	100% of flags removed and holes backfilled

10.7.3.5 QC Step 5, Excavation Sampling Inspection

Step 5 of the QC process is an inspection of the intrusive investigation. This QC step utilizes MIL-STD-1916 Verification Level III as the base (or minimum) number of targets that are to be sampled. The minimum QC sample size for a UoP is summarized in Table 10-4 (below) as a function of the sample population size. Sample populations shown in Table 10-4 can vary depending on whether the level of QC is at a normal, elevated or relaxed state. This State of QC (tightened, normal or relaxed) is dependent upon whether a UoP has previously failed this QC step in the past. If so, the project team consisting of the JPA, MES, and ADEM may choose to elevate the minimum State of QC to a tightened level of QC until such time as all involved are comfortable with returning the State of QC back to its original level. Conversely, the project team may choose to lower the State of QC if no discrepancies have been found over a lengthy period of time. QC sample populations are chosen at random from the total population.

Table 10-4. Excavation QC Minimum Sample Populations.

State of QC	% of targets in the UoP that are to be checked by the QC Team
Tightened	35%
Normal	25%
Relaxed	15%

The Excavation Sampling Inspection will verify that the geophysical target anomaly locations have been thoroughly investigated and are “electronically” cleared. The size of the minimum QC sample population is dictated by Table 10-4 above and also in accordance with MIL-STD-1916 (VL III). Below are two scenarios that illustrate how Table 10-4 and MIL-STD 1916 (VL III) are to be used together.

- Scenario 1: The level of QC has been set to “Normal”. The geophysical data was collected and a total of 60 targets were found in this UoP. According to Table 10-4 above, 25% of these targets would need to be checked by the QC Team (i.e., 15 targets). However, using MIL-STD-1916 (VL III) the QC sample population is 32. The larger of the two (15 or 32) is 32 targets and as such, 32 targets now become the minimum QC sample population for this 1st scenario.
- Scenario 2: Using the same level of QC (Normal) but changing the number of targets in the UoP from 60 to 400, MIL-STD-1916 (VL III) would dictate that 32 targets would need to be checked; however Table-10-4 (above) dictates that 25% (100 targets) would need to be checked. The larger of the two (32 or 100) is 100 targets and as such, 100 targets now become the minimum QC sample population for this 2nd scenario.

The QC Team will reacquire, at a minimum, each of the randomly selected targets that comprise the minimum QC sample population with an EM61-MK2. During the excavation phase, once the UXO team has excavated a target and has successfully removed the object(s) the UXO team member will leave the excavation hole open and will leave the pin-flag (with the anomaly ID) at the hole. The QC Team will then re-analyze the excavation with their EM61-MK2. Should discrepancies exist, they will be documented in the UXOQC logbook and reported in the DQCR. The criticality of these discrepancies will be based specifically on what was found and the results of a root-cause analysis. The results of this root cause analysis will be used to implement corrective actions and also to determine the extent of the area that has been potentially impacted by this error should rework become necessary. Critical discrepancies would include location of metallic items that have an mV signature above the mV threshold that was established at the GPO. To clarify, MEC or any metallic object having a size and mV

response similar to an item that should have been removed but instead was found by the QC Team during post excavation inspections will be considered Critical discrepancies. The finding of a critical discrepancy would then trigger a root cause analysis, the results of which could possibly make the UoP a critical non-conforming unit. If a critical nonconforming UoP is encountered, 100% of the targets in that UoP will be re-investigated by the UXO teams and the State of QC will then be elevated to a Tightened State (See Table 10-4) for the re-QC of this and subsequent UoPs. The State of QC will then remain at a Tightened Level until the situation is considered corrected by the UXO Contractor and MES allows the State of QC to return to normal. QC Step V will not be performed after the grids have been remapped.

10.7.3.6 QC Step 6, Target Data Comparison To Excavation Results

Upon completion of all excavations in the UoP, the GeoQCS will compare target mV readings with excavation results. This quality control procedure is intended to check that the target that was excavated by the UXO team(s) corresponds to the mV response for that specific target location as shown in the geophysical data. In other words, a 50 mV geophysical target should not produce two nails during the intrusive investigation. Should this type of discrepancy between the mV response and the excavation results occur, the GeoQCS will conduct a root cause analysis. The results of this root cause analysis will be used to implement corrective actions and also to determine the extent of the area that is impacted by this error should rework become necessary.

10.7.4 UoP Pass/Fail Criteria

10.7.4.1 Geophysical Operations

The geophysical survey is expected to detect and locate a variety of MEC items at various depths. Use of the USACE, Huntsville, Data Item Description MR-005-05 which specifies that items should be located to their maximum depth of detection using the 11X diameter rule will be used as a “rule of thumb” for pass/failure criteria. As discussed in EM 1110-1-4009 (June 2007) the 11X diameter “rule of thumb” has site-specific and item-specific limitations which need to be taken into account. Therefore, failure criteria for geophysical operations will be an anomaly that has not been targeted for excavation that has an mV threshold above that which was established at the FCA and GPO to define a target. Furthermore, final pass/failure decision of the UoP will be made on a case by case basis using the root cause analysis to examine the exact nature and extent of the error (should one occur). Rework (if required) will be done from the point at which the problem occurred onward, as identified through the root cause analysis.

10.7.4.2 Intrusive Operations

If the QC Team finds a metallic item that has an mV response above that which was established at the FCA and GPO to define a target and this target is generally within in the 11X the diameter rule (as stated in Section 10.7.4.1), this would be cause for a UoP failure. Upon finding a failure the QC staff will conduct a root cause analysis to determine the extent of the failure and why it occurred. All the factors will be evaluated and corrective action will be based on the root cause analysis. Rework (if required) will be completed from the point at which the problem occurred, as identified through the root cause analysis, forward.

10.7.4.3 QC Seed Items for Aggressive Surface/Near Surface Clearance Operations

The MES QC team will randomly distribute metallic seed items at a minimum of one per UoP. Seed items for this task will include galvanized 60 d nails. QC seed items will be painted orange and affixed with waterproof ID tags stating SURFACE SEED and the seed number so that when recovered they are easily identified as seed items. Care will be taken during the placement of these items so that their location is hidden. The location of the seed items will be

recorded by the QC team in a PDA to help track the recovery of all seed items. Any grid turned over as complete with a surface seed still in place, will require the rework of that grid or UoP.

10.7.4.4 QC Seed Items for Clearance to One Foot and Clearance to Depth Operations

In addition to the UoP failure criteria for geophysical and intrusive operations as described above, the MES QC team will heavily seed the areas to be investigated with metallic objects. Blind QC seed items will be placed by the UXOQCS and GeoQCS (or designees) throughout the site at a density of a minimum of one seed item per UoP. QC seed items will be painted orange and affixed with waterproof ID tags stating GEO SEED and the seed number so that when excavated they are easily identified as seed items. Care will be taken during the placement of these items so that their location is very well hidden. The location of the seed items will either be surveyed in by a licensed surveyor or their location will be measured from corner stakes using tape measures. Once the geophysical data has been collected and target lists have been generated, the GeoQCS will use the GIS to compare the seed item locations to the geophysical target locations. A seed item will be counted as having been found if the geophysical data position of the seed item is within a 2.5 ft radius of its actual location. This seed item test is intended to verify that both the geophysical and intrusive investigation are working properly. Upon finding a failure (i.e., missed seed item), the QC staff will conduct a root cause analysis to determine the extent of the failure and why it occurred. All the factors will be evaluated and corrective action will be based on the root cause analysis. Rework (if required) will be done from the point at which the problem occurred, as identified through the root cause analysis.

10.7.5 Additional Inspections

At the discretion of MES, additional inspections may be implemented on the same DFW. Such instances may be:

- Unsatisfactory work, as determined by MES.
- Change in key personnel or resumption of work after a substantial (2 weeks or more) period of inactivity.
- Changes to the project scope of work/specifications.

10.7.6 Geophysical Confirmation Remapping

After a UoP has successfully passed the six-step UoP certification process, it is then eligible for geophysical confirmation remapping and intrusive investigation of any targeted anomalies. This inspection is the digital geophysical remapping of grids (or portions of grids) within a UoP (or may include multiple UoPs). It is anticipated that selection of the areas to be geophysically remapped will be selected based on intrusive investigation results and target densities. The amount of area that is to be remapped is at the discretion of the project team, consisting of the JPA, MES and ADEM; however, the amount of area is anticipated to be elevated in the beginning of the project (upwards of 20-30% site wide) and is expected to decrease to approximately 10% as confidence in the “process” increases.

10.7.7 Safety Inspections

Both the SHSM and the contractor UXOSO will perform periodic safety inspections throughout the project. The inspections will evaluate site operations, which will be reported on the Daily Quality Control Report/Contractor Production Report.

The contractor UXOSO will be adequately experienced and trained to identify and correct any deficiencies in site operations. Any deficiency and correlating correction will be duly noted in the Daily Quality Control Report/Contractor Production Report. The information will include the area of deficiency, type of deficiency, corrective action to be taken or which has been taken, the

responsible party for corrective action, date of follow-up inspection(s), and signature of the investigating person(s).

All on-site inspections will be considered a matter of record for the project. The inspections will be filed in MES QC files, submitted in the specified reports and uploaded onto the project portal site. Summary tables will also be presented to facilitate contract reporting as required.

10.7.8 Surveillance of Contractor Activities

The Site Operations Manager will be responsible for oversight of all surveillance activities performed by contractors. Discrepancies associated with contractor work will be communicated to the contractor for resolution. The Site Operations Manager and his staff have the authority to act directly with contractor representatives on routine QC activities.

10.7.9 Quality Control Meetings

After the start of field work at McClellan, the UXOQCS will conduct QC meetings on a weekly basis with the Geophysical Contractor, ADEM, and the JPA. At a minimum, the following shall be accomplished at each meeting:

- A review of the minutes of the previous meeting.
- A review of the current schedule.
- Rework items identified since the last meeting.
- Rework items completed since the last meeting.
- A review of the status of submittals.
- A review of the work to be accomplished in the next two weeks and the documentation required.
- Site Resolution of any QC and production problems.
- Discussion of outstanding deficiencies and/or nonconformance issues.
- Changes in procedure.

QC meeting minutes will be forwarded to all appropriate parties within 2 days of the meeting. The minutes will document the parties present and their affiliations, the topics of discussion, action items identified and responsible party, as well as other QC-related issues.

10.8 Deficiency Management

MES and the Geophysics Contractor's Quality Improvement Process comprise the internal systems that evaluate the quality program's effectiveness in ensuring and continually improving the quality of work. The primary goal of the Quality Improvement Process and the QC program as defined in this document is to prevent deficiencies or nonconformances and facilitate continual process improvement. To the extent that the first of these goals is not achieved, identified deficiencies or nonconformances will be corrected in a timely and cost-effective manner and with the intent of preventing their recurrence. This includes provisions for preventing quality problems and facilitating process improvements as well as identifying, documenting, and tracking deficiencies until corrective actions have been verified.

10.8.1 Deficiencies and Nonconformance

The UXOQCS will be notified of all deficiencies and nonconformance conditions identified during the course of the field activities to ensure that each of these occurrences is documented, reported, and tracked, and that corrective actions are taken and follow-up verification is conducted.

The UXOQCS will include the identified deficiencies and nonconforming conditions in the DQCR noting the items found to be deficient or nonconforming; the date; time and location; the person

who identified the deficiency or nonconformance; and the status of the item to which the deficiency applies. If the deficiency has the potential to result in the need for rework or jeopardizes the quality of future work to the extent that rework may be required, the UXOQCS will stop work or recommend and implement immediate corrective action to address the deficiency.

When an item is identified as deficient or nonconforming, the UXOQCS will describe the item and/or condition in the DQCR, complete a deficiency notice (DN) or nonconformance report (NCR). The forms provide documentation on the status of the deficiency or nonconformance and include the documented history of the problem as corrective action proceeds. Copies of the DN and NCR forms are included in Appendix D, Forms. The UXOQCS will update the status of the deficiency when there is a change in status. Before the work activities of the day begin, the UXOQCS will note the deficiencies or nonconformances that require follow up verification that day. New or changed status will be entered into the DQCR at the end of each day. The DQCR will include a report on each nonconformance or deficiency that was completed and closed out for that day.

10.8.2 Root Cause Analysis

Both the DN and the NCR forms contain an area for the entry of information regarding the cause of the problem and the proposed resolution. The determination of the root cause of a deficiency or nonconformance is an integral part of the QC process. Root cause analysis will be made by the UXOQCS in conjunction with other appropriate site personnel such as the GeoQCS, the Site Operations Manager, and the Project Manager. Criteria considered in the analysis will include but not be limited to:

- Staff qualifications and training.
- Adequacy of procedures.
- Adequacy of equipment.
- Adequacy of QC measures.

Input will be obtained as necessary from field staff and technical advisors in order to identify the factors which led to the problem.

The root cause is always “upstream” from where the problem was detected. Two strategies that will be employed for determining the root cause of a deficiency or nonconformance for this project are: (a) tracing the problem back to the source, and (b) evaluation of the cause using basic questions such as who, what, when, where, why, and how. Why is probably the most beneficial question when attempting to arrive at a root cause. This question may need to be asked multiple times before the root cause is identified. For example, “*Why did A happen?*” Answer: “*Because of B.*” “*Why did B happen?*” Answer: “*Because of C.*” This process is carried on until the real cause is identified.

Root cause analysis is a process designed for use in investigating and categorizing the root causes of events with safety, quality, and production impacts. Root cause analysis is a tool designed to help identify not only what and how an event occurred, but also why it happened.

It is anticipated that the root cause analysis will be used to pinpoint exactly where the system failed. Work that has been conducted up to the point of system failure will be accepted, and once corrective actions have been taken, rework (if necessary) should only be redone from the point of system failure on.

10.8.3 Corrective Action

Following the root cause analysis, the UXOQCS will perform analysis of potential solutions (corrective actions) to determine which remedy is most effective in correcting the problem. This process will include all appropriate staff and will be documented via meeting notes and information listed in the proper sections on the DN or NCR. Potential remedies considered will include:

- Supplemental staff training.
- Changes of equipment or modification of equipment currently in use.
- Acquisition of supplemental equipment.
- Implementation of new procedures or modification of existing procedures.
- Changes in QC procedures.

Final approval of all remedies will be the responsibility of the MES PM and will be made with the concurrence of other stakeholders, as appropriate.

Successful implementation of corrective action will be documented by the UXOQCS in the appropriate areas of the DN or NCR. This documentation will be supported by changes to the inspection procedures or schedule as warranted (i.e., the UXOQCS will not certify that corrective action has been taken until inspection of the actions and the resulting changes in the program are complete).

All deficiencies and nonconformances must be corrected prior to the product being delivered to the customer. If the identified condition can be corrected quickly on the spot, if it is an isolated trivial issue, and a system is in place for preventing recurrence, the condition may be documented on the surveillance report as corrected on the spot without issuing a DN or NCR. For example, if while conducting review of UXO Intrusive forms it is determined that one form is missing the date, this is an isolated human error. The form can be corrected and the correction noted in the surveillance report. When the identified deficiency is determined to be other than trivial, or is not an isolated case, then the process must be carried further. If the deficiency is minor in nature and not problematic throughout the process, a DN will be issued. If the problem is such that overall quality of the product is affected and/or the problem is widespread, then an NCR will be issued. If the deficiency has the potential to result in a need for rework or jeopardizes the quality of future work to the extent that rework may be required, the UXOQCS will stop work or recommend and implement immediate corrective action to address the deficiency.

10.8.4 Completion of Inspection Punch List

Completion inspections conducted by the UXOQCS typically result in the development of a completion inspection “punch list” of items that do not conform to approved designs, plans, and specifications. During the course of each completion inspection the UXOQCS will document items of non-compliance in a punch list that will serve as input to the UXOQCS file for items requiring corrective action. The file will serve as the tracking system for the follow-up of open items and will identify when they are completed or closed out.

10.8.5 Notification

The MES Project Manager will be informed immediately of the identification and progress towards the resolution of deficiencies and nonconforming items and/or conditions. This is to be accomplished through the reporting requirements stated in implementing procedures and/or plans, through attendance at coordination meetings or direct contact.

10.8.6 Continual Improvement

Project staff at all levels will be encouraged to provide recommendations for improvements in established work processes and techniques. The intent will be to identify activities that are compliant but can be performed in a more efficient or cost-effective manner. Typical quality improvement recommendations include identifying an existing practice that should be improved (e.g., a bottleneck in production) and/or recommending an alternative practice that provides a benefit without compromising prescribed standards of quality. Project staff will bring their recommendations to the attention of project management or the QC staff through verbal or written means. However, deviations from established protocols will not be implemented without prior written approval by the Project Manager and concurrence of UXOQCS. Certain deviations may require ADEM approval. When a staff-initiated recommendation results in a tangible benefit to the project, public acknowledgement shall be given by the Project Manager and the staff personnel that initiated the recommendation. Field work variances will be noted on the Field Change Request Form (attached below).

10.9 Field Logbook

A field logbook will be assigned to personnel as required for documenting details of field activities during QC monitoring activities. The information in the log book is intended to serve as a memory aide in the preparation of the Daily Quality Control Report/Contractor Production Report and in addressing follow-up questions that may arise.

10.10 Quality Control Certification Statement

Each Daily QC and Contractor Production Report shall contain the following statement attested to by the QCM:

“I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by MES (and each contractor) and have determined that all materials, equipment, and workmanship are in strict conformance with the plans and specifications except as may be noted above.”

10.11 Quality Control Forms

The forms and checklists listed below are to be used at the discretion of the QC Staff and can be found in Appendix D:

- Work Plan Signoff Sheet.
- Geophysical Investigation QC Check Sheet.
- Intrusive Investigation QC Check Sheet.
- General QC Surveillance.
- DN Report.
- NCR.
- DN/NCR Log.
- Field Change Request Form.
- Field Change Request Log.
- Daily QC Report.

11.0 ENVIRONMENTAL PROTECTION PLAN

This Environmental Protection Plan has been developed to identify and protect sensitive cultural and natural resources that may be affected by MEC/UXO field activities at McClellan. This plan presents an initial assessment of governing agencies and identifies cultural and biological resources identified in literature pertaining to McClellan. Possible mitigation measures that can be used to avoid or lessen the impacts from geophysical and MEC intrusive investigation activities are also identified.

11.1 Assessment

The Army is responsible for reviewing plans and reports to ensure consistency with the Environmental Services Cooperative Agreement, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), National Oil and Hazardous Substance Pollution Contingency Plan (NCP), and DDESB requirements, and other applicable laws and/or regulations. ADEM is the governing authority and the environmental regulations through which ADEM governs apply to this work. The work being conducted at McClellan and covered by this work plan does not fall under the purview of the EPA.

11.2 Environmental Issues and Concerns

McClellan and the nearby Pelham Range have been investigated for cultural and natural resources in the recent past. An environmental baseline study (EBS) was prepared by Environmental Science and Engineering in 1998 which addresses these resources. Wetlands, endangered species foraging habitat, mountain longleaf pine areas, sensitive plants and animals have been identified to occur at McClellan and cultural resources may be encountered according to the EBS. Table 11-1 shows the environmental concerns for the Alpha and Bravo MRAs along with those that occur in the individual MRSs. Figure 11-1 in Appendix A shows the entire MRA areas, MRSs, and the large-scale environmental concerns.

In addition to the environmental concerns on natural and cultural resources are the land use controls (LUCs) in place at McClellan as mandated by the Land Use Control Implementation Plans (LUCIPs) found in Attachment 3 of the Findings Of Suitability for Early Transfer (FOSET) dated September 2003. The LUCIPs outline the environmental conditions which may pose hazards to human health and provide the means of controlling access to or modifying real property accordingly. The LUCIPs place restrictions on the use of groundwater and public access to specific parcels at McClellan based on past land use and/or environmental conditions in each parcel from both a MEC and hazardous, toxic and radioactive waste (HTRW) basis.

Table 11-1. Environmental Concerns

Environmental Concern	Alpha MRA	Bravo MRA
Archeological Sites	none	4
Northern Alpha MRS	none	
Southern Alpha MRS	01CA0114*	
Bain's Gap Road / MRS -1		01CA0618*, 01CA0619*
MRS-2		01CA156
MRS-11		01CA565*, 01CA0157, 01CA0588, 01CA0129
Historic Buildings/Districts	none	none
Cemeteries	1	none
Endangered Species	Gray Bat foraging habitat	Gray Bat foraging habitat
Northern Alpha MRS	none	
Southern Alpha MRS	yes	
Bain's Gap Road / MRS-1		yes
MRS-2		yes
MRS-11		yes

Environmental Concern	Alpha MRA	Bravo MRA
SINAs Northern Alpha MRS Southern Alpha MRS Bain's Gap Road / MRS-1 MRS-2 MRS-11	MLP Community significant component MLP significant component MLP	MLP Community South Branch Cane Creek significant individuals/patches MLP significant individuals/patches MLP significant individuals/patches MLP
Wetlands Northern Alpha MRS Southern Alpha MRS Bain's Gap Road / MRS-1 MRS-2 MRS-11	yes none none	yes none none yes
MBTA (migratory bird treaty act)	yes	yes
Groundwater Monitoring Wells Northern Alpha MRS Southern Alpha MRS Bain's Gap Road / MRS-1 MRS-2 MRS-11	yes none yes	yes yes yes yes
Fill Areas Northern Alpha MRS Southern Alpha MRS Bain's Gap Road / MRS-1 MRS-2 MRS-11	230(7), 126(7), part of 227(7) none none	none none none none

Note: Information presented on this table is included in this table is referenced from the September 2003 FOSET and attached deed notices.

Note: As new MRS are added to the program, this table will be updated accordingly.

* These sites were officially removed from potential listing with the National Historic Register due to MEC hazards posed to future investigations.

11.2.1 Cultural Resources

11.2.1.1 Reasons for Mitigating Actions

Numerous laws and regulations require Federal agencies to consider the effects of a proposed undertaking on cultural resources. While the JPA is not a Federal agency, compliance with these laws and regulations is required in order to comply with the Notice of Archeological Property and Preservation Covenant included in the transfer deed. The archeological property is subject to applicable provisions of a Programmatic Agreement signed by the Army and the State Historic Preservation Office (SHPO) (included as Exhibit H-2 of the deed) and under these provisions the SHPO must be notified in writing prior to the disturbance of archeological sites. The primary law governing cultural resources is the National Historic Preservation Act (NHPA) (Public Law 93-91), which addresses protection of historic and cultural resources. Section 106 of the NHPA requires each agency to consider the effects of its actions on historic properties. The agency must initiate the 106 process by defining the undertaking and identifying the appropriate SHPO/Tribal Historic Preservation Officer (THPO) and other consulting parties, such as Indian tribes, local governments, permit or license applicants, and concerned members of the general public. The agency must also identify any historic properties that might be affected by the undertaking, and assess the significance of the property being affected (i.e., its inclusion or eligibility for inclusion in the National Register). The type and degree of adverse effect(s) must be assessed, and steps must be taken, in consultation with the SHPO/THPO, to avoid, minimize, or mitigate adverse affects.

McClellan contains many culturally significant resources due to age and large areal extent. Several archaeological and historic surveys have been completed by various entities, including the University of Alabama in Birmingham, Jacksonville State Archaeological Resource Laboratory, Jacksonville State University, Fort McClellan Directorate of Environment (DOE) personnel, Alabama SHPO, Auburn University, and New South Associates, Inc. (NSA). Approximately half of the Main Post area has been surveyed. The surveys address both prehistoric and historic resources, as discussed in the following paragraphs.

11.2.1.2 Historic Sites

Prehistoric occupation of McClellan by humans has been confirmed by archeological studies conducted in northeast Alabama. Chronological periods of prehistoric presence by humans have been established for this area based on unique cultural traditions and date back as far as the Paleo-Indian Period, approximately 12,000 years before present (BP). Subsequent periods following the Paleo-Indian Period are the Archaic Period, the Woodland Period, the Mississippian Period, and Early Historic Indian Period. Occupation during the Paleo-Indian Period is marked by distinct projectile point forms used to hunt now extinct megafauna.

The Archaic Period extended from approximately 10,000 to 3,000 years BP and is significant for the gradual change from a migratory existence to a sedentary lifestyle. A total of seven Archaic Period sites have been identified on the Main Post (FTMC CRO, 1992). The Woodland Period extended from approximately 2,300 to 900 years BP and is significant for the use of ceramics and the inclusion of ritual and mortuary practices. Three Woodland Period sites have been found on the Main Post.

The Mississippi Period extended approximately from 900 to 300 BP and is distinguished by the evolution of chiefdoms, villages, and ceremonial practices. A total of two Mississippi Period sites have been found at the Main Post. The early Historic Indian Period extended from the late 1600s to the mid 1800s. During this period, the Mississippian chiefdom system was discontinued as contact with European explorers and settlers increased. The native inhabitants who remained eventually became known as the Creek Indians. The Creek Indians inhabited the area until the mid-1800s when the US Government resettlement program moved the Creeks to reservations.

There are 8 archeological sites (1 in Alpha, 7 in Bravo) located in the 2 MRAs. These sites are protected under a deed notice and covenant. Site 01CA0114 is located in the Southern Alpha MRS, sites 01CA0618 and 01CA0619 in the Bain's Gap Road / MRS-1, and site 01CA565 is located in MRS-11. It was determined through consultation with the Alabama Historic Commission that these sites could not be preserved for future archaeological investigation due to potential MEC hazards. Therefore, these four sites were officially removed from potential listing with the National Historic Register and MEC remediation will be completed in each of the areas. Site 01CA156 is located in MRS-2 along Iron Mountain Road. Sites 01CA0157, 01CA0588 and 01CA0129 are all located within MRS-11. With the delisting of four sites in the Bravo MRA, the total number of archeology sites is four.

There are no architecturally significant resources in the 2 MRAs. NSA completed a comprehensive architectural survey in 1993 with the objective of identifying and evaluating all structures greater than 50 years in age (pre-1941). A total of 123 structures built prior to 1941 were identified. These results are represented in the report, *The Military Showplace of the South, Fort McClellan, Alabama: A Historic Building Inventory*, published in 1993 by NSA.

There is a historic district and buildings identified in the Cold War Study (NSA, 2000). The study identified the Chemical Decontamination Training Facility (CDTF) as meeting the criteria of

exceptional significance and listed buildings 4479, 4482, 4483, and 4484 as contributing elements to the district. The area is now known as COBRA.

Three historic building districts were identified on the Main Post: the Post Headquarters Area, the Industrial Area, and the Ammunition Magazine Area (NSA, 1994). Within these three districts, a total of 89 of the 123 pre-1941 buildings have been determined to be eligible for nomination to the National Registry of Historic Places (NRHP) (NSA, 1994).

There were 4 cemeteries identified on Main Post. Some of these cemeteries are marked; others are not. A WWII German/Italian prisoner of war cemetery also exists on the Main Post (ESE, 1998) and is eligible for nomination to the NRHP (NSA, 2000). None of these cemeteries are within MRS boundaries, however, field teams will be made aware that unmarked cemeteries may exist.

11.2.2 Biological Resources

Biological resources include the native and introduced plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife and special interest species and habitats.

11.2.2.1 Reasons for Mitigating Actions

Section 9 of the Endangered Species Act (ESA) prohibits the taking of listed species without an incidental take permit. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Under the terms of Section 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act, provided that such taking is in compliance with the incidental take statement. Although direct take is not expected, alteration of foraging habitat is expected to be unavoidable, but could be minimized.

Section 2 of the Migratory Bird Treaty Act (MBTA) prohibits, at any time, by any means, or in any manner, pursuit, hunting, taking, capturing, killing, or any attempt to take, capture, or kill migratory birds protected by the MBTA, except as exempted by Federal and state regulations. Until recently, only regulatory agencies had promoted project compliance with the MBTA. Compliance with the MBTA is currently under greater scrutiny, as recent circuit court decisions have upheld private interest group claims of MBTA violations by project proponents in Texas and other states. The proposed project could have impacts on birds protected by the MBTA.

11.2.2.2 Vegetation

Forest and grassland habitats dominate the vegetative communities. Forests cover approximately 14,000 acres on the Main Post (USATHAMA, 1977). The most common tree species found on the installation are pine, oak, hickory, sweet gum, yellow poplar, maple, elm, and black walnut. Of special interest is the Mountain Long Leaf Pine tree which is considered a rare species of pine in the area.

Grasslands, both natural and man-made, cover approximately 4,732 acres. Man-made grasslands are used for a wide range of activities such as parade grounds, golf courses, tank battle drill areas, and firing ranges.

11.2.2.3 Wildlife

The natural fauna present at any time on the installation depends on seasonal variations and the type of vegetation growing. Approximately 35 species of mammals and 240 species of birds

have been reported to be residing within the installation's habitat. The predominant mammals found are the white-tailed deer, cottontail and swamp rabbits, gray squirrel, raccoon, opossum, fox, and beaver (USATHAMA, 1977; Weston, 1990). The bird species population includes wood duck, quail, and turkey. As reported by Fort McClellan DOE personnel, no endangered bird species are currently nesting within the installation's habitat (Garland, 1995). The creeks, springs, and ponds located on the installation also support fish populations that include bluegill, crappie, bream, bass, catfish, and trout (USATHAMA, 1977).

11.2.2.4 Special Species and Habitats

In accordance with the ESA of 1973, the regulations of the USFWS, and the Army Regulation AR 200-3, Fort McClellan formerly-operated under the guidelines of the 1995 Endangered Species Management Plan (ESMP) for Fort McClellan. The overall objectives of the ESMP were to sustain the existing habitat that supports populations of species identified in the ESMP and promote the augmentation of these species into unoccupied land that has similar habitats.

11.2.2.4.1 Special Interest Natural Areas

The ESMP identifies 11 Special Interest Natural Areas (SINAs) at McClellan. SINAs are locations where the habitat fosters one or more rare, threatened, or endangered species. Because these species are sensitive to environmental degradation, SINAs require management practices that promote the continued well being of these ecosystems. The 11 SINAs found at McClellan are:

- Mountain Longleaf Community Complex (portions in Alpha and Bravo MRAs).
- Cave Creek Seep.
- Moorman Hill Mountain Juniper.
- Frederick Hill Aster Site.
- Bains Gap Seep.
- Marcheta Hill Crow Poison Seep.
- Marcheta Hill Orchid Seep.
- South Branch Cane Seep (portions in Bravo MRA).
- Stanley Hill Chestnut Oak Forest.
- Reynolds Hill Turkey Oak.
- Davis Hill Honeysuckle.

11.2.2.4.2 Rare Species

Rare species deserving unofficial protection and management measures in the State of Alabama are inventoried and ranked by the Alabama Natural Heritage Program. Table 11-2 lists the 31 species considered rare and inhabiting certain areas of McClellan's Main Post (ESMP, 1995). Table 11-3 lists candidate species recorded on McClellan's Main Post. The sensitivity of these rare species to environmental degradation is used to gauge the well being of the habitat as a whole.

Table 11-2. Rare and Uncommon Species Recorded

Common Name	Latin Name
Mammals Appalachian Cottontail	Sylvilagus obscurus
Mollusks Coldwater Elimia	Elimia gerhardti
Insects Diana	Speyeria diana

Caddisfly	Cheumatopsyche harwoodi
Caddisfly	Heteroplectron americanum
Caddisfly	<i>Hydroptila consimilis</i>
Caddisfly	<i>H. setigera</i>
Caddisfly	<i>H. Talladega</i>
Caddisfly	<i>Ironoquia punctatissima</i>
Caddisfly	<i>Molanna blenda</i>
Caddisfly	<i>Ochrotrichia confusa</i>
Carlson's Polycentropus Caddisfly	<i>Polycentropus carlsoni</i>
Caddisfly	<i>Psiloltreta frontalis</i>
Caddisfly	<i>Pycnopsyche gentilis</i>
Caddisfly	<i>P. lepida</i>
Caddisfly	<i>P. luculenta</i>
Caddisfly	<i>Rhyacophila glaberrima</i>
Caddisfly	<i>R. nigrita</i>
Caddisfly	<i>R. torva</i>
Cold Spring Triaenodes Caddisfly	<i>Triaenodes taenia</i>
Plants	
Sky-blue Aster	<i>Aster azureus</i>
Pink Lady's Slipper	<i>Cypripedium acaule</i>
Pale Coneflower	<i>Echinacea pallida</i>
Eastern Purple Coneflower	<i>E. purpurea</i>
Soapwort Gentian	<i>Gentiana saponaria</i>
Ground Juniper	<i>Juniperus communis</i>
Yellow Honeysuckle	<i>Lonicera flava</i>
Fraser's Loosestrife	<i>Lysimachia fraseri</i>
White Fringeless Orchid	<i>Platanthera integrilabia</i>
Rose Pink	<i>Sabatia capitata</i>
Crow-poison	<i>Zigadenus leimanthoides</i>

Table 11-3. Candidate Species

Latin Name	Common Name	Special Interest Natural Area (SINA)
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	Mountain Longleaf Community Complex
<i>Elimia gerhardti</i>	Coldwater Elimia	Cane Creek Corridor
<i>Speyeria diana</i>	Diana	Marcheta Hill Orchid Seep
<i>Polycentropus carlsoni</i>	Carlson's Caddisfly	Bains Gap Seep Cave Creek Seep
<i>Lysimachia fraseri</i>	Fraser's Loosestrife	Bains Gap Seep
<i>Platanthera integrilabia</i>	White Fringeless Orchid	Marcheta Hill Orchid Seep Cave Creek Seep

11.2.2.4.3 Threatened and Endangered Species

The ESMP has identified two endangered species and two threatened species that are recognized under Federal regulations. The ESMP also identifies one additional endangered species that has the potential to inhabit the site. The ESMP differentiates endangered and threatened species for both Pelham Range (formerly part of Fort McClellan) and McClellan's Main Post area. Since both MRAs are located within the Main Post area, those specific species will only be discussed. The endangered species which have been found at McClellan's Main Post are (ESMP, 1995):

- The gray bat (*Myotis grisescens*).
- The red-cockaded woodpecker (*Picoides borealis*).

The gray bat is the only endangered species of concern in the 2 MRAs. Four gray bat foraging areas exist on the property within the Alpha and Bravo MRAs. The red-cockaded woodpecker (*Picoides borealis*), has not been observed on site since the 1970s in the Mountain Longleaf Community Complex SINA; however, the potential exists for its return because it is known to inhabit the adjacent Talladega National Forest. McClellan's Main Post has no listed threatened species on site.

11.2.3 Water Resources

Numerous creeks, streams, and ponds are found at McClellan. Shallow ground water is not expected at the site except in the vicinity of creeks and drainages. Drinking water is provided by Anniston's Water Works and Sewer Board.

11.2.3.1 Wetlands

The wetland habitats found within the installation's boundaries are generally located in various topographical depressions and along creek flood plains (Weston, 1990). The indicator plant species that assist in defining a wetland include water oaks, sweet gum, bulrush, needlerush, and cattail. There are an abundance of wetlands representing important habitats for a wide variety of plants and animals found at McClellan. Wetlands are generally found in the valleys along creek flood plains, near stream seepages, and in depressions (SAIC, 1993). Wetland communities include the Marcheta Hill Orchid Seep, Cane Creek Seep, South Branch Cane Creek, and 200 acres west of the airstrip that comprises the tributary to Victoria Creek (ESMP, 1995; ACOE, 1994). Additionally, wetland habitat potentially exists at or around the installation's lakes, namely Lake Reilly, Lake Conteras, Lake Yahou, and Lake Willet, and along the nearly 10 miles of creeks, namely Cane and Cave Creeks (USATHAMA, 1977; Weston, 1990).

11.2.3.2 Coastal Zones

There are no coastal zones with McClellan.

11.3 Potential Impacts of Field Activities

The nature of field work planned may affect sensitive cultural and biological resources if they exist in and around MRSs. Paragraph 11.4 addresses minimization of these impacts while this section lists the impacts. The activities planned involve brush clearance, intrusive operations such as hand digging, and potentially the use of heavy equipment. Specific impacts to resources are discussed in the following sections.

11.3.1 Cultural Resources

Detonations have the potential to affect cultural resources if they are present within the project area. A detonation close to a potential cultural resource could diminish the integrity of, or completely destroy, that resource. Additional activities during the site investigation such as vehicular traffic and heavy equipment work can affect cultural resources. Therefore, the application of mitigation measures is required to reduce potential impacts if resources exist near an MRS. Impact minimization measures for the protection of cultural resources are discussed below.

11.3.2 Biological Resources

Brush clearance to facilitate geophysical and intrusive clearance work will effect vegetation at each MRS. Detonations could also affect vegetation in the immediate area. Small areas (2- to 4-ft diameter and 1- to 2-ft deep craters) would be disturbed but would most likely re-grow naturally. The noise associated with field crews and detonations could disrupt wildlife on the site. Noise and ground disturbance from a blast has the potential to scare wildlife in the area,

causing them to move away. The disturbance should cause only a temporary shift in their activities.

Disruption of mobile species and foraging habitat for raptors could occur. Temporary ground disturbance could destroy animal burrows and cause individual mortality of less mobile species such as nesting birds, small mammals, and reptiles. Impact minimization measures for biological resources are discussed below.

11.3.3 Potential Effects on Sensitive Habitats

Sensitive habitats exist within the footprint of the removal actions. Ingress and egress routes to work areas will be planned such that they do not impact wetland areas or identified SINAs.

11.4 Impact Minimization Measures

The procedures outlined in this section will be implemented by MES personnel to minimize negative environmental effects of the removal action.

11.4.1 Cultural Resources

Historic properties will be avoided to the extent possible during field activities. The boundaries of archaeology site 01CA156 are within the footprint of MRS-2. This site has been delineated and demarcated so as to avoid any potential impact. Site damage by vehicular traffic will be avoided by utilization of roadways on site. Sites unexpectedly discovered during fieldwork will require identification and evaluation, and a determination of effect will be developed before appropriate mitigation measures can be finalized.

11.4.2 Worker Education Briefing

Prior to commencement of field activities, all on-site personnel will be briefed on health and safety issues, and on the cultural resources of the area. Methods for minimizing potential impacts on historic properties will form an integral part of the on-site training.

11.4.3 Treatment of Unanticipated Finds

Every effort will be made to identify historic properties within the project area. However, the potential for unexpected cultural remains to be encountered always exists. In the event that prehistoric or historic archaeological resources or traditional resources are encountered (particularly human remains), the location will be noted in the field log and recorded using a GPS unit (if possible). A professional archaeologist will be consulted. Subsequent activities will be coordinated with appropriate State of Alabama historical preservation personnel.

11.4.4 Biological Resources

A number of measures that vary in effectiveness and cost are available to mitigate impacts to biological resources. These range from avoidance to on-site monitoring and species removal or protection as discussed in the following paragraphs.

11.4.5 Worker Education Briefing

Prior to commencing field activities, all on-site personnel will be briefed on health and safety issues and the ecology of sensitive species in the area. Methods for minimizing potential impacts to these species will form an integral part of the on-site training.

11.4.6 Mitigation by Avoidance

Incorporated into the field activities will be sensitive-area and sensitive-species mitigation by avoidance. In order to avoid adverse effect to any federally-listed threatened or endangered species and their habitat, site orientation training will include awareness training to the species listed at McClellan. Should one of these species be identified, avoidance measures will be

taken and a USFWS-approved biologist or biological monitor will be consulted to plan subsequent steps to avoid disturbing listed species and their habitat. This measure would ensure that the effect on listed species would be minimized.

11.4.7 Minimize Vegetation Impacts

Brush clearance (grubbing) will be conducted in association with the geophysical work at the site. Trees smaller than 3 inches in diameter will be cut within the footprint of MRSs. Mountain Longleaf Pine trees will not be cut if at all possible and site work methods may be modified to accommodate this tree. MES QA personnel will be responsible for approving the removal of Mountain Longleaf Pines.

Tree canopy along creeks will be maintained wherever possible to protect foraging areas used by the endangered gray bat.

11.4.8 Dust Suppression and Emission Control

Dust suppression and emission control activities are not anticipated for this work.

11.4.9 Spill Control and Prevention

Chemicals are not anticipated to be used on this project. Fuel for equipment will be stored in approved containers and filling operations will be conducted off-site whenever possible.

11.4.10 Post-activity Cleanup

Post-activity cleanup will be accomplished on a daily basis as field crews collect solid waste associated with lunch breaks and other daily breaks and remove them from the site. Solid waste will be disposed of in an approved off-site location.

11.4.11 Site Restoration/Compensation

Site restoration is not being conducted at McClellan due to subsequent redevelopment plans.

12.0 INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) in the form of MEC scrap and non-MEC scrap will be generated during this remediation. Handling of this IDW is discussed in Section 2.5.5.1.

**13.0 INTERIM HOLDING FACILITY SITING PLAN
NOT REQUIRED**

14.0 RECOVERED CHEMICAL WARFARE MATERIALS PLAN

Recovered chemical warfare materiel (RCWM) was encountered during MEC remediation in Southern Alpha. Two intact bottles one with “H” etching later confirmed as sulfur mustard fill, and one with “DM” etching later confirmed as adamsite fill from a Chemical Agent Identification Set (CAIS) were recovered during intrusive operations. These items were all destroyed by the Army. A mustard vial was also found in the T-38 area of the Alpha MRA, this site has been designated as no further action with respect to MEC remediation. Additionally, a Livens smoke round was found in the Southern Alpha MRS and Livens rounds have been used for CWM in the past. If suspected RCWM is encountered during any phase of work, MES will immediately cease all operations, withdraw upwind from the work area, and notify the USACE Transition Force. If the USACE Transition Force is not onsite, it is the responsibility of MES to contact local law enforcement so that they may contact the EOD unit assigned to the area for response, the 723rd EOD Company stationed at Fort Gillem, Georgia. If the local EOD response unit determines that the item is RCWM, they will notify the 20th Support Command and 22nd Chemical Battalion Technical Escort Unit (TEU) through official Department of the Army channels. MES will maintain a security watch over the suspect item until relieved by competent authority. Once the RCWM item is eliminated, and the site stabilized, MES will direct the MEC removal operation, suspend operations until further notice, or begin demobilization.

15.0 REFERENCES

- Alcohol, Tobacco, and Firearms (ATF), 2006. User of High Explosives License; License number 9-CA-081-33-6C-00464
- 27 Code of Federal Regulations (CFR) Part 55, Alcohol, Tobacco Products and Firearms. Commerce in Explosives
- 29 CFR 1910 Occupational Health and Safety Standards
- 29 CFR 1910.120. Hazardous Waste Operations and Emergency Response
- 29 CFR 1926. Safety and Health Regulations for Construction
- 40 CFR, Protection of Environment, 1986. Parts 260-299, Hazardous Waste Management System
- 49 CFR Parts 100 to 199, Transportation. Research And Special Programs Administration, Department Of Transportation
- Army Regulation (AR) 385-10, 2000. Army Safety Program
- AR 385-16, 2001. System Safety Engineering and Management
- AR 385-64, 2000. US Army Explosives Safety Program
- AR 200-1, 1990. Environmental Protection and Enhancement
- ATF 5400.7, 2003. Alcohol Tobacco and Firearms Explosives Laws and Regulations
- Department of Defense (DoD) 4145.26-M, 1997. Contractor's Safety Manual for Ammunition and Explosives
- Department of the Army (DA) Pamphlet (PAM) 385-64, 1999. Ammunition and Explosives Safety Standards
- DoD 4160.21-M, 1997. Defense Materiel Disposition Manual DoD 6055.9-STD, 1997. Ammunition and Explosives Safety Standards
- DoD Explosives Safety Board (DDESB) Technical Paper 16, 1 December 2003. Methodologies For Calculating Primary Fragment Characteristics
- Environmental Chemical Corporation, 2006a. Final Conventional Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, Alabama
- Environmental Chemical Corporation, 2006b. Amendment 1 to Conventional Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, Alabama
- Environmental Science and Engineering, January 1998. Environmental Baseline Survey
- EPA, DoD, DOE, Intergovernmental Data Quality Task Force, 2005. Uniform Federal Policy for Implementing Environmental Quality Systems, Evaluating, Assessing, and Documenting Environmental Data Collection/Use and Technology Programs
- International Fire Code (IFC), Chapter 33, 2003. Explosives and Fireworks, as adopted by the City of Anniston
- Matrix Environmental Services, LLC., 2004. Site-Wide Digital Geophysical Mapping Quality Assurance Plan, McClellan, Anniston, Alabama

Matrix Environmental Services, LLC., 2005. Final Engineering Evaluation and Cost Analysis (EE/CA) Action Memorandum Alpha Area Munitions and Explosives of Concern, McClellan, Anniston, Alabama

Matrix Environmental Services, LLC., 2006. Draft Final Engineering Evaluation and Cost Analysis (EE/CA) Action Memorandum Bravo Munitions Response Site MRS-1 and Industrial Access Road, McClellan, Anniston, Alabama

Matrix Environmental Services, LLC., 2007a. Final Engineering Evaluation and Cost Analysis (EE/CA) Action Memorandum Bravo Munitions Response Site MRS-2, McClellan, Anniston, Alabama

Matrix Environmental Services, LLC., 2007b. Amendment 2 to Conventional Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, Alabama

MIL-STD-1916, 1996. DoD Preferred Methods for Acceptance of Product

National Historic Preservation Act (NHPA) (Public Law 93-91)

National Security Agency (NSA), 1993. The Military Showplace of the South, Fort McClellan, Alabama: A Historic Building Inventory

SDSFIE, 2003. GIS Technology Center Spatial Data Standards for Facilities, Infrastructure and Environment

Tetra Tech Foster Wheeler, Inc., 2003. Final Engineering Evaluation/Cost Analysis Alpha Area of the Redevelopment Fort McClellan, Alabama

Tetra Tech Foster Wheeler, Inc., 2004. Draft Engineering Evaluation/Cost Analysis Bravo Area of the Redevelopment Fort McClellan, Alabama

Tetra Tech Foster Wheeler, Inc., 2004. Draft-Final Site Specific Final Report Eastern Bypass "Y" Area Junction Fort McClellan, Alabama

Tetra Tech Foster Wheeler, Inc., 2004. Site-Specific Work Plan OE Site Characterization For M1.01 Parcel and M3 Miscellaneous Properties On Fort McClellan, Alabama

USACE Archives Search Report (ASR) FORT McCLELLAN ANNISTON, CALHOUN COUNTY ALABAMA, 1999a. Findings

USACE ASR FORT McCLELLAN ANNISTON, CALHOUN COUNTY ALABAMA, 1999b. Conclusions and Recommendations

USACE Data Item Description (DID) MR-005-04, 2003. Explosives Siting Plan

USACE DID MR-005-05, 2003. Geophysical Investigation Plan

USACE DID MR-005-05, Attachment C, 2003. Geophysical Anomaly Dig Sheet and Target History

USACE DID OE-025.01, 2002. Personnel Work Standards

USACE EM 385-1-1, 2003. Safety - Safety and Health Requirements

USACE EP 385-1-95a, 2004. Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations

USACE EP 385-1-95a, 29 June 2001. Basic Safety Concepts and Considerations for OE Operations

USACE HNC-ED-CS-5-98-7, 1998. Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

USACE HNC-ED-CS-S-00-3, 2000. Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

USACE HNC-ED-CS-S-98-8, 2003. Miniature Open Front Barricade

USACE Ordnance and Explosives Directorate publication, 2000. Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites

USACE Technical Manual (TM) 60, Year. Series Publications as applicable

USACE TM 60A-1-1-31, 1997. EOD Disposal Procedures

USACE TM 9-1300-200, 1969. Ammunition General

USACE TM 9-1300-214, 1990. Military Explosives

USAESCH ER 385-1-92, 2003. Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities

Appendix A
Figures

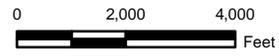
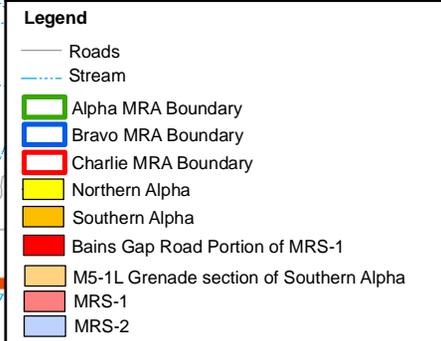
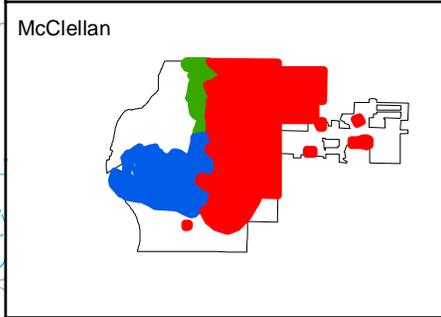
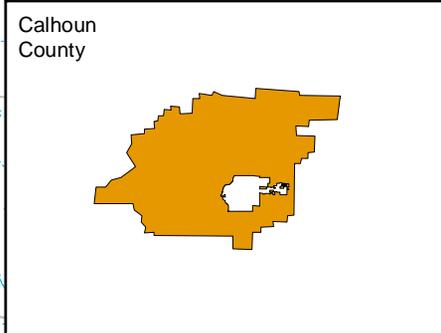
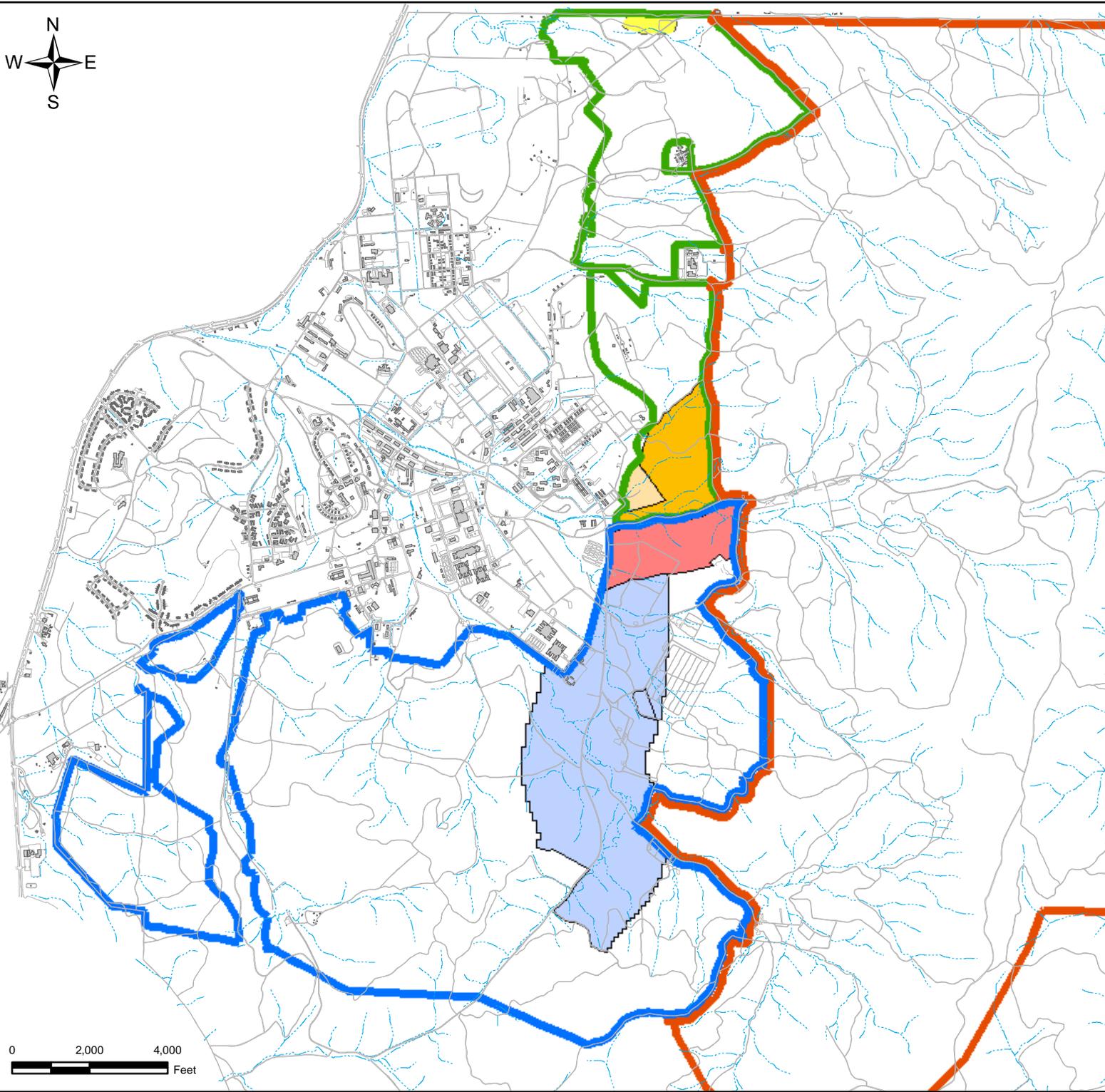
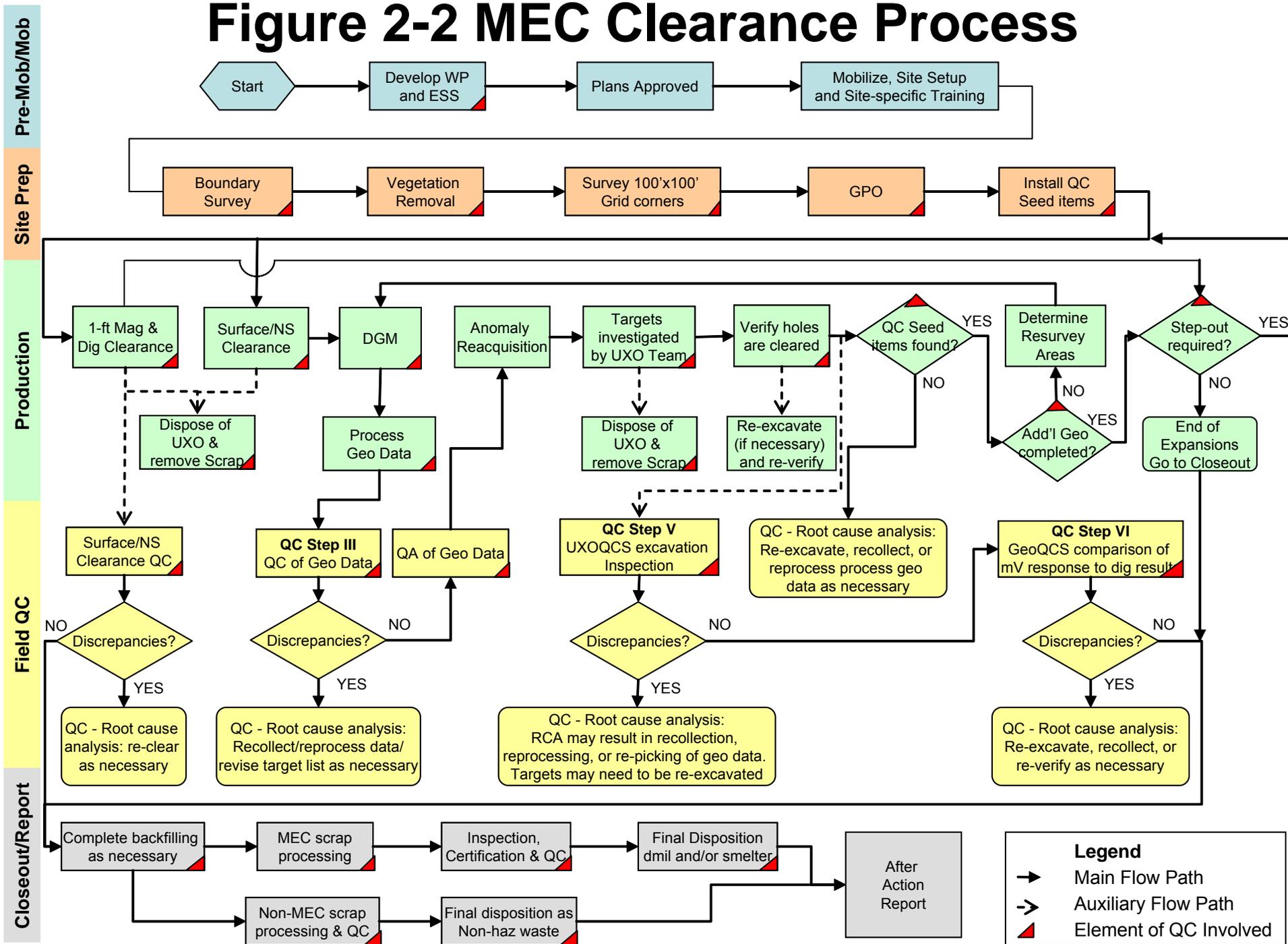


FIGURE 1-1
Site Locations

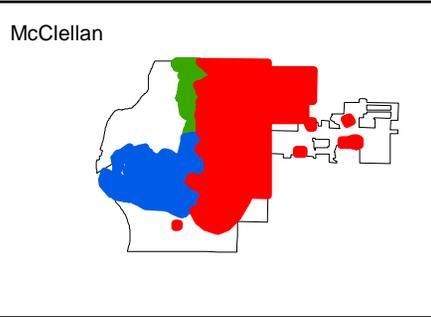
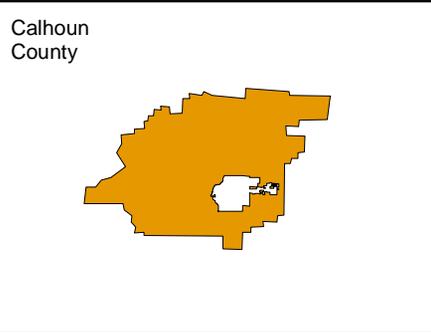
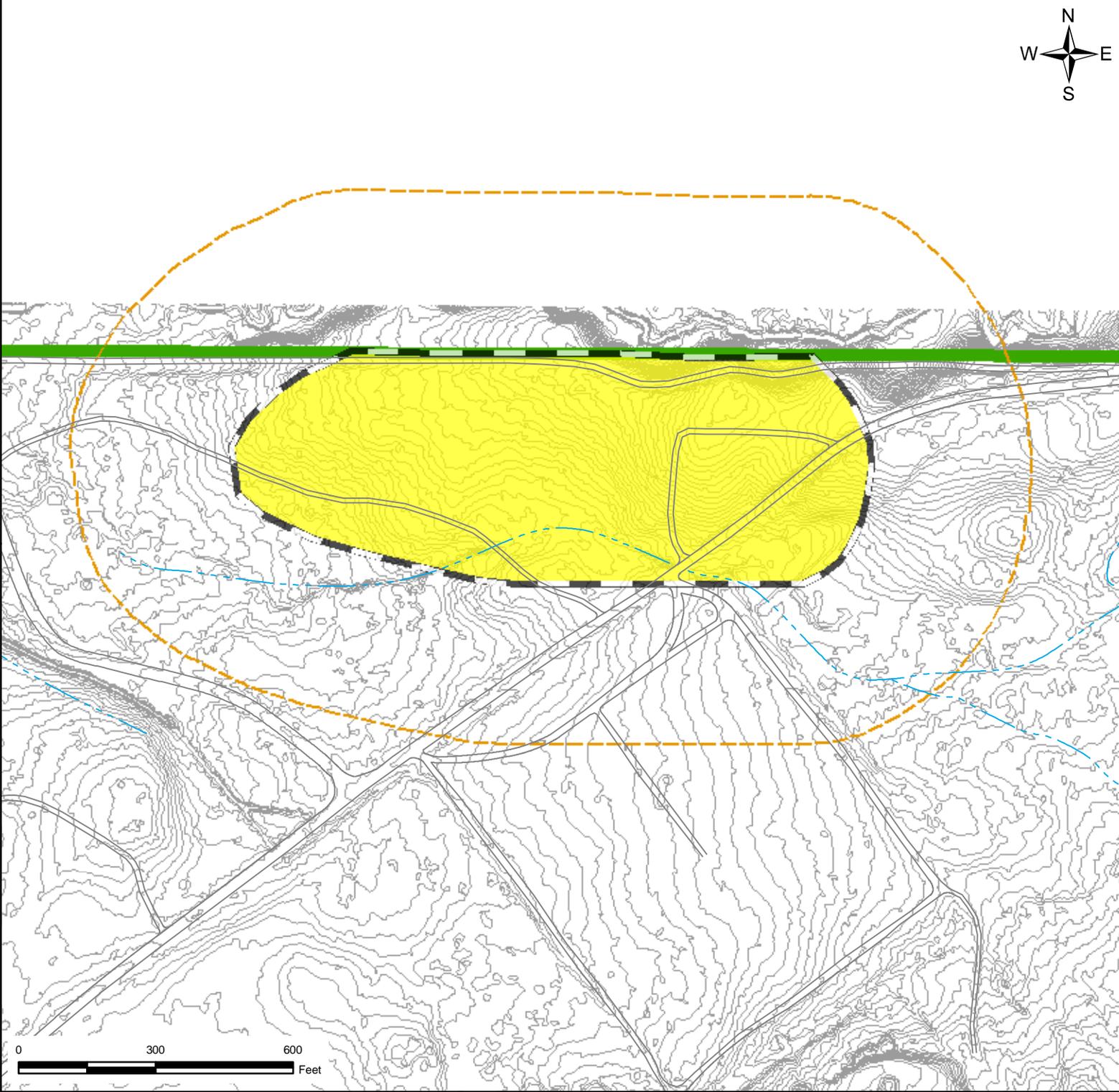
McClellan
Munitions Response Site
Anniston, Alabama

FILE: \\hemera\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Workplan\Figure1-1.mxd, 8/22/2007, jeff_cobins

Figure 2-2 MEC Clearance Process

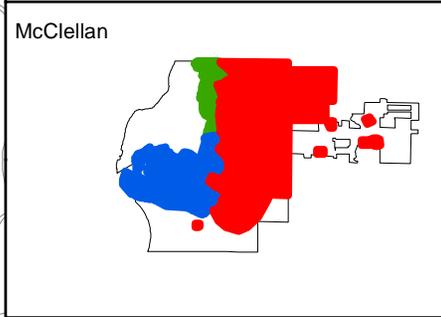
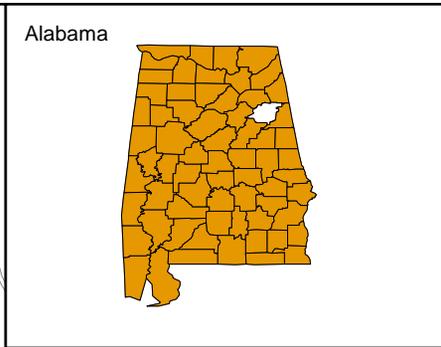
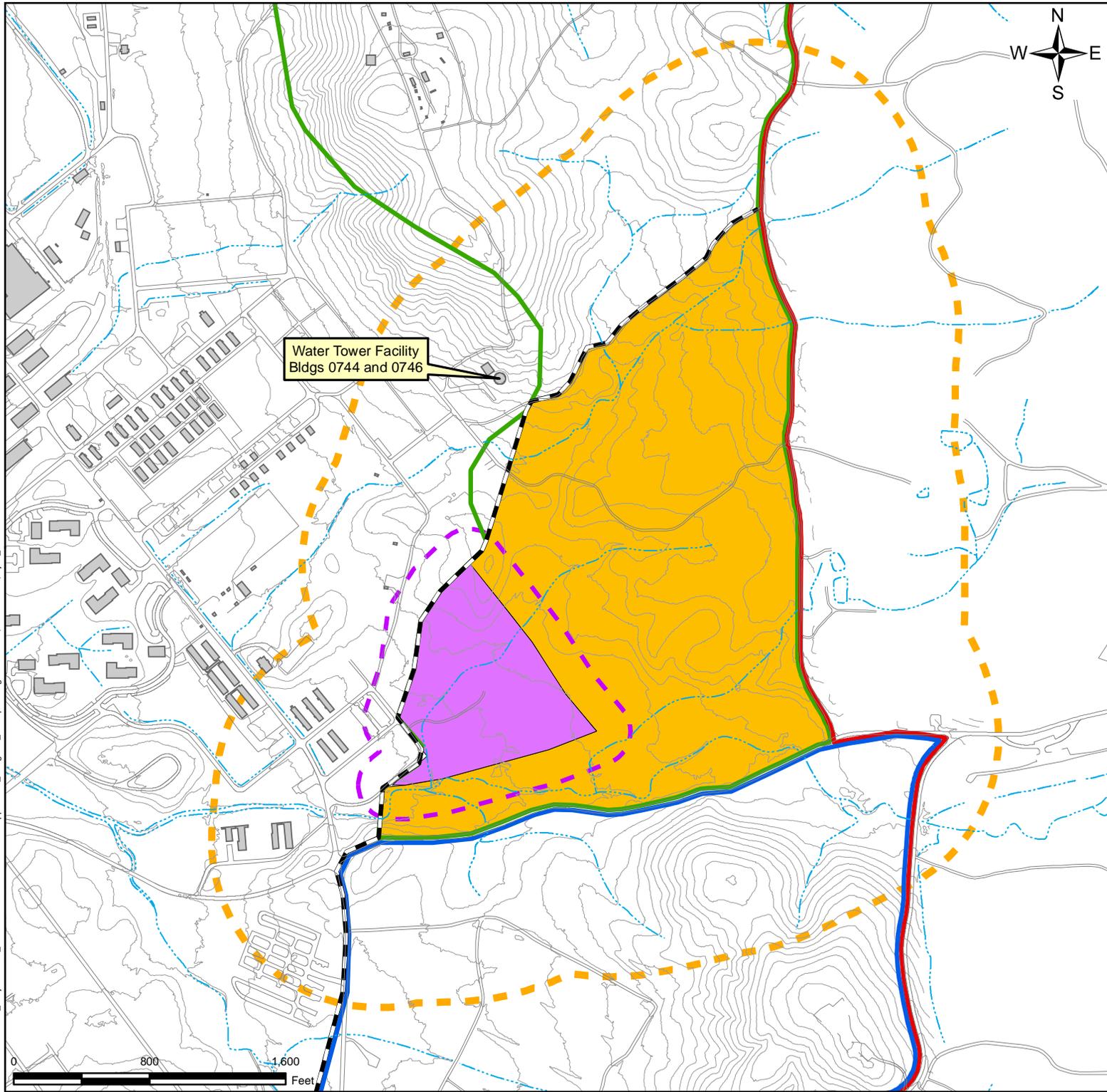


FILE: \\Hemera\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Work\Map\Figure2-3.mxd, 8/22/2007, jeff_clonts



**FIGURE 2-3
NORTHERN ALPHA MRS**

McClellan
Munitions Response Site
Anniston, Alabama



Legend

- Roads
- - - Stream
- Buildings
- Contour (10 ft)
- Alpha MRS
- Bravo MRS
- Charlie MRS

MRS

- Southern Alpha
- Southern Alpha (M5-1L South)

Corresponding Exclusion Zone

- - - 37mm HE = 980 ft
- - - Practice Grenade
- - - M2 = 200 ft

**FIGURE 2-4
SOUTHERN ALPHA
MRS**

McClellan
Munitions Response Site
Anniston, Alabama

FILE: \\hemera\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Workplan\Figure2-5.mxd, 8/22/2007, _jeff_clonts

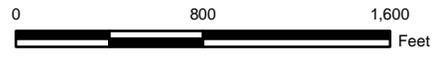
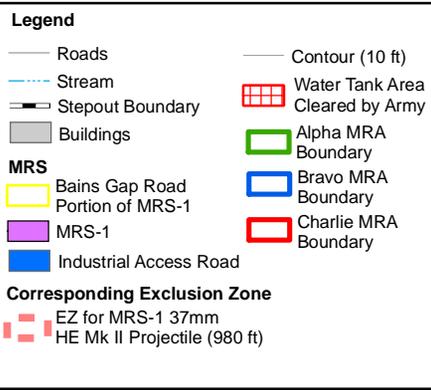
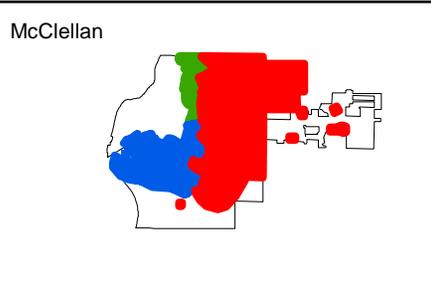
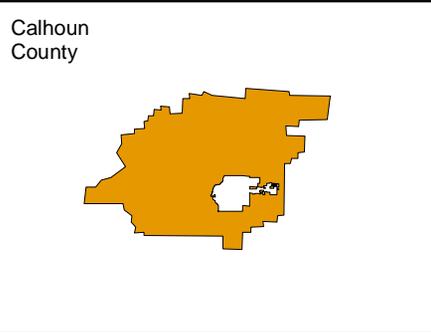
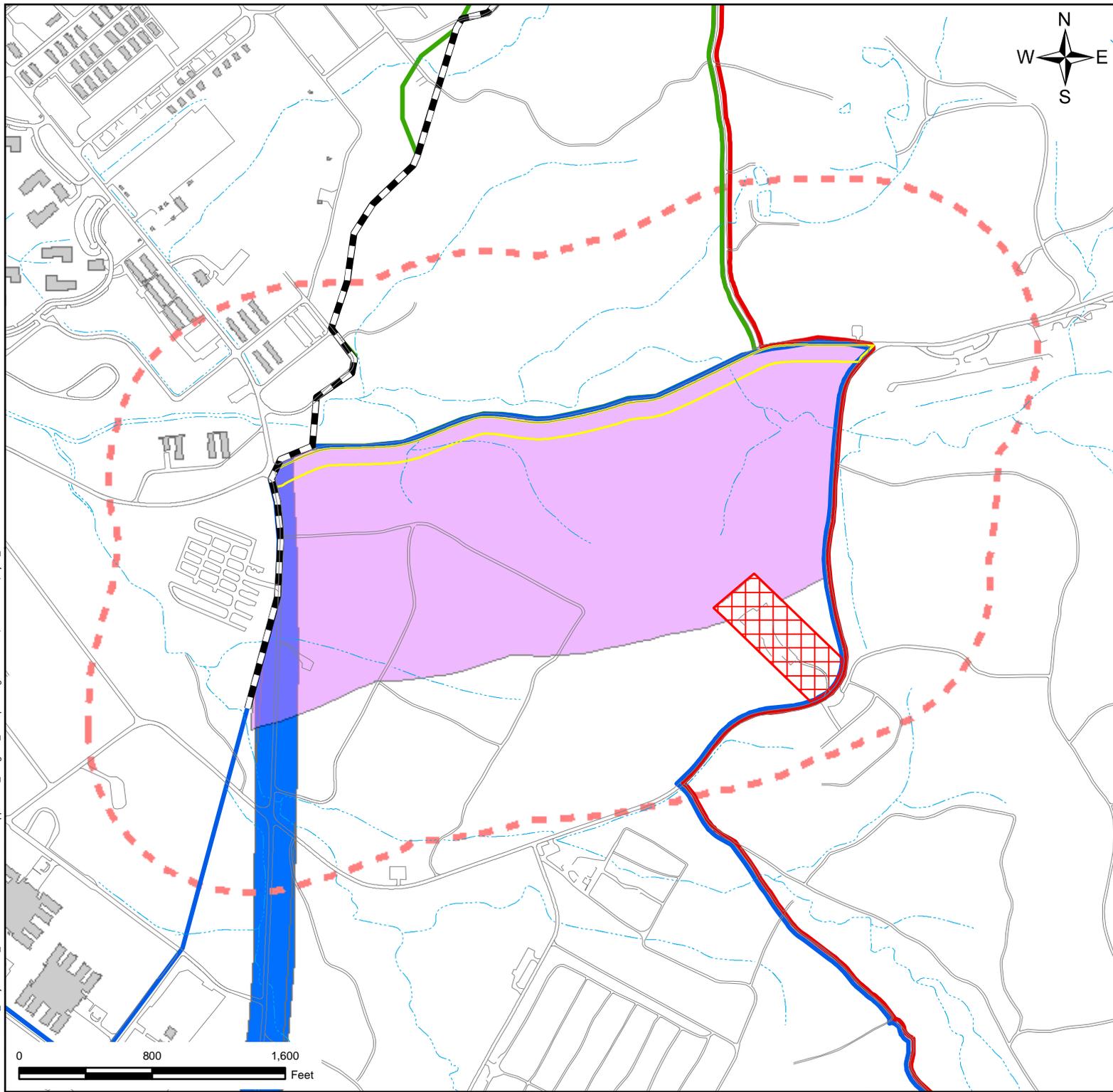
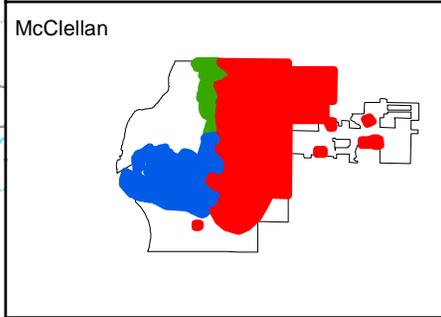
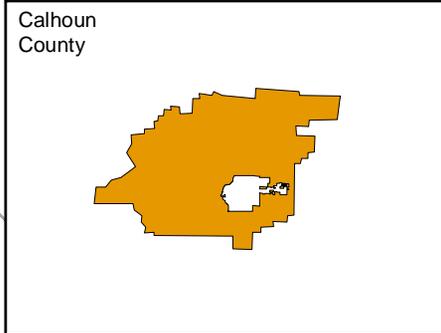
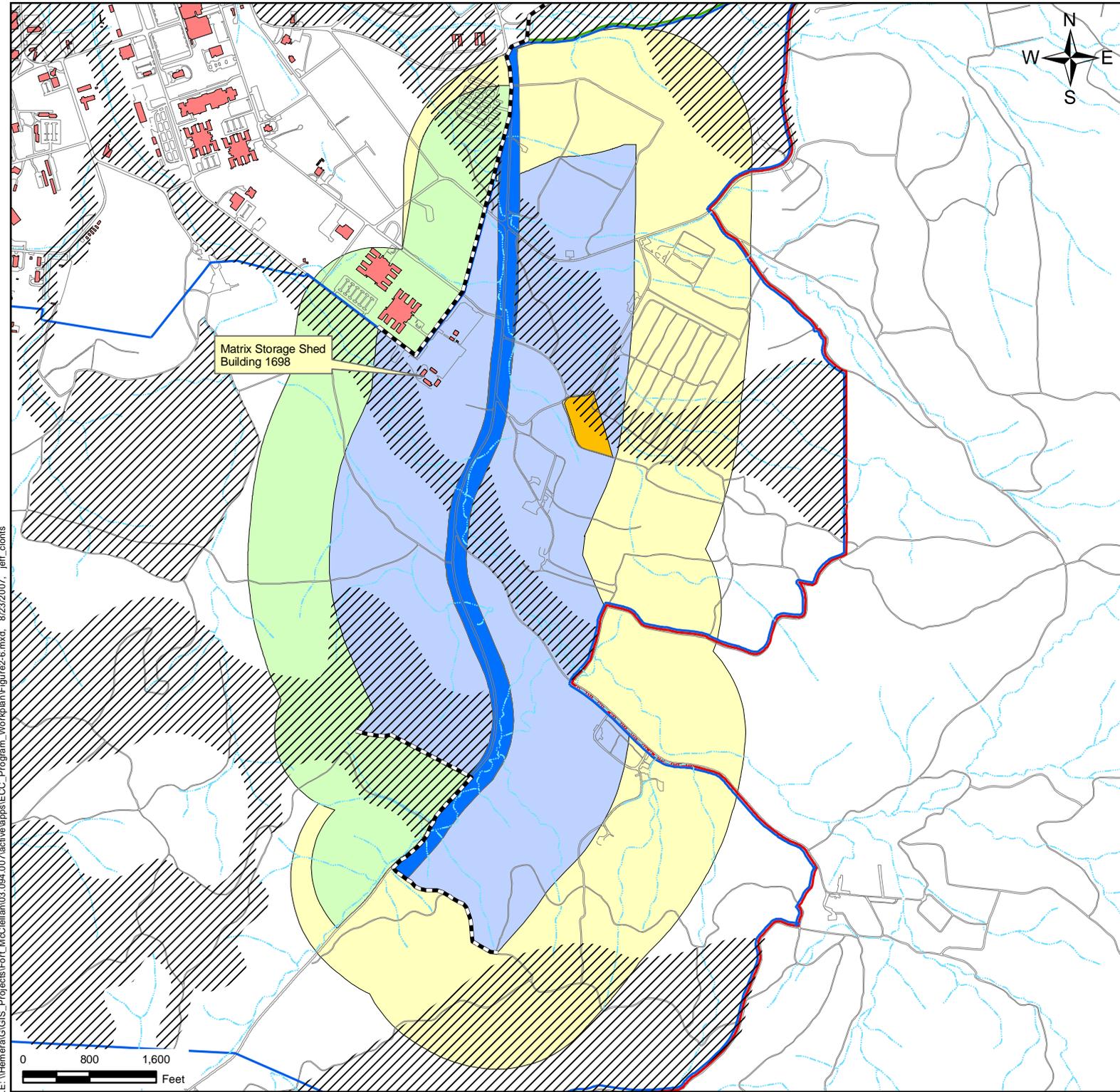


FIGURE 2-5
BAINS GAP ROAD
MRS-1
 McClellan
 Munitions Response Site
 Anniston, Alabama



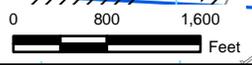
Legend

Roads	Original Industrial Access Road Footprint
Stepout Boundary	McClellan Park System One Foot Clearance
Alpha MRA	Buildings
Bravo MRA	Water Tank Area cleared by Army
Charlie MRA	Stream
MRS-2	EZ for MRS-2 West 37mm HE MK II Projectile (980 ft)
EZ for MRS-2 East 81mm, M43, HE Mortar (1,395 ft)	

FIGURE 2-6
MRS-2

McClellan
 Munitions Response Site
 Anniston, Alabama

FILE: \\Homerad\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Workshop\Figure2-6.mxd_ 8/23/2007_ jeff_clonts



FILE: \\Hemera\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Workplan\Figure4-1.mxd, 8/22/2007, jeff_clonts

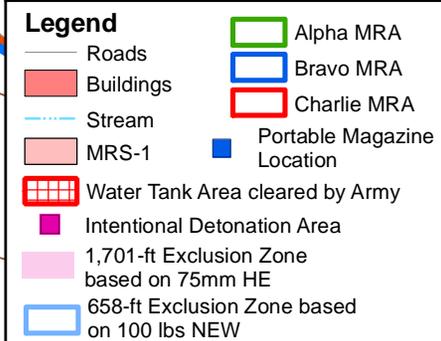
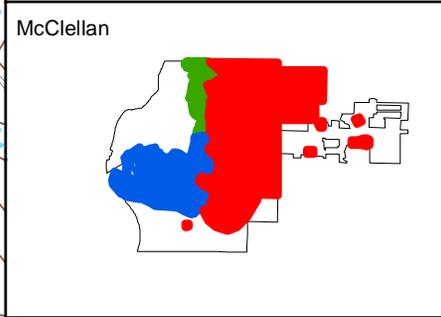
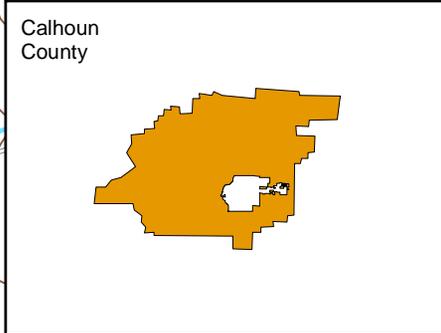
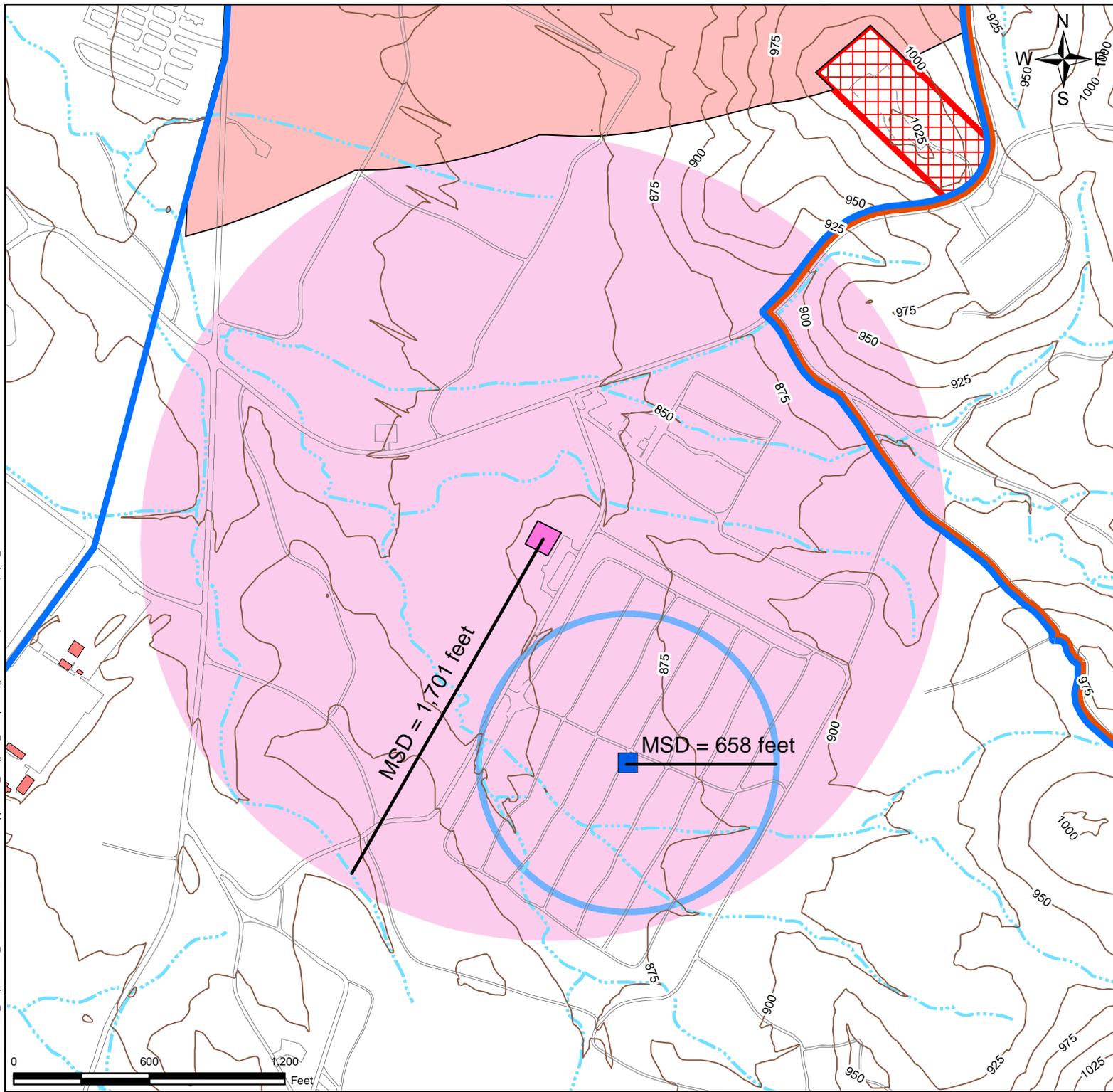
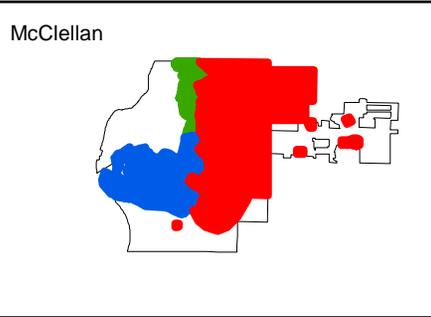
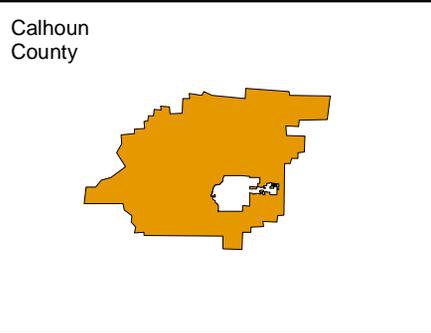


FIGURE 4-1
Intentional Detonation Area and
Portable Magazine Location
 McClellan
 Munitions Response Site
 Anniston, Alabama



N271 E154	N271 E155	N271 E156	N271 E157	N271 E158	N271 E159	N271 E160	N271 E161	N271 E162	N271 E163	N271 E164	N271 E165	N271 E166	N271 E167	N271 E168	N271 E169	N271 E170	N271 E171	N271 E172	N271 E173
N270 E154	N270 E155	N270 E156	N270 E157	N270 E158	N270 E159	N270 E160	N270 E161	N270 E162	N270 E163	N270 E164	N270 E165	N270 E166	N270 E167	N270 E168	N270 E169	N270 E170	N270 E171	N270 E172	N270 E173
N269 E154	N269 E155	N269 E156	N269 E157	N269 E158	N269 E159	N269 E160	N269 E161	N269 E162	N269 E163	N269 E164	N269 E165	N269 E166	N269 E167	N269 E168	N269 E169	N269 E170	N269 E171	N269 E172	N269 E173
N268 E154	N268 E155	N268 E156	N268 E157	N268 E158	N268 E159	N268 E160	N268 E161	N268 E162	N268 E163	N268 E164	N268 E165	N268 E166	N268 E167	N268 E168	N268 E169	N268 E170	N268 E171	N268 E172	N268 E173
N267 E154	N267 E155	N267 E156	N267 E157	N267 E158	N267 E159	N267 E160	N267 E161	N267 E162	N267 E163	N267 E164	N267 E165	N267 E166	N267 E167	N267 E168	N267 E169	N267 E170	N267 E171	N267 E172	N267 E173
N266 E154	N266 E155	N266 E156	N266 E157	N266 E158	N266 E159	N266 E160	N266 E161	N266 E162	N266 E163	N266 E164	N266 E165	N266 E166	N266 E167	N266 E168	N266 E169	N266 E170	N266 E171	N266 E172	N266 E173
N265 E154	N265 E155	N265 E156	N265 E157	N265 E158	N265 E159	N265 E160	N265 E161	N265 E162	N265 E163	N265 E164	N265 E165	N265 E166	N265 E167	N265 E168	N265 E169	N265 E170	N265 E171	N265 E172	N265 E173
N264 E154	N264 E155	N264 E156	N264 E157	N264 E158	N264 E159	N264 E160	N264 E161	N264 E162	N264 E163	N264 E164	N264 E165	N264 E166	N264 E167	N264 E168	N264 E169	N264 E170	N264 E171	N264 E172	N264 E173
N263 E154	N263 E155	N263 E156	N263 E157	N263 E158	N263 E159	N263 E160	N263 E161	N263 E162	N263 E163	N263 E164	N263 E165	N263 E166	N263 E167	N263 E168	N263 E169	N263 E170	N263 E171	N263 E172	N263 E173
N262 E154	N262 E155	N262 E156	N262 E157	N262 E158	N262 E159	N262 E160	N262 E161	N262 E162	N262 E163	N262 E164	N262 E165	N262 E166	N262 E167	N262 E168	N262 E169	N262 E170	N262 E171	N262 E172	N262 E173
N261 E154	N261 E155	N261 E156	N261 E157	N261 E158	N261 E159	N261 E160	N261 E161	N261 E162	N261 E163	N261 E164	N261 E165	N261 E166	N261 E167	N261 E168	N261 E169	N261 E170	N261 E171	N261 E172	N261 E173

Grid colors denote initial Unit of Production selections

Legend

- Roads
- Stream
- Stepout Boundary
- Alpha MRA Boundary
- Bravo MRA Boundary
- Charlie MRA Boundary
- MRS**
- Northern Alpha
- Corresponding Exclusion Zone**
- Rifle Grenade M9 = 351 ft
- Contour (1 ft)

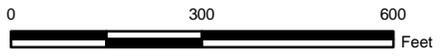


FIGURE 10-1
Initial UoP Selection
Northern Alpha MRS
 McClellan
 Munitions Response Site
 Anniston, Alabama

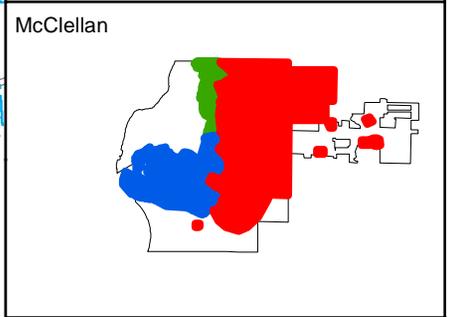
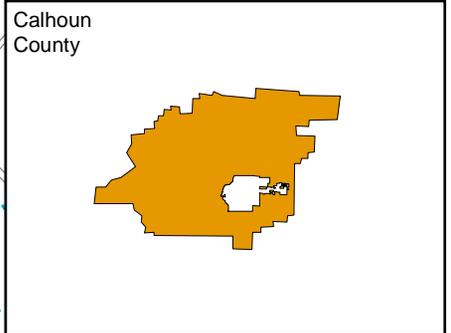
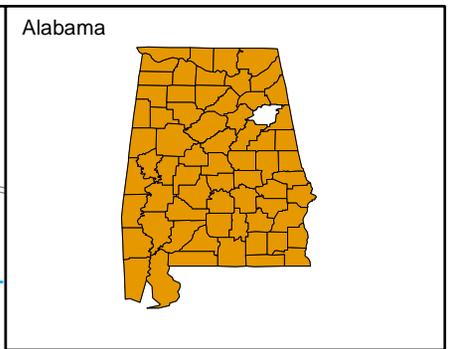
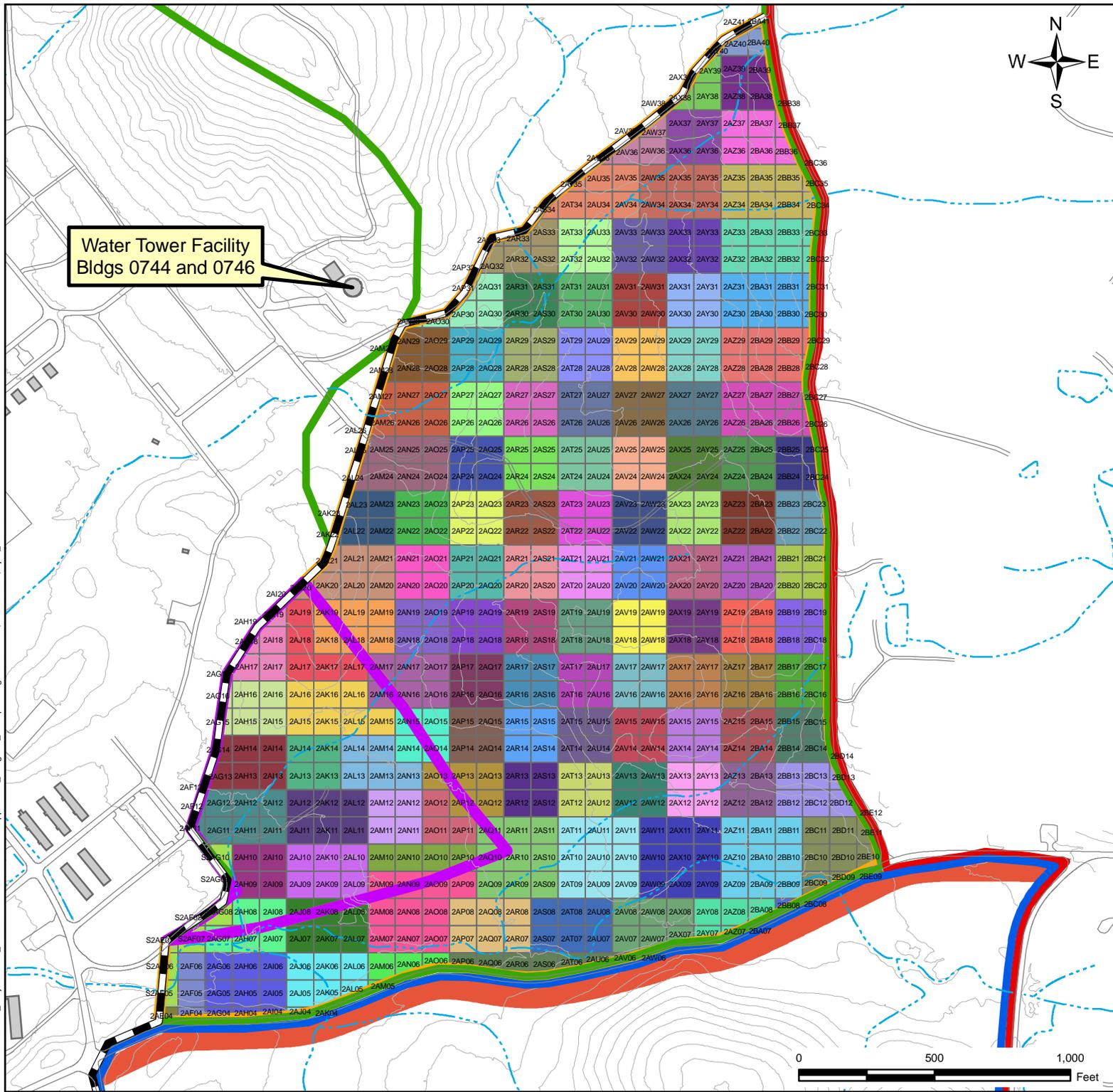
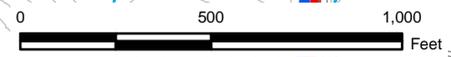
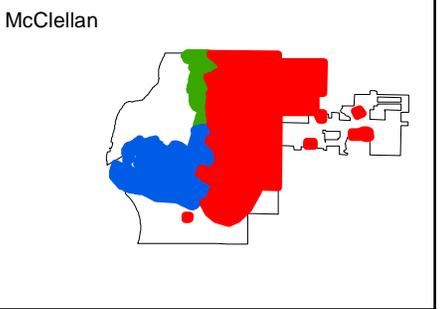
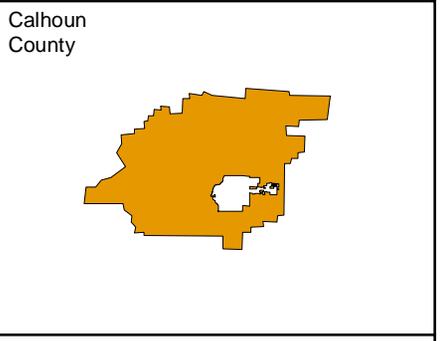
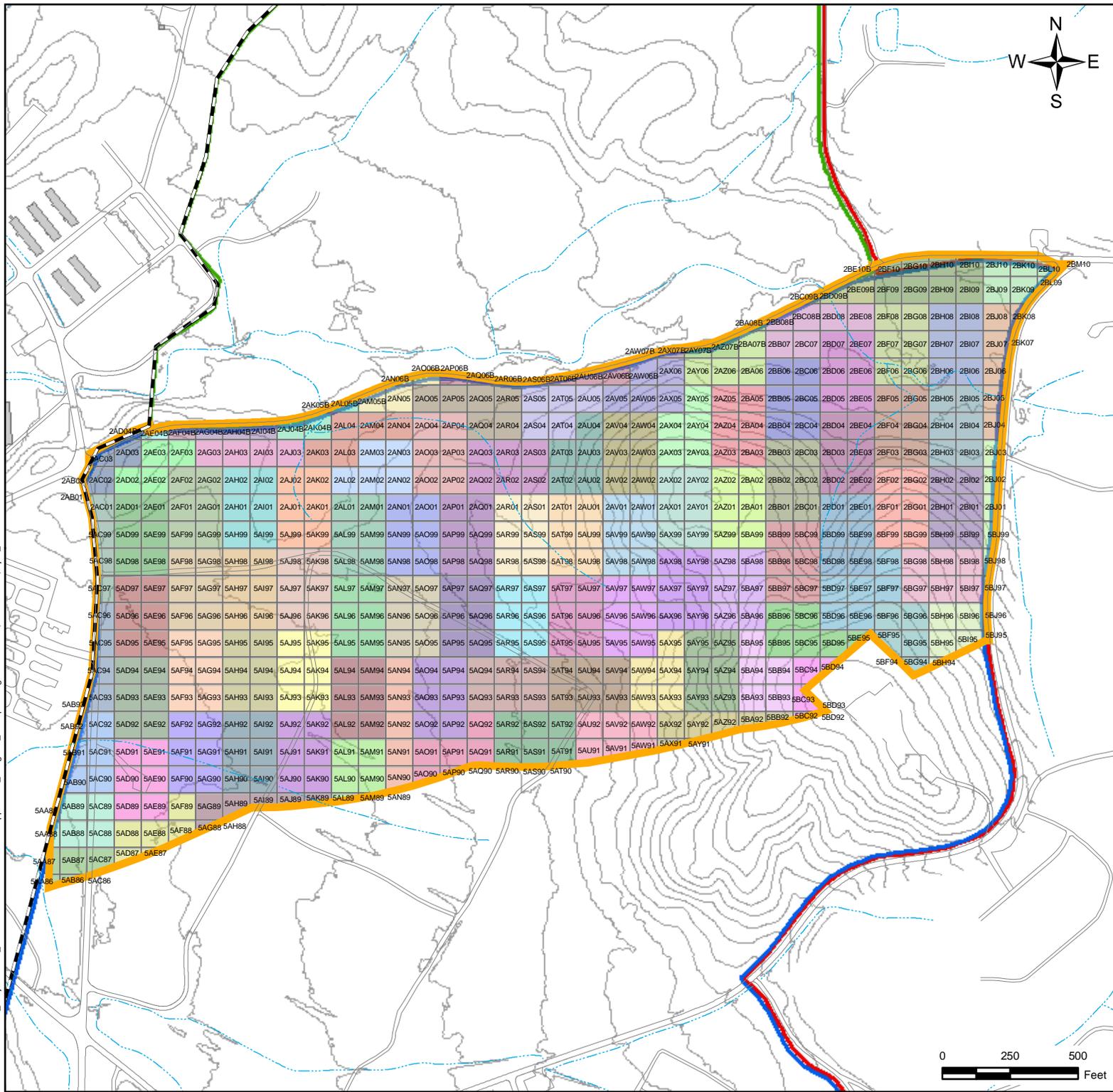


FIGURE 10-2
Initial UoP Selection
Southern Alpha MRS

McClellan
 Munitions Response Site
 Anniston, Alabama



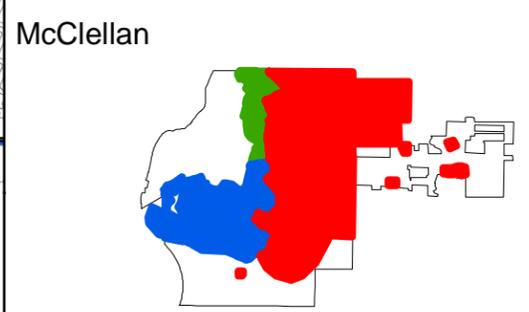
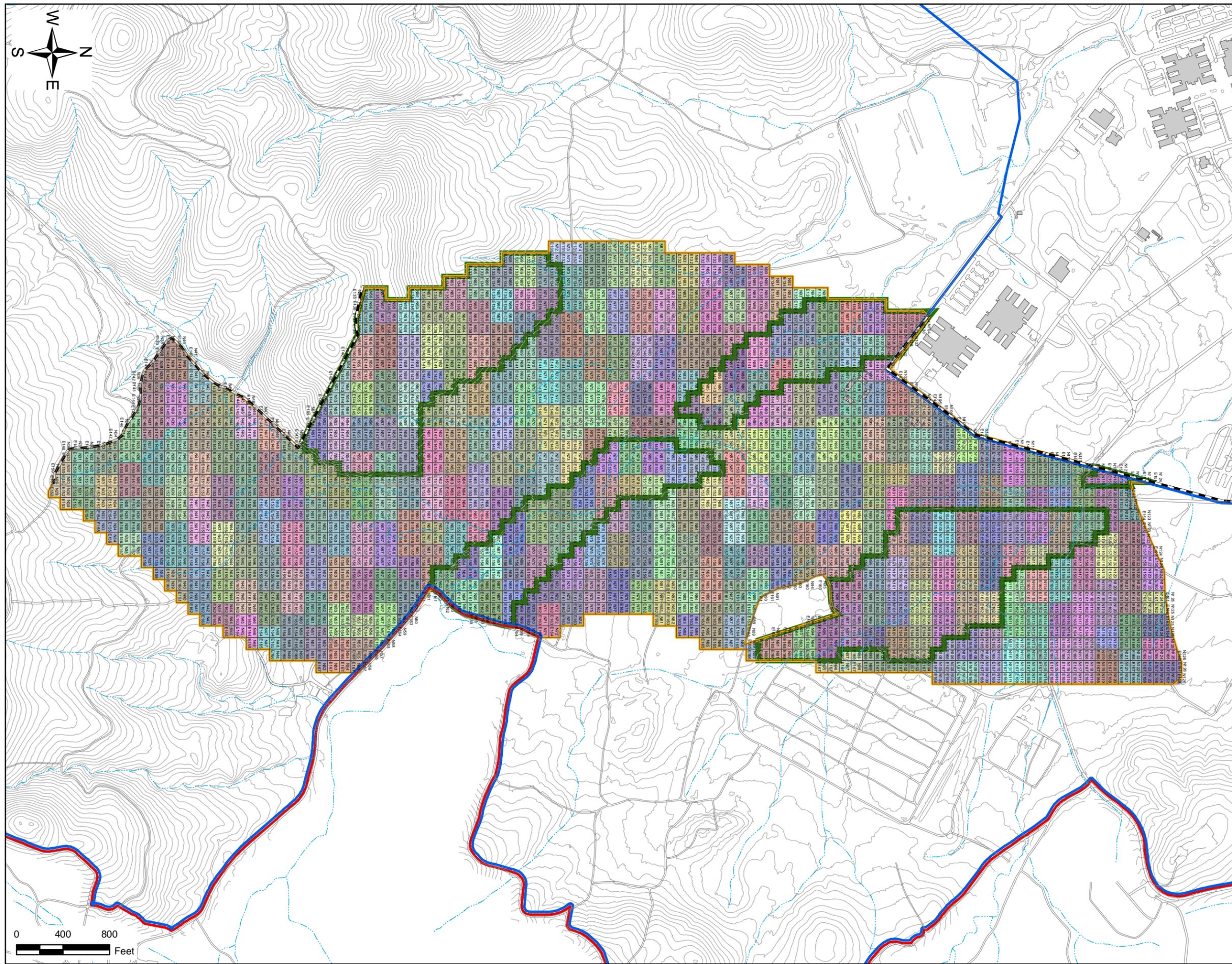
FILE: \\hemera\GIS_Projects\Fort_McClellan\03_094_007\activeapps\ECC_Program_Work\plan\Figure10-3.mxd, 8/23/2007, jef_doms



Legend

- Roads
- Stream
- Buildings
- MRS-1 Boundary
- Grid (100x100 feet)
- Alpha MRA
- Bravo MRA
- Charlie MRA
- Contour (10 ft)

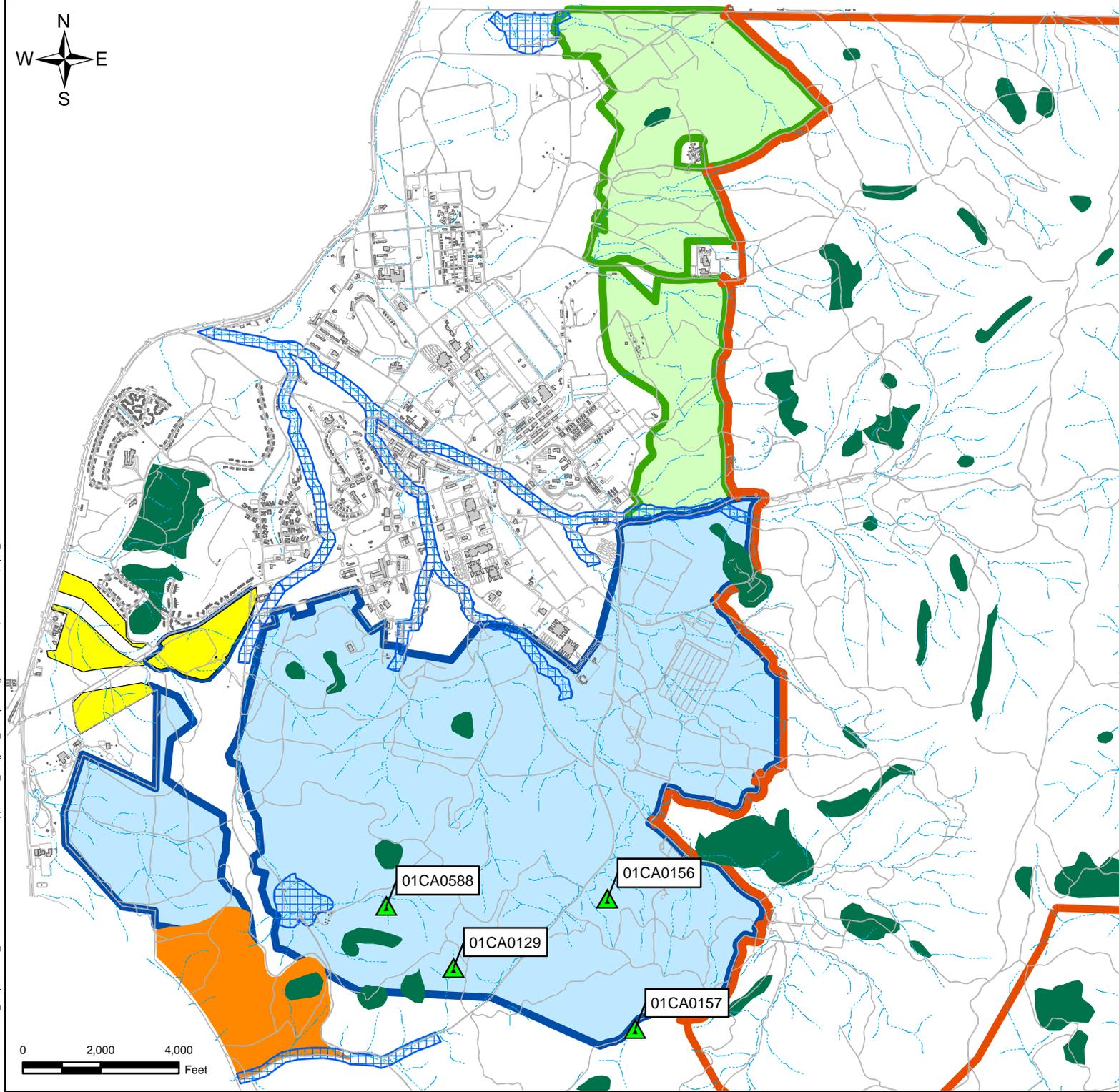
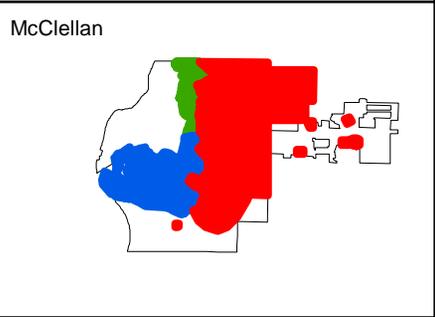
FIGURE 10-3
Initial UoP Selection
MRS-1
 McClellan
 Munitions Response Site
 Anniston, Alabama



- Legend**
- Roads
 - Stream
 - Buildings
 - MRS-2 Boundary
 - Grid (100x100 feet)
 - Park Area
 - Alpha MRA
 - Bravo MRA
 - Charlie MRA
 - Contour (10 ft)
 - Stepout Boundary

FIGURE 10-4
INITIAL UoP SELECTION
MRS-2

McClellan
 Munitions Response Site
 Anniston, Alabama



Legend

Roads	Alpha MRA Boundary
Stream	Bravo MRA Boundary
Buildings	Charlie MRA Boundary
Golden Triangle	Gray Bat Forage Area
Gray Bat Forage Area	Reynolds Hill Turkey Oak
Reynolds Hill Turkey Oak	Mountain Longleaf Pine
Mountain Longleaf Pine	Archeological Points

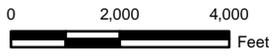


FIGURE 11-1
Alpha & Bravo MRAs

McClellan
Munitions Response Site
Anniston, Alabama

FILE: \\hemera\GIS_Projects\Fort_McClellan\03_094_007\active\apps\ECC_Program_Workplan\Figure11-1.mxd, 8/22/2007, jefl_cblnts

Appendix B
Emergency Points of Contact

EMERGENCY CONTACT LIST

ORGANIZATION	CONTACT PERSON	NUMBER(S)
911		911
723 EOD Fort Gillem		404-469-5436 – Main 404-469-3467 - Operations
Alabama Department of Environmental Management	Tracy Strickland	334-271-7738
	Julie Ange	334-270-5646
	Brandi Little	334-274-4226
Alabama Dept. of Public Safety EOD Investigations	Corporal Thad Snyder	435-5873 – Office 223-2978 – Cell 435-3521 – 24 hrs
Alabama Security & K-9	Capt Susan Akridge	546-3058 – Office 312-2346 – Cell
	Major Beth Guttry	312-2410 - Cell
Anniston Fire	Chief Bill Fincher	231-7647 - Office 231-7644/7645 - Main
Anniston Police	Chief John Dryden	238-1800 - Main
ATF	Report Stolen Explosives	800-800-3855
Calhoun County Sheriff	Sheriff Larry Amerson	236-6600 - Main
Cobra-Homeland Security	Bruce Greene	847-2061 - Office 310-2902- Cell
	Leo Usry	847-2514 – Office 310-8113 - Cell
Hospital Regional Medical Center (RMC)		235-5121 – Main
JPA	Miki Schneider	236-2011 -Office 310-0267- Cell
Matrix Environmental Services (MES)	Site Program Mgr – Michelle Klomp	847-0780
	PM - Richard Satkin	404-414-7054 - Cell
	Site Operations Mgr - Cecil Taylor	310-8004
	Program Mgr - Steve Young	719-575-1011 – Office 720-201-6780 – Cell
	UXO QA – Talmadge Bohannon	850-832-7155 - Cell
Poison Control		800-292-6678
Range Control		847-3037 / 3038 / 3039
Transition Force	Scott Bolton	848-3845 – Office 423-280-6926- Cell
	Joe Ostrander (Security)	848-5680 - Office
US Fish & Wildlife	Steve Miller	848-6833 – Office 310-9194 – Cell
	Bill Garland	256-452-0230 – Cell

Appendix C
Accident Prevention Plan (APP)

APPENDIX C – ACCIDENT PREVENTION PLAN

MEC REMEDIATION ALPHA AND BRAVO MUNITIONS RESPONSE AREAS

Prepared for:

Anniston-Calhoun County Fort McClellan Development
Joint Powers Authority



Prepared by:

Matrix Environmental Services, LLC



August 2007

APPENDIX C – ACCIDENT PREVENTION PLAN

Table of Contents

1.0	SIGNATURE SHEET	1
2.0	INTRODUCTION	2
2.1	Purpose	2
2.2	Application	2
2.3	Revisions	2
2.4	Components of the APP	3
3.0	BACKGROUND INFORMATION	3
3.1	Project Description	3
3.2	Contractor Safety Information.....	3
4.0	STATEMENT OF ENVIRONMENTAL, HEALTH AND SAFETY POLICY	4
5.0	RESPONSIBILITIES AND LINES OF AUTHORITY	4
5.1.1	MES Project Manager.....	4
5.1.2	MES Corporate Health and Safety Manager	5
5.1.3	Site Health and Safety Manager (SHSM)	5
5.1.4	UXO Quality Control Specialist (UXOQCS).....	6
5.2	Field Personnel	6
5.3	Subcontractors	7
5.4	Site Visitors	7
5.5	Lines of Authority.....	7
6.0	SUBCONTRACTORS AND SUPPLIERS	7
6.1	Managing Subcontractors	8
6.2	Supplier Control.....	8
7.0	TRAINING REQUIREMENTS	8
7.1	Project Training Requirements	8
7.2	Visitor Indoctrination Policy	9
8.0	SAFETY AND HEALTH INSPECTIONS	9
8.1	General Inspection Procedures.....	9
8.2	External Inspections and/or Certifications	10
9.0	SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE	10
9.1	Safety Goals for this Contract.....	10
9.2	Safety Incentive Program	10
9.3	Disciplinary Procedures.....	10
9.4	Manager and Supervisor Accountability	11
10.0	ACCIDENT REPORTING	11
10.1	Incident Summary	11
10.2	Immediate Notification of Major Accidents	11
11.0	MEDICAL SUPPORT	11
11.1	Onsite First Aid Support	11
11.2	Hospital and Emergency Route Map.....	12
11.3	Medical Transport of Employees and Case Management.....	12
12.0	PERSONAL PROTECTIVE EQUIPMENT	12
13.0	HAZARD ASSESSMENTS	12
13.1	Personal Protective Equipment Inspection and Care	12
13.2	Personnel Decontamination	12
13.3	General Site Rules	13

14.0	SITE-SPECIFIC HAZARDS AND CONTROLS.....	14
14.1	Site Control.....	14
14.2	Hazard Communication	14
14.3	Biological Hazards.....	14
14.3.1	Insect Bites/Stings	14
14.3.2	West Nile Virus	15
14.3.3	Stray animals – cats, raccoons.....	16
14.3.4	Snakes.....	16
14.3.5	Poison Ivy, Poison Oak, Poison Sumac	17
14.3.6	Spiders.....	17
14.3.7	Black Widow	18
14.3.8	Brown Recluse.....	18
14.4	Physical Hazards.....	19
14.4.1	Noise.....	19
14.4.2	Underground Utilities	19
14.4.3	Precautions When Near Overhead Utility Lines	20
14.5	Site Monitoring	21
14.6	Emergency Planning	21
14.7	Responsibilities	22
14.8	Alerting and Communications.....	22
14.9	Coordination with Local Emergency Agencies	22
14.10	Emergency Action Procedures	22
14.11	Rescue Operations.....	23
14.12	Evacuation Routes and Procedures.....	23
14.13	Contamination Control during Emergencies.....	23
14.14	Spill and Discharge Control.....	23
14.14.1	Contingency Plan.....	23
14.14.2	Notification of Spills and Discharges	24
14.15	Fire Prevention and Protection.....	24
14.16	Emergency Supplies	25
14.17	Documentation and Review.....	25
14.18	Accident Prevention Signs, Tags and Labels.....	25
14.19	Postings.....	26
14.20	Daily Safety Briefings	26
14.21	Safety and Health Bulletin Board	26

List of Attachments

Attachment 1 – Site Safety and Health Plan.....	27
Attachment 2 – Activity Hazard Analysis	37
Attachment 3 – Site Layout Plan and Work Zones	57
Attachment 4 – Emergency Contacts & Hospital route Map.....	58
Attachment 5 – Standard Operating Procedures.....	60
Attachment 6 – Supplemental Plans.....	61
Attachment 7 – Site Safety and Health Forms.....	62

List of Tables

Table 1. APP Document Outline	3
Table 2. Project Training Requirements	9
Table 3. General Inspection Requirements	10
Table 4. Equipment / Powerline Safe Distances.....	20

List of Abbreviations and Acronyms

AALF	Anomaly Accountability Log Form
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
AOC	Areas of Concern
APP	Accident Prevention Plan
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
BIP	Blow-in-place
BRAC	Base Realignment and Closure
CA	Corrective Action
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CO	Contracting Officer
COR	Contracting Officer Representative
CPR	Cardiopulmonary Resuscitation
CQCM	Corporate Quality Control Manager
CRZ	Contamination Reduction Zone
CWM	Chemical Warfare Materiel
dba	Decibels
DDESB	Department of Defense Explosives Safety Board
DFW	Definable Feature of Work
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
DID	Data Item Description
DMM	Discarded Military Munitions
DOD	Department of Defense
DQO	Data Quality Objective
EE/CA	Engineering Evaluation/Cost Analysis
EMR	Experience modification rate
EOD	Explosive Ordnance Disposal
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FCA	Function Check Area
ft	Feet
FUDS	Formerly Used Defense Site
GEOQCM	Geophysical Quality Control Manager
GIS	Geographical Information System
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations
HEAT	High-Explosive Anti-Tank
HIPO	High Potential Incidents
HMIS	Hazardous Materials Identification System
hr	Hour
HTRW	Hazardous Toxic Radiological Waste
IAW	In Accordance With
JPA-MES	Joint Powers Authority – Matrix Environmental Services
JRA	Joint Reuse Authority
Kv	Kilovolt
lbs	Pounds
MC	Munitions Constituents

List of Abbreviations and Acronyms

McClellan	McClellan Reuse Area
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MEC/UXO	Munitions and Explosives of Concern/Unexploded Ordnance
MES	Matrix Environmental Services, LLC
MGFD	Munition With the Greatest Fragmentation Distance
MMRP	Military Munitions Response Program
MOFB	Miniature Open Front Barricade
mph	miles per hour
MPPEH	Material Potentially Presenting an Explosive Hazard
MR	Munitions Response
MRA	Munitions Response Area
MRS	Munitions Response Sites
MSD	Minimum Separation Distance
MSDS	material safety data sheet
mV	milliVolt
NCP	National Contingency Plan
NCR	Nonconformance Report
NEW	Net Explosive Weight
NFPA	National Fire Protection Agency
NTCRA	Non Time Critical Removal Action
OE	Ordnance Explosive
OE/MEC	Ordnance Explosive/Munitions and Explosives of Concern
OSHA	Occupational Safety and Health Administration
PDA	Personal Digital Assistant
PgM	Program Manager
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
QCM	Quality Control Manager
QCP	Quality Control Plan
Q-D	Quantity – Distance
QIP	Quality Improvement Process
RA	Removal Action
RCRA	Resource Conservation Recovery Act of 1976
RCWM	Recovered Chemical Warfare Materiel
RIR	Recordable Incident Rate
ROE	Right of Entry
ROPs	Rollover Protection Structure
SHSM	Site Health and Safety Manager
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHPP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
SZ	Support Zone
TBC	To Be Considered
TGR	Turret Gunnery Range
TO	Task Order
USACE	U.S. Army Corps of Engineers
USATCES	U.S. Army Technical Center for Explosives Safety
UXO	Unexploded Ordnance
UXOOPS	Unexploded Operations Manager

List of Abbreviations and Acronyms

UXOQCS	Unexploded Ordnance Quality Control Specialist
WNV	West Nile Virus
WP	Work Plan

ACCIDENT PREVENTION PLAN

MEC REMEDIATION ALPHA AND BRAVO MUNITIONS RESPONSE AREAS

1.0 SIGNATURE SHEET

This appendix provides MES's Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP) for the MEC Remediation of the Alpha and Bravo Munitions Response Areas, Anniston, Alabama.

Plan Preparer:



August 27, 2007

256-847-0780

Date

Phone Number

Site Health and Safety Manager

Plan Concurrence:



August 27, 2007

256-847-0780

Date

Phone Number

Corporate Health and Safety Manager

Plan Approval:



August 27, 2007

404-414-7054

Date

Phone Number

Senior Project Manager

2.0 INTRODUCTION

This APP has been prepared by MES, to perform MEC Remediation in the Alpha and Bravo Munitions Response Area Anniston, Alabama. This work is being conducted for the Joint Powers Authority (JPA), who is facilitating the reuse of McClellan. Work conducted under this contract will be performed in accordance with applicable Federal, State, and local safety and occupational health laws and regulations including: Occupational Safety and Health Administration (OSHA) standards (including 29 Code of Federal Regulation (CFR) 1910 and 29 CFR 1926). The *USACE Safety and Health Requirements Manual* (EM 385-1-1, 3 Nov 2003) and *USACE Data Item Description, Accident Prevention Plan*, MR-005-06 (1 Dec 2003) are also used as general guidance but are not specified requirements. The contents of the APP are subject to review and revision, as new information becomes available.

2.1 Purpose

This APP has been developed based on known and anticipated potential hazards that may arise during performance of the Scope of Work (SOW) provided in this Work Plan. At least one copy of the APP will be located in a readily accessible on-site location during all field activities. The APP consists of several components that together define the Safety and Health program as outlined in Section 2.4.

2.2 Application

The requirements established by this APP are mandatory and apply to all MES employees, its subcontractors, and any other personnel entering designated work areas at the project site during active field operations. All employees, subcontractors, and visitors shall sign-off on the APP Compliance Agreement Form (provided at the end of this document in Attachment 7) after receiving training on this plan and before working at the site. In addition, MES shall provide a copy of this plan, if requested, to any authorized personnel who must enter the regulated work area.

2.3 Revisions

Changes in the scope of work, field changes or unanticipated site conditions may require APP modification and approval in order to retain field safety compliance with contract requirements and OSHA regulations. All changes to the APP or SSHP shall be prepared and/or reviewed by MES's Site Health and Safety Manager (SHSM) and submitted to the Project Manager (PM), Corporate Health and Safety Manager and Matrix Environmental Services (MES) QA Officer.

2.4 Components of the APP

Table 1. APP Document Outline

Document	Purpose
Accident Prevention Plan (APP)	<ul style="list-style-type: none"> The APP provides general safety and health requirements and practices.
Attachment 1 – Site Safety and Health Plan (SSHP)	<ul style="list-style-type: none"> The SSHP contains task order-specific health and safety requirements that meet SSHP requirements per OSHA and EM 385-1-1-USACE DID MR-005-06 (1 Dec 2003).
Attachment 2 – Activity Hazard Analysis (AHA)	<ul style="list-style-type: none"> These AHAs addresses specific hazards and precautions for major activities of the project task order.
Attachment 3 – Site maps	<ul style="list-style-type: none"> Due to the nature of this project, MES will establish exclusion zones each day in the work area(s). Site maps are located in Appendix B of the Work Plan.
Attachment 4 – Emergency Contact Numbers and Hospital Route Map	<ul style="list-style-type: none"> This attachment provides emergency contact numbers and the route map to the local hospital.
Attachment 5 – Listing of Standard Operating Procedures	<ul style="list-style-type: none"> This attachment provides SOPs.
Attachment 6 – Supplemental Plans	<ul style="list-style-type: none"> Supplemental plans are not required for this task order.
Attachment 7 – Site Health and Safety Forms	<ul style="list-style-type: none"> Forms referenced throughout the APP and SSHP are attached at the end of this document in Attachment 7. These forms are to be used as instructed by the SHSM.

3.0 BACKGROUND INFORMATION

MES will conduct Munitions and Explosives of Concern (MEC) remediation project management and quality oversight in the Alpha and Bravo Munitions Response Areas (McClellan), Anniston, Alabama, formerly known as Fort McClellan. This work supports continuing MEC remediation activities associated with the transfer of Army property to the JPA, the local redevelopment authority. The property was previously used by the U.S. Department of Defense (DoD) as an active military installation. The property was closed and transferred to the JPA under federal authorities created for Base Realignment and Closure (BRAC).

3.1 Project Description

See Attachment 1 – SSHP, Section 1.0 – Site Description for the project-specific scope of work.

3.2 Contractor Safety Information

MES has an excellent safety record. Copies of MES's OSHA Form 300 are available on request. The Anniston MES total case incident rate for 2004, 2005 were 0.0 and 0.93 for 2006.

4.0 STATEMENT OF ENVIRONMENTAL, HEALTH AND SAFETY POLICY

Matrix is committed to the protection of its employees and to the prevention of environmental pollution and degradation. Matrix intends to honor this commitment on every project by:

- Making EH&S a core value of the business.
- Ensuring that protection of health, safety, and the environment is planned into our projects.
- Requiring subcontractors to comply with a high standard of EH&S protection.
- Encouraging senior level company managers to have the highest ethics and personal commitment to safety and the environment.
- Holding employees accountable for their actions and decisions regarding personnel safety and the environment.
- Working toward continuous improvement of our EH&S programs, performance, systems, and culture.
- Continuously providing avenues and opportunities for communication of EH&S information, improvements, concerns, updates, alerts, and other EH&S-related information.
- Complying with federal, state, and local health and safety laws, standards, and practices.

5.0 RESPONSIBILITIES AND LINES OF AUTHORITY

This section describes the MES and subcontractor personnel responsibilities and lines of authority for project safety.

5.1.1 MES Project Manager

The MES PM represents MES in all aspects of its work under the contract and is responsible for the following:

- Providing leadership by, among other things, setting an example for all site personnel through actions and words regarding the importance of proper health and safety practices and holding project staff accountable for safety performance.
- Coordinating all work performed by MES and its subcontractors for the project.
- Ensuring the APP is approved prior to commencing field operations.
- Ensuring all required personal protective equipment (PPE), other types of equipment and instruments, safety incentives, and other safety-related items are budgeted and provided.
- Ensuring that subcontractor Statements of Work include appropriate safety provisions and expectations.
- Ensuring that safety and health requirements are covered during kickoff meetings.
- Participating in the investigation of, and ensuring that unplanned events, high loss potential incidents, and accidents are properly reported to JPA and within MES's health and safety reporting network.
- Notifying the Corporate Health and Safety Manager of any changes in the scope of work or site conditions, and ensuring that the APP is updated to address new hazards.
- Immediately stopping MES operations in the event of an emergency or serious hazard, in order to protect personnel and the environment.
- Preparing and submitting required work progress reports.

5.1.2 MES Corporate Health and Safety Manager

The MES Corporate Health and Safety Manager (HSM) will oversee the overall project health and safety structure and implementation. Responsibilities include the following:

- Review and sign the APP prior to submittal.
- Develop and/or review AHAs prepared for the project.
- Approve the appointment of the SHSM and ensure that he/she has the appropriate training and competencies to perform the duties.
- Participate in quality control planning such as development of Quality Control Plans, safety and health checklists, and perform design and system safety analyses as appropriate.
- Provide safety and health expectations and flow down requirements for subcontractor statements of work.
- Be available on a 24-hour basis for consultation with SHSM during on-site emergencies or as needed.
- Provide on-site consultation as needed to ensure the APP is fully implemented.
- Coordinate any modifications to the APP with the SHSM, the MES PM, and JPA, as required.
- Provide continued support for upgrading and/or downgrading the level of personal protection.
- Participate in the investigation of unplanned events, high loss potential incidents, and accidents.
- Assist in development of on-site training, which will be provided by the SHSM.

5.1.3 Site Health and Safety Manager (SHSM)

The SHSM implements the task-specific SSHP. In accordance with USACE EM 385-1-1 and USACE Data Item Description (DID), Personnel/ Work Standards, OE-025.02 (2 Feb 2004), the SHSM will have completed the 10-hour OSHA Construction Safety course (or an equivalent course applicable to the work to be performed) within the past 3 years. This individual will have the specific training, knowledge, and experience necessary to implement the SSHP and verify compliance with applicable safety and health requirements. This individual will be able to perform all functions enumerated for UXO Sweep Personnel and UXO Technicians I, II, and III. In addition, the SHSM 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. The SHSM will have the authority and is responsible for the following actions:

- Be present during operations to implement the SSHP.
- Inspect site activities to identify safety and occupational health deficiencies and correct them.
- Coordinate changes/modifications to the SSHP with the Corporate HSM, Project Manager and contracting officer.
- Conduct project specific training.
- Ensure all field personnel, including any subcontractor personnel, assigned to the project have satisfied requirements for training and medical surveillance as specified by 29 CFR 1910.120, and that records of training and medical approval are available and maintained for each person.
- Oversee compliance with the APP procedures and OSHA regulations through daily, informal inspections.
- Assist and represent the project HSM in on-site training.
- Report to the site on a full-time basis for the entire duration of field activities.
- Serve as a member of the QC staff on matters relating to safety and health.

- Stop work if unacceptable safety and health conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate modifications to the APP with the corporate HSM, the PM, and JPA.
- Serve as a point of contact for all MEC work and safety policies.
- Establish and ensure compliance with all site specific safety requirements for MEC operations.
- Analyze MEC operational risks, hazards, and safety requirements.
- Enforce personnel limits and safety exclusion zones for MEC clearance operations.
- Conducting safety inspections to ensure compliance with MEC and explosives safety codes.
- Operate and maintain air monitoring equipment required at a site for airborne contaminants and prepare air monitoring reports.
- Ensure all site personnel and visitors are properly trained on site hazards.
- Maintain all required safety and health records (e.g., OSHA 300 Logs, incident/accident reports, training certificates and qualifications, equipment checklists, safety plans, air monitoring data and reports, etc.) throughout the life of the project.

5.1.4 UXO Quality Control Specialist (UXOQCS)

The UXOQCS will be responsible for establishing and ensuring compliance with site control procedures and the Project Quality Control Plan (QCP). UXOQCS responsibilities will include the following:

- Conduct and/or document daily site safety and health inspections and document in the daily QC log.
- Conduct QC meetings and training sessions.
- Assure all personnel on site are trained on the provisions of the safety and health plans, as well as other necessary work plans.
- Review project submittals.
- Report equipment malfunctions and deficiencies to the UXO Operations manager, SHSM and field QC personnel.
- Provide daily QC reports to JPA.
- Ensure the scope of work and specifications are followed and met.

5.2 Field Personnel

Field Personnel will be responsible for understanding and following the APP and performing their work in a safe and responsible manner. Specific responsibilities will include the following:

- Act in a responsible manner at all times in order to prevent incidents, injury, and/or exposure to themselves and their co-workers.
- Report any and all incidents, including near misses, to the Team Leader, Operations manager or SHSM.
- Attend and participate in all daily health and safety tailgate meetings.
- Participate in the development of Activity Hazard Analyses (AHAs) as required, and follow the provisions as outlined in the final AHA.
- Follow instructions and directions of the SHSM and Site Operations Manager.
- Utilize the PPE provided and specified for use.
- Following all field safety procedures for safe work practices (e.g., the buddy system, communication, site control, decontamination, evacuations, and related emergency procedures).
- Perform only those tasks they have been instructed to perform if they are trained, qualified, and capable of performing safely at the time of assignment.

- Report any personal condition that could affect their safety and/or the safety of co-workers (e.g., fatigue, drowsiness, severe illness, impairment by prescription medications, influence by drugs and alcohol, emotional stress, or other condition).
- Ensure that no work tasks are performed in deviation from the APP and/or the initial instructions of the SHSM, QC manager and operations manager.

5.3 Subcontractors

Subcontractors that perform work for MES under this APP will be responsible for the health and safety of their employees. Specific responsibilities of subcontractors will include:

- Comply with the requirements of their SOW.
- Participate in development of a health and safety plan with AHAs for their work activities.
- Maintain a safe and healthy work environment.
- Compliance with the APP, contract requirements, laws, regulations, and EM 385-1-1.
- Review the APP to ensure that the health and safety requirements of their specific tasks are satisfied.
- Provide trained and experienced workers for the specific work activities.
- Participate in the Daily Safety Tailgate Meetings.
- Identify additional training needs for unique tasks.
- Enforce company- and project-specific rules and procedures during work activities.
- Report all incidents and participate in the investigations.
- Participate in routine site inspection activities.
- Ensure all equipment brought to the site is in proper working order, is routinely inspected and maintained in safe working order.
- Set a positive safety example for all project staff.

5.4 Site Visitors

Site visitors will:

- Participate in a site briefing before leaving the administrative office or site entry point.
- Follow all site rules and instructions.
- Be escorted at all times by a qualified UXO Technician II unless otherwise approved by the SHSM.
- Wear PPE provided.

Conformance of everyone with these responsibilities is necessary to achieve the goals of the APP. Failure to do so could result in removal from the site.

5.5 Lines of Authority

The SHSM has a technical and administrative reporting relationship to the Program Manager, and corporate HSM, who reports directly to the MES Vice President for Environment Services. The reporting relationship provides for access to safety and health expertise as well as an independent reporting and line of communication. The SHSM has a functional reporting relationship to the PM, providing the PM and team with a resource for safety and health support for the project.

6.0 SUBCONTRACTORS AND SUPPLIERS

The following sections describe how MES will manage the health and safety aspects of its suppliers and subcontractors.

6.1 Managing Subcontractors

Subcontractor safety is critical to successful performance on projects. When onsite subcontractor labor and/or services are needed to perform High Potential Incident (HIPO) activities, part of the selection criteria may include an evaluation of the subcontractor's safety history and program. Subcontractors are expected to comply with the provisions of this APP, the SSHP, and all AHAs. Their activities will be reviewed as part of regular site inspections and audits. Their safety performance on the job will be monitored and substandard practices and conditions will be addressed immediately. Furthermore, subcontractor safety performance will be evaluated in the MES procurement system where the information can be used for future subcontracting decisions.

6.2 Supplier Control

All suppliers of safety-related items are required to provide approved and/or appropriate materials for the project, and meet the specifications, testing criteria or third party certifications. These criteria are identified in the SOW, QCP, and APP or are recommended by the SHSM.

For safety-critical items, specifications will be identified and receipt inspections will be conducted and documented.

Each hazardous material supplied for site use will be accompanied by a Material Safety Data Sheet (MSDS) and will be added to the site list of hazardous materials. MSDSs and the list will be maintained by the SHSM.

Health and safety related supplies will be obtained from recognized safety supply vendors and will meet specified OSHA or consensus standards. These items will be inspected upon receipt by the SHSM and/or the UXOQCS.

7.0 TRAINING REQUIREMENTS

The following two sections detail project training and requirement and visitor indoctrination.

7.1 Project Training Requirements

The training listed in Table 2 will be provided to project participants as noted. In addition to the topics listed, the SHSM, in cooperation with the Operations manager, will identify other topics and work tasks to be included in the training requirements. These special requirements will be noted in the AHAs. All required training will be documented and this training documentation will be maintained onsite.

Table 2. Project Training Requirements

Topic	Description	Personnel
General Training		
Accident Prevention Plan	Review of APP requirements during site orientation, before commencement of field work.	All project personnel
Site Safety and Health Plan	Training on site-specific hazards and control requirements before commencement of field work. Includes training in proper use and care of PPE.	All project personnel
Activity Hazard Analysis	Review of AHAs, controls and training requirements for a specific phase or activity prior to commencement of activity.	Workers, supervisors and oversight personnel engaged in the activity
Daily Safety Briefing	In addition to plan-of-the-day and daily hazard reminders often used to cover a specific topic; provide refresher training on various issues or changes in hazards, controls or procedures.	All field workers, supervisors, field oversight personnel, and visitors
Emergency Action Plan	Cover the roles, responsibilities, recognition of emergency conditions, reporting and notification, evacuation and other procedures.	All project personnel, with detailed information on procedures for workers with special responsibilities
Hazard Communication	Discuss requirements for MSDSs, labels; hazards of site materials and controls; location of and access to inventories and MSDSs.	All project personnel potentially exposed to hazardous materials
Fire Extinguisher	Provide general education on selection, distribution, and proper use of fire extinguishers.	All project personnel
Special Training		
First aid/ CPR	Provide Red Cross, National Safety Council or other authorized course with current refresher.	At least 2 project personnel

7.2 Visitor Indoctrination Policy

All site visitors will be required to review the daily tailgate safety issues and sign the APP Compliance Agreement Form. At a minimum, all visitors must be informed of the anticipated hazards and PPE requirements, designated work zones, escort procedures, and emergency procedures by the SHSM.

8.0 SAFETY AND HEALTH INSPECTIONS

The following 2 sections describe general and external inspection procedures to be followed for this project.

8.1 General Inspection Procedures

Table 3 lists the general inspection requirements for this Project. Findings that represent deficiencies in the implementation of the APP/SSHP, EM 385-1-1 or EP-385-1-95a and which cannot be corrected immediately will be added to the Tracking Log which will be posted in the administrative area and updated on a daily basis.

Additional specific inspection requirements may be necessary and will be included in the AHA, QCP, or site standard operating procedures, where applicable.

Table 3. General Inspection Requirements

What	Who	When	Documentation
General Site Conditions	SHSM	Daily	Log Book
	SHSM	Weekly	Health and Safety Site Inspection Form
	Project Manager	Monthly	Health and Safety Site Inspection Form and Non-Conformance Report, cc: UXOSO, PgM, HSM
	Project SHSM	Quarterly	Health and Safety Site Inspection Form
Detection Equipment	UXOQCS/GeoQC	Daily	QC Log
Tools and Equipment	Users	Daily	None. Tag defective items out of service
MEC Site Specific Hazards and Excavations	SHSM or designee	Daily	If greater than 4 feet deep, use Daily Excavation / Trench Inspection Form If less than 4' deep: log book.
Personal Protection Equipment	SHSM	Initial	Log book

8.2 External Inspections and/or Certifications

In the event that a regulatory agency arrives on site to conduct an inspection, the Project Manager and one of the following individuals will be contacted immediately:

- MES Site manager and JPA.
- SHSM.

9.0 SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE

This section describes the safety goals for this project, the safety incentive program, disciplinary procedures, and management accountability implemented to ensure the safety goals are met.

9.1 Safety Goals for this Contract

The safety objectives and goals for this task are many and include the following:

- Conduct all work in accordance with OSHA and other applicable safety regulations.
- Complete the project with zero OSHA recordable injuries and illnesses.
- Complete the project with zero high-loss potential incidents.
- Provide prompt identification and correction of health and safety concerns.
- Obtain 100% participation of all employees in the maintenance of a safe work environment.

9.2 Safety Incentive Program

Safety incentive programs will be evaluated and established as appropriate relative to safety participation and awareness efforts of the employees. MES will work with subcontractors to establish an appropriate incentive plan for subcontractor employees.

9.3 Disciplinary Procedures

All employees will be required to comply with APP policies and procedures. MES reserves the right to discipline and/or terminate (when justified) employees at its sole discretion for serious safety infractions. Discipline will be in accordance with the Disciplinary Policy described in the MES Employee Handbook. MES expects that all subcontractors will exercise their right to discipline and/or terminate its employees at its sole discretion when justified. MES retains the right to deny access to the site to any individual not sufficiently compliant with safety requirements.

9.4 Manager and Supervisor Accountability

MES managers and supervisors are held accountable for safety, not only for providing a safe work environment (through proper staffing, training, and equipment availability), but also through the example that they set. Annual performance reviews and incentive plans for managers and supervisors include assessments of project safety performance as well as the individual's demonstrated attitude toward safety.

10.0 ACCIDENT REPORTING

The next three sections describe accident reporting procedures.

10.1 Incident Summary

The SHSM will provide a monthly incident summary to the JPA. The summary will include the person-hours worked during the month and a list of incidents, including:

- OSHA Recordable Injuries or Illnesses (e.g., medical treatment beyond first aid).
- Any injuries to authorized visitors.
- Fires and explosions of any magnitude.
- Reportable spills and environmental releases.
- Tool or equipment failure which results or could result in serious injury.
- Property damage, equipment damage, environmental damage resulting in a loss of more than \$500.00 (\$2,000 for client reports).
- Any event, which under slightly different circumstances, could have resulted in one of the above.

The Operations manager with the assistance of the SHSM and UXOQCS will investigate the incident and complete all necessary incident reports and logs, including the MES Incident Report and client or regulatory agency reports.

All incidents, regardless of severity, require some type of investigation and corrective action. Immediate and basic causes will be identified and evaluated, and used to support the recommended corrective actions.

A project-specific OSHA 300 Log (Log of Work-Related Injuries and Illnesses) will be kept at the job site. Minor injuries requiring only first aid will be recorded on a project-specific First Aid Log. From February 1 through April 30 of each year, Form 300A (Summary of Work-Related Injuries and Illnesses) will be posted on the project Safety and Health Bulletin Board. These forms are available at the following web site: <http://www.osha.gov/pls/publications/pubindex.list>

10.2 Immediate Notification of Major Accidents

The MES PM and JPA will be verbally notified immediately and will receive a written notification within 24 hours for incidents.

11.0 MEDICAL SUPPORT

This section details medical support that will be available for the project.

11.1 Onsite First Aid Support

Onsite medical support during project execution will be available from two or more individuals who are trained in First Aid and Cardiopulmonary Resuscitation (CPR) and blood borne pathogens. Onsite first aid kits will meet the requirements of EM 385-1-1 (03.B). First aid kits shall be Type III, 16 unit kits, including one pocket mouthpiece or CPR barrier. Kits will be checked prior to use, and at least weekly when work is in progress to ensure that contents are

replaced as used. If a unit is available, personnel will be trained in the use of the Automated External Defibrillator (AED).

11.2 Hospital and Emergency Route Map

An emergency route map and local emergency medical support contact information is contained in Attachment 4. Local hospital emergency rooms must be notified of the potential types of injuries and the contaminants involved.

11.3 Medical Transport of Employees and Case Management

For non-emergency injuries, a local clinic has been identified and its location and phone number are listed in the Master Health and Safety Plan for McClellan. The SHSM will attempt to contact the clinic prior to the arrival of the patient to establish oversight of case management. Under no circumstances will an injured employee drive unescorted to a hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The SHSM or other project management personnel will transport the injured person to the facility. The employee who transports the injured person will be trained in first aid and CPR whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance.

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written return to work statement from the treating physician. This statement will supply a medical diagnosis of the problem, the date of return to work, and work limitations. Should a return to work statement such as "light duty" be given, the treating physician will be contacted to determine the specific limitation. MES will make an assessment of work the employee normally performs whether or not the limitation interferes with the employee's normal work.

12.0 PERSONAL PROTECTIVE EQUIPMENT

The purpose of PPE and clothing is to protect individuals from chemical and physical hazards.

13.0 HAZARD ASSESSMENTS

Specific work tasks with unique hazards and/or PPE requirements will be evaluated or reevaluated prior to beginning work. This task review will be led by the Corporate HSM and the SHSM, and will include knowledgeable individuals such as the worker(s) and the supervisor. PPE requirements, based on this assessment, are included in Master Health and Safety Plan for McClellan in the AHA for the specific task. All workers must be trained in the requirements of the APP, master health and safety plan and the applicable AHAs prior to beginning work. The required PPE may be changed by the SHSM, based on the results of additional air monitoring, or on task-specific needs. Downgrades will require the approval of the Corporate HSM unless otherwise permissible by the Master Health and Safety Plan for McClellan.

13.1 Personal Protective Equipment Inspection and Care

Inspection and care of PPE are covered in the master health and safety plan for McClellan and this APP, Appendix I.

13.2 Personnel Decontamination

All personnel, clothing and equipment leaving the established exclusion zone areas will be decontaminated within the boundaries of the established Contamination Reduction Zone (CRZ). The decontamination procedures will be an organized process with a series of stations to provide the maximum level of decontamination. Depending on the contaminants involved, and the potential risks, the decontamination process may range from a simple removal of gross,

visible debris from work clothing to a more intensive wet rinsing of protective coveralls. Specific decontamination procedures will be modified as necessary following establishment of work zones and observations of the work tasks. All contaminated PPE, and solutions used for decontamination, will be disposed of properly.

Standard personnel decontamination procedures include the following:

- Level D (e.g., leaving the site or support zone).
- Ensure no gross contamination remains on work boots.
- Wash hands, face, arms, and other exposed skin.

13.3 General Site Rules

The following site rules are applicable to all MES projects.

- Eat, drink, use gum or tobacco products, or apply cosmetics in designated areas only.
- Do not smoke in government buildings and near sources of ignition. Smoking is not allowed within the EZ. Areas shall be marked where smoking is permitted.
- Wash hands, face, and any exposed skin during decontamination, before eating, drinking or using tobacco products, and at the end of each shift.
- Participate in tailgate safety meetings.
- Continually observe work location and be alert to changes that may affect safety.
- Only enter regulated work areas as instructed by the SHSM, only at designated control points.
- Avoid direct contact with contamination by not purposefully walking, touching, or contacting any obviously contaminated surfaces.
- Immediately report incidents, accidents, near misses, or unusual situations to SHSM or the Operations Manager.
- Use PPE provided, and as instructed by the SHSM.
- Do not wear or carry personal items into regulated work area.
- Avoid hand-to-mouth or hand-to-face activities.
- Instruments and safety equipment/vehicles and construction equipment shall be inspected prior to use.
- Minimize the number of personnel in a work area to reduce potential exposures.
- Use the buddy system when entering an EZ and be continually aware of each other's location.
- Work within physical and mental limits.
- Take adequate rest breaks and replace body fluids (water and electrolyte) continuously.
- At all times follow the instructions of the Field Supervisor.
- Do not deviate from the APP or the instruction of the SHSM.
- Avoid rushing and/or taking short cuts.
- No waste shall be disposed of without the direction of the SHSM.
- Conduct visual checks on machinery and equipment prior to use, and complete the daily inspection form.
- Take precautions to prevent spillage and splashing. Contain spilled liquid if possible.
- Alert your senses to potentially dangerous situations (e.g., strong, irritating, or nauseating odors).
- Familiarize yourself with the physical characteristics of the site.
- Keep a minimum number of personnel and equipment in the contaminated area, consistent with the requirements of safe site operations.
- Dispose of all wastes generated during activities as directed by the SHSM.

- Conformance with these site rules is mandatory for continued project participation.

14.0 SITE-SPECIFIC HAZARDS AND CONTROLS

The anticipated hazards, control measures, and safety procedures for the following specific site activities and tasks are presented in Attachment 1 – SSHP.

In addition, MES's Master Health and Safety Plan for McClellan, referenced throughout the APP and SSHP, will be utilized to assist in the identification and implementation of appropriate hazard control measures.

14.1 Site Control

Site control procedures for this project will include the establishment of work zones at each work location to provide site security by avoiding unauthorized access and to secure work locations between shifts

Site security will be established by clearly marking all work zones at normal locations of possible entry by unauthorized personnel in order to minimize and prevent public exposure to hazards created by site activities. In addition, the SHSM, as well as, all MES employees, and contractors will stay alert for any unauthorized entry and take necessary actions to control the work area.

Work zones will be marked with barricades or signs, and visitors will be instructed to check in at the administrative office or access point.

Authorized site visitors may visit the site upon meeting the following conditions:

- Receiving site hazard and safety instructions from the SHSM.
- Reviewing and complying with the essential elements of the APP.
- Using their own, or provided PPE, to enter regulated work areas per the APP and SSHP.
- Reporting any observed unsafe act and/or condition at, or affecting, the work site.

14.2 Hazard Communication

MES will implement a hazard communication program on field projects in accordance with Explosives Safety Submission (ESS). The SHSM is responsible for maintaining a list of hazardous materials used on the site, as well as MSDSs for each hazardous material. These materials list will be maintained in the office or vehicle used by the SHSM, and for large sites, at other designated areas convenient to field personnel. Employees will be trained in the program and their access to the information as part of the site-specific training.

14.3 Biological Hazards

This section provides a description of some of the common biological hazards and controls that may be applicable to this project. Indigenous hazards will be discussed during the site orientation training and daily briefings, and where necessary, PPE and first-aid treatment protocols will be established during site operations.

14.3.1 Insect Bites/Stings

An insect bite or sting can cause pain, disease, and inflammation. If not treated correctly, some bites and stings may cause serious illness or even death. Bites from deer ticks can cause Lyme Disease, which can be fatal. During seasons of the year when insects are prevalent, the first line of defense is the use of an insect repellent, applied at two to three hour intervals.

If an insect bite occurs, employees should be aware of the following symptoms. A ring may form around the bite indicating that the tick may be carrying the Lyme Disease. This is not

always true however, and crewmembers that have received a tick bite should seek appropriate medical treatment if soreness, swelling, or other effects occur. Personnel will take precautionary measures by wearing proper clothing, use of repellants, use of good work practices, and recognizing symptoms early. Individuals that develop a rash or experience other early symptoms of Lyme disease (i.e., fatigue, headache, muscle aches, neck stiffness, fever, and swollen glands) should notify the SHSM promptly for referral to a physician for evaluation.



From left to right: The deer tick (*Ixodes scapularis*) adult female, adult male, nymph, and larva on a centimeter scale.

General guidelines for prevention of exposure to ticks and tick-borne diseases include:

- Limit work in tick infested areas.
- Wear light-colored clothing to allow for easy visibility of ticks on clothing.
- Wear tick-prevention gaiters or use duct tape around pant legs to prevent ticks from crawling up the leg.
- Apply repellants (e.g., permethrin to boots and clothing, DEET to exposed skin).
- Conduct a body check upon return from potentially tick-infested areas. Embedded ticks should be removed using the following guidelines:
 - Use a fine-tipped tweezers or shield your fingers with rubber gloves.
 - Grasp tick as close to the skin surface as possible and pull upward with a steady, even pressure.
 - Do not twist or jerk the tick, or squeeze, crush, or puncture the body of the tick.
 - After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
 - Save the tick for identification in case you become ill.

DO NOT use petroleum jelly, hot matches, nail polish, or other products to assist in tick removal.

14.3.2 West Nile Virus

Symptoms usually develop between 3 and 14 days after being bitten by an infected mosquito. Approximately 80 percent of people who are infected with West Nile Virus (WNV) will not show any symptoms at all. Up to 20 percent of the people who become infected with WNV will display mild symptoms, including fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms typically last a few days. About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Mild WNV illness improves without treatment, and medical attention is not necessary. If symptoms of severe WNV illness are present, such as unusually severe headaches, immediately seek medical evaluation.

General guidelines for prevention of exposure to mosquitoes and WNV include the following:

- Wear long-sleeved shirts.
- Spray exposed skin with an insect repellent containing 15-30% DEET.
- Spray clothing with products containing DEET or permethrin, as mosquitoes may bite through thin clothing. Permethrin should only be used on clothing; do not apply it directly to skin. Wash treated clothing before wearing it again.
- Do not apply repellent to skin that is under clothing.
- Wash treated skin with soap and water after returning indoors.

14.3.3 Stray animals – cats, raccoons

Animal bites (both wild and domestic) can result in both infection and disease. Tetanus, rabies, and various types of fevers can follow an untreated animal bite. Never approach or harass wild animals. Notify the SHSM of any animals observed onsite. If the animal does not exit the work area voluntarily, appropriate animal control officials will be contacted to assist in the removal.

Any individual bitten by an animal will be evaluated promptly by medical personnel. In the interim:

- Clean the wound thoroughly with soap or detergent solution.
- Flush it well with water.
- Cover with a sterile dressing.
- Immobilize an injured extremity.
- If unable to capture or kill the animal, provide medical personnel with any information possible to help identify the animal so that they can provide appropriate treatment.

14.3.4 Snakes

All personnel should be aware that site activities have the potential for encountering or disturbing snakes. Areas with heavy undergrowth or shrubs are of special concern. Prompt first aid measures are extremely important.

If an individual is bitten by a snake, the basic rule is -- TREAT ALL SNAKEBITES AS POISONOUS. A probability exists that all snakes may be potential carriers of tetanus (lockjaw); if bitten by any snake, whether poisonous or not, seek medical attention immediately. If bitten, identify and/or kill the snake (if it can be done quickly and safely) and take it to the hospital for identification. This information is valuable to medical personnel when treating snakebites.

The following first-aid steps should be taken if bitten by a snake:

Seek medical help. In the interim:

- Remain calm, but act swiftly.
- Immobilize the affected area in a position horizontal to the heart, or in a gravity-neutral position.
- Do not attempt to cut open the bite or suck out venom. If venom should seep through any damaged or lacerated tissues in the mouth, it could cause immediate unconsciousness and/or death.
- Do not drink alcohol or use medication. Do not apply hot or cold packs. Do not use a tourniquet such as a belt, necktie, or cord. Do not waste time trying to capture, kill, or bring

in the offending snake unless it can be done quickly and safely for use in identification of the proper treatment.

14.3.5 Poison Ivy, Poison Oak, Poison Sumac

Poison ivy and poison oak have poisonous sap (urushiol) in their roots, stems, leaves and fruits. The sap is released when the plant is bruised, and is especially hazardous in the early spring and summer when the leaves are tender. The sap may be deposited on the skin by direct contact with the plant or by contact with contaminated objects, such as clothing, shoes, tools, and animals.

Poison Ivy grows everywhere in United States except Hawaii and Alaska. In the East, Midwest, and the South, it grows as a vine. In the Northern and Western United States, it grows as a shrub. Each leaf has three leaflets. (*Leaves of three, let it be!*) Leaves are green in the summer and red in the fall. In the late summer and fall, white berries may grow from the stems.

Poison Oak has oak-like fuzzy leaves in clusters of three. It has two distinct kinds: Eastern poison oak (New Jersey to Texas) grows as a low shrub. Western poison oak (Pacific Coast) grows six-foot-tall clumps or vines up to 30 feet long and may have clusters of yellow berries.

Signs and symptoms of poisoning include itching, redness, burning sensation, swelling, blisters, and a rash. Symptoms may develop within a few hours or may take three to five days to develop. If left untreated, the rash may last several weeks.

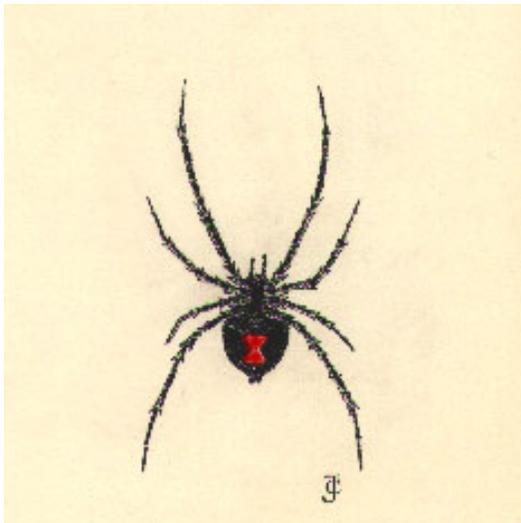
Hazardous Plants

	<p>Poison Ivy: A woody shrub or vine. The vine climbs by aerial rootlets that cling readily to trees. Three leaflets borne on a single petiole make up the leaf. Each leaflet can be up to four inches long and is a dark waxy, shiny green above and lighter green and fuzzy beneath. The flowers grow like berries on very thin stems. During the summer, the flowers are lost and the leaves turn fire-engine red. All parts of the plant are poisonous.</p>
	<p>Poison Oak: In the West, poison oak may grow as a vine or a shrub. In the East, it grows as a shrub. Hair grows on the fruit, trunk and leaves. Leaves have three leaflets like poison ivy. The flowers of poison oak are glossy, white-green and grow like berries. In the fall, poison oak is yellowish red and in the winter it is bare. When bare, poison oak can be distinguished by its three branches. All parts of the plant are poisonous.</p>
	<p>Poison Sumac: This plant can be a tree or shrub, it can grow up to 25 feet in height with a trunk up to 6 inches in diameter. It is limited to swampy lands but ranges from Maine to Florida and west to Minnesota, Missouri and Louisiana. The leaves alternate, can be 15 inches or more long made up of 7 to 13 alternating thin oval to pointed leaflets. The whole plant is very poisonous.</p>

Preventive measures include wearing long-sleeved shirts and long pants, and cloth or leather gloves. Barrier creams should be applied to exposed skin. Calamine lotion over affected area will also help relieve itching and promote healing. Rubbing alcohol can be used to remove the oily resin up to 30 minutes after exposure.

14.3.6 Spiders

Spiders in the United States are generally harmless, with two notable exceptions – the black widow spider (*Latrodectus mactans*) and the brown recluse or violin spider (*Lox osceles reclusa*). Field workers must exercise caution when lifting covers off manholes or sumps or rummaging through wood, rock, or brush piles, etc. Both the black widow and brown recluse spiders are typically found in these locations. The following describes the symptoms and treatment for spider bites.



Black Widow



Brown Recluse

14.3.7 Black Widow

Black widow spiders spin tangled webs of coarse silk in dark places, usually outdoors. Webs are usually built near the ground normally in trash, rubble piles, under or around houses and outbuildings such as privies, sheds, and garages. The bite feels like a pinprick or is not even felt. At first, there may be only slight local swelling and two faint red spots surrounded by local redness at the bite. Pain becomes intense in one to three hours and may continue up to 48 hours. Pain usually progresses from the bitten member up or down the arm or leg, finally localizing in the abdomen and back. The abdominal muscles may become rigid and board-like with severe cramps (resembles appendicitis). There may be pain in the muscles and soles of the feet, and eyelids may become swollen. Other symptoms may be nausea, profuse perspiration, tremors, labored breathing and speech, and vomiting. During this time, a feeble pulse, cold clammy skin, unconsciousness, convulsions and even death may result if the victim does not receive medical attention immediately. Additional complications may occur due to the infection of the bite. Bites are uncommon and serious long-term complications or death are rare. If bitten, remain calm, collect the spider (if possible) for positive identification, and get medical attention immediately. First aid is of limited help. Application of a mild antiseptic such as iodine or hydrogen peroxide prevents infection.

14.3.8 Brown Recluse

The brown recluse spider, or violin spider, is about 1 inch long. The most distinguishing mark is the violin like dark patch on their head and thorax with the skinny part of violin pointing toward the abdomen. It is not an aggressive spider, but will attack if trapped or held against the skin. No deaths have been reported in the US from a brown recluse bite.

Venom from the brown recluse spider usually causes local tissue damage. The most common symptoms of a bite from a brown recluse spider bite include: burning, pain, itching, or redness at the site which is usually delayed and may develop within several hours or days of the bite; a deep blue or purple area around the bite, surrounded by a whitish ring and large red outer ring similar to a "bull's eye"; an ulcer or blister that turns black; headache, body aches; rash; fever; nausea or vomiting. These symptoms of a brown recluse spider bite may resemble other conditions or medical problems.

First Aid: Seek immediate medical attention. In the interim, the following steps should be taken:

- Wash the area well with soap and water.
- Apply a cold or ice pack wrapped in a cloth to reduce swelling and redness.
- Apply an antibiotic lotion or cream to protect against infection.
- Give acetaminophen for pain.
- Elevate the site if the bite occurred on an arm or leg (to help prevent swelling).
- Seek immediate emergency care for further treatment. Hospitalization may be needed.

14.4 Physical Hazards

14.4.1 Noise

- A Hearing Conservation Program will be in place whenever employees are exposed to 85 dBA (slow) averaged over an 8-hour workday in accordance with MES Master Health and Safety Plan for McClellan.
- Employees will be trained on the contents and purpose of the Hearing Conservation Program when the program is established. Training will also include the proper use and care of various types of hearing protection.
- Annual audiograms will be provided for employees exposed to 85 dBA (slow) averaged over an 8-hour work day.

14.4.2 Underground Utilities

- The PM, SHSM and/or Operations manager will be responsible for determining whether utilities “reasonably may be expected to be encountered.”
- All known utilities will be identified and marked prior to excavation/trenching activities. Potential utilities requiring evaluation include electric, gas, oil, chemical lines, pipelines, sewers, telephone/communications, fiber optic, cable TV. Every effort will be made to identify, trace, and mark utility lines. Unknown underground utilities may exist at many projects, in many areas.
- MES and the Subcontractor(s) are responsible for ensuring that safe work practices are used to identify and avoid contact with underground utilities.
- All utility locate activities shall be coordinated with the PM, the SHSM and/or local utility locate businesses.
- Identified utilities will be marked with stakes, flags, paint, chalk, offsets, or other visible means of identification.
- Intrusive soil activities conducted within a five foot “Buffer Zone” (horizontal or vertical, as measured from the outside edge of the utility) of any utility (electric, gas, high pressure, chemical storage tanks, pipelines, sewers, etc.) may require the use of non-aggressive excavation methods such as hand excavation using non-conductive hand tools, use of an air spade, hydro-excavation, or similar means.
- If a previously unknown utility line is identified, uncovered, or disturbed during excavation/trenching activities, the excavation activity shall stop immediately and project management notified. Excavation will not recommence until the line has been evaluated, identified, traced, and/or safe work practices have been developed and implemented to limit or prevent associated hazards.
- Excavation spoil piles should not be placed atop surface features or ground markings identifying the locations of underground utilities.
- Utilities exposed during excavation or potholing must be protected. Utilities can shift or sag when the soil that was supporting and protecting the utility is removed. Utilities that are

unsupported will be temporarily supported by shoring or other means as excavation continues.

Uniform Color Code of the American Public Works Association:

- Red – Electric power distribution and transmission lines, cables, conduit, and lighting cables
- Yellow – Gas and oil distribution systems, steam, petroleum, or other hazardous liquid or gaseous materials
- Orange – Telephone, video, cable TV, other telecommunications, alarm or signal lines, cable or conduit
- Blue – Water, irrigation, and slurry lines
- Green – Sewers, storm sewer facilities, other drain lines
- Pink – Temporary survey markings
- Purple – Slurry and reclaimed water (also used for Cable TV)
- White – Proposed excavation limits, centerline and width of proposed lineal installations

14.4.3 Precautions When Near Overhead Utility Lines

- Best Safety Practice: Never get closer than 10 feet to an overhead power line.
- Before you begin work, survey the site for overhead power lines. LOOK UP!
- All overhead wires will be considered to be energized unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line or it has been visibly disconnected.
- If overhead lines are present, call the utility company/owner and find out what voltage is on the lines. Ask if the lines can be de-energized while work is performed near the lines.
- If lines cannot be shut down and/or line insulation is applied, a minimum safe distance of 10 feet must be established. Conduct a pre-work briefing to discuss the planned work. Include discussion of all equipment that could come in contact with the power lines (dump trucks, excavators, back hoes, cranes, etc.).
- For lines rated 50kV or below, the minimum clearance between the lines and any part of the equipment (e.g., excavator, loader, crane) or load shall be 10 feet. For lines rated over 50kV, minimum clearance between the lines and any part of the equipment or load shall be 10 feet plus 4 inches for each 10kV over 50 kV. Or, follow the ANSI guidelines for operating cranes (and other equipment) near overhead power lines (ANSI Standard B30.5-1994, 5-3.4.5)[ANSI 1994]:

Table 4. Equipment / Powerline Safe Distances

Power line voltage phase to phase (kV)	Minimum safe clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

- Notify line owners before work is performed near power lines.
- Post warnings on equipment cautioning the operators to maintain safe clearance between energized power lines and their equipment.

- Operate all equipment at a slower-than-normal rate in the vicinity of power lines.
- Exercise caution near long spans of overhead power lines, since wind can cause the power lines to sway laterally and reduce the clearance between equipment and the power line.
- Mark safe routes where equipment must travel beneath power lines.
- Exercise caution when traveling over uneven ground that could cause the equipment to weave or bob into power lines.
- Keep all personnel well away from the equipment whenever it is close to power lines.
- Prohibit persons from touching the equipment or loads until a signal person indicates that it is safe to do so.

Procedures to Follow if Contact with Overhead Power Line Occurs:

To protect against electrical shock injury in the event of contact between a piece of equipment and an energized line, the following procedures are recommended:

- The equipment operator will remain inside the cab.
- All other personnel shall keep away from the equipment, crane, ropes, and/or load, as the ground around the equipment might be energized.
- The equipment operator should try to remove the equipment from contact by moving it in the reverse direction from that which caused the contact.
- If the equipment cannot be moved away from contact, the operator will remain inside cab until the lines have been de-energized.

14.5 Site Monitoring

No site monitoring is planned at this time. The master health and safety plan for McClellan will be revised to include monitoring procedures should the need arise to conduct monitoring.

14.6 Emergency Planning

MES's project management team will hold an emergency response planning meeting during mobilization and prior to fieldwork to discuss and define the following:

- Personnel roles and line of authority.
- Safe distances from emergency location.
- Evacuation/Hospital route, procedures, and pre-determined meeting place.
- Medical emergency and communication procedures.
- Emergency alert and response procedures.
- Emergency equipment and its location on-site.

The emergency response plan will be discussed during initial site training and discussed regularly during the Daily Tailgate Safety Meetings. Annually or as needed, the SHSM and the PM will review the plan and make any changes necessary to keep the plan current with new or changing site conditions and information. The SHSM will conduct drills bi-annually or more frequently if conditions change to evaluate the response and testing the effectiveness of the plan.

Conditions that may lead to an emergency situation during field activities will be addressed in specific AHAs as tasks are identified. These conditions include:

- Fire.
- Vehicle collisions or rollovers.
- Environmental release.
- Severe weather.

- Medical emergency due to heat/cold stress, physical/physiological incident, allergic reactions.

14.7 Responsibilities

During all emergencies, the Operations Manager will serve as the Emergency Coordinator and the SHSM will support the Emergency Coordinator. Together they will abate and/or contain the emergency.

Upon discovering an emergency, the following series of events will occur:

- Notify personnel.
- Establish communication.
- Stop work activities, if necessary.
- Lower background noises (shut down equipment).
- Begin emergency procedures (order is dependent on the situation).
- Survey casualties.
- Access “Airway, Breathing, Circulation” of each patient.
- Request aid, if necessary.
- Assess existing and potential hazards to site personnel and off-site populations.
- Allocate resources.
- If a certified EMT is in attendance, help extricate and stabilize victims.
- Evacuate all non-essential personnel.

14.8 Alerting and Communications

An employee alarm system will consist of the use of air horns or verbal instructions, either directly or via radio. Air horn signals, (and hand signals if necessary) will be established and employees will be trained in the signals and appropriate response. Telephones will be used to contact off-site emergency responders. Contact lists, included in the master health and safety plan will be posted in the site offices, and a copy will be kept in site vehicles. The following information will be communicated:

- Name of the person reporting the emergency.
- Telephone number at the location of the person making the call.
- Name of the injured person, if known.
- Description of the emergency.
- Exact location of the emergency.
- Actions already taken.
- Assistance required.

14.9 Coordination with Local Emergency Agencies

Local authorities and emergency services will be contacted prior to initiation of work. The work objectives and on-site capabilities will be explained, as well as the most likely emergencies. Preferred contact procedures will be established and the response capabilities of local responders will be determined. MES will ensure there is good coordination between our emergency plan and local requirements. Contact agencies, points of contact and phone numbers are presented in the Master Health and Safety Plan.

14.10 Emergency Action Procedures

At least two employees certified in both First Aid and Cardiopulmonary Resuscitation (CPR) will be on the project at all times. A first aid kit must be maintained on site and checked weekly (EM 385-1-1 section 03.B.02). A log of items used will be maintained.

If an injury or illness requires more than first aid, but is not an emergency, the employee will be taken to a pre-determined clinic for examination or observation.

If the injury or illness is considered an emergency, the local ambulance service will be contacted to transport the victim to the local hospital or emergency care facility.

14.11 Rescue Operations

Where employees are engaged in one of the following activities or environments, a rescue plan will be incorporated into the site-specific work plans as required.

- Working at elevations.
- Using personal fall arrest systems.
- Confined spaces, or potentially IDLH atmospheres.
- Working alone.
- Working in remote environments.

14.12 Evacuation Routes and Procedures

Evacuation Routes and rally points will be identified during pre-mobilization activities. The SHSM and operations manager will be responsible for training the site personnel in the proper evacuation procedures and for arranging for accountability of all personnel in the event of an evacuation. Generally, this will consist of designating a person to take the daily sign-in sheet(s) to the rally point and taking a roll call.

14.13 Contamination Control during Emergencies

No decontamination is required for this project.

14.14 Spill and Discharge Control

Potential hazardous spills from the work sites are identified in the master health and safety plan.

Control measures:

- Provide for secondary containment where required by regulation or contract, and where a spill could result in significant hazard or economic loss.
- Provide other appropriate engineering controls to prevent environmental releases to the ground, water or air. These will be identified in AHAs or environmental permits (or equivalent).
- Provide equipment and personnel to perform emergency measures to mitigate spills and control their spread.
- Dispose of contaminated materials.
- Provide a decontamination program to clean previously uncontaminated areas.

14.14.1 Contingency Plan

In the event of a spill or release, MES will:

- Notify the client representative immediately.
- Take immediate measures to control and contain the release, including contacting local emergency service providers, if necessary.
- Isolate and contain hazardous release areas.
- Deny entry to the spill area to unauthorized personnel.
- Stay upwind, keep out of low areas.
- Keep combustible materials away from the spilled material.
- Collect samples for analysis to determine that cleanup is adequate.

- If liquid, prevent the discharge from traveling beyond site boundaries.
- Take caution when handling drums and containers.

14.14.2 Notification of Spills and Discharges

MES will notify the contracting representative immediately of any spill or discharge. The client representative will make regulatory notifications unless MES is requested to do so by the client. However, MES is aware of its regulatory responsibilities and will make such notifications if a delay presents a compliance issue.

14.15 Fire Prevention and Protection

In addition to the office buildings, major fire hazards and their control are noted in the AHA.

Requirements for storage of flammable and combustible liquids will include:

- A suitable portable fire extinguisher will be available at the location where flammable or combustible liquids are stored.
- “No Smoking” signs will be posted in the storage area.
- Flammable liquids will be stored in closed containers. Type I or Type II metal safety cans (not greater than 5 gallons capacity) will be used for small quantities. Plastic storage containers are not allowed.
- Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.
- Containers of flammable and combustible liquids shall be stored properly when not in use.
- The grounds around the storage area will be kept free of weeds, trash, and other unnecessary combustible materials.
- Spills will be cleaned up promptly.

All project personnel will be responsible for observing and reporting fires and conditions that could lead to fires. During all on-site activities, the following practices will be used for fire prevention and protection:

- Smoking on-site is prohibited in designated work areas, contamination reduction zones, and other areas where smoking may create a fire hazard (e.g., dry fields).
- A designated smoking area will be established as necessary by the SHSM or team supervisors when operations on site begin.
- Accumulations of combustible scrap and debris on-site will be promptly removed and properly disposed.
- Care will be taken with all equipment to reduce the possibility of sparks or open flames.
- Inspect all electrical cords and plugs prior to use; keep cords away from water and moisture.
- Fire extinguishers (minimum 2ABC, 10-lb) will be available at the work area and support area.
- A fire extinguisher will be available on all pieces of heavy equipment.
- Fire extinguishers will be inspected monthly.
- Defective fire fighting equipment will be replaced immediately.
- Fires or open flame devices will be prohibited, unless authorized by the SHSM or team supervisors .
- Only employees trained in the use of fire extinguishers will be permitted to use them.
- Only fires in the incipient stage will be addressed using portable fire extinguishers. Regardless of the size and nature of the fire, and MES’s ability to respond, all fires will be reported immediately to the local fire department.

14.16 Emergency Supplies

At a minimum, the following supplies will be immediately available for on-site use:

- Air horns.
- First aid equipment and supplies.
- Emergency eyewash station as per ANSI Z-358.1 if exposure to corrosive materials is present.
- Blood borne Pathogen PPE and bodily fluid cleanup kit.
- Spill control material and equipment.
- Radio and Cell phone.
- Type ABC fire extinguisher, 10 lb. capacity, minimum of two.
- A vehicle parked at an exit point.

Each field team will have a first aid kit, eye wash, fire extinguisher, air horn and communications equipment. Additional emergency response equipment will be located at the field office.

14.17 Documentation and Review

After the response, MES will prepare an Incident Report. It will include such things as a chronological history of the emergency, facts, action, personnel present, sample results (if collected), summary of injuries, and possible exposures. For spills and releases it will also include:

- Description of material spilled, including identity, quantity, and a copy of the waste disposal manifest.
- Exact time and location of the spill, and the description of the area involved.
- Containment procedures utilized.
- Description of the cleanup procedure employed at the site, including disposal of spill residue.
- Summary of the communications MES had with other agencies.

This report will be given to JPA within two days of the incident along with immediate verbal notification.

The report will also contain a critique of the response and modifications to this plan will be made if necessary to adequately address subsequent emergencies.

14.18 Accident Prevention Signs, Tags and Labels

Standard accident prevention signs, tags and labels will be used to communicate hazards and precautions in accordance with Section 8 of EM 385-1-1. Examples that may be used include:

- Project sign, including running injury-free record.
- Danger, Warning and Caution signs.
- Work zone signs.
- PPE requirement signs.
- Lockout/ tag out tags.
- Inspection and Do Not Use tags.
- NFPA or HMIS hazardous material signs and labels.

Specific items will be determined by SHSM.

14.19 Postings

Required postings and general safety awareness reminder posters will be used to communicate information to site participants. In addition to the Safety and Health Bulletin Board described below, posters may be used anywhere throughout the site as determined by the SHSM. Poster topics will be directed at the known hazards on the site.

14.20 Daily Safety Briefings

Daily briefings will be used to communicate daily activities, hazards and precautions, as well as to solicit input from site participants on safety issues or improvements. The briefings may also be used to present safety training topics and refresher items.

14.21 Safety and Health Bulletin Board

MES will erect and maintain a safety and health bulletin board in an area commonly accessed by workers. The bulletin board will be maintained current, in clear view of onsite workers; and protected against the elements and unauthorized removal. It will contain at least the following safety and health information:

- Map denoting the route to the nearest emergency care facility.
- Emergency phone numbers.
- Copy of the current APP and the task-specific SSHP will be mounted on or adjacent to the bulletin board or state the location, which will be accessible on the site by all workers.
- Copy of current AHA reports mounted on or adjacent to the bulletin board or state the location, which will be accessible on the site by all workers.
- OSHA Form 300A will be posted from February 1 through April 30 of each year. The form will be mounted on or adjacent to the bulletin board.
- Safety and Health promotional posters.
- Date of last lost workday injury.
- OSHA Safety and Health Poster.
- Copy of Safety and Occupational Health Deficiency Tracking Log will be mounted on or adjacent to the bulletin board or state the location where it will be accessible by all workers upon request. (See below for required content.)

The Safety and Occupational Health Deficiency Tracking Log will list the status of safety and health deficiencies in chronological order. The list will be updated daily, and include:

- Date deficiency identified.
- Description of deficiency.
- Name of person responsible for correcting deficiency.
- Projected resolution date.
- Date actually resolved.

Attachment 1 – Site Safety and Health Plan

This Master Health and Safety plan for McClellan supplements the Accident Prevention Plan and contains task order–specific information. Additional safety and health requirements will be found in the AHAs, supplemental plans (if applicable), MES Corporate SOPs and project specific SOPs as identified below. If hazards or conditions are identified that are not covered by this SSHP, contact your SHSM. Applicability to EM 385 is shown in the table below.

Hazard Assessment and Control	EM 385 Reference	Required Yes/no	If Required, Location or Reference
Activity Hazard Analysis (AHA)	01.A.13	Yes	AHAs are presented in APP
Alcohol and drug abuse prevention plan	N/A	Yes	Master Health and Safety Plan
Electrical safety	11	Yes	Master Health and Safety Plan
Excavations	25	Yes	Master Health and Safety Plan
Fall protection plan	21	No	Master Health and Safety Plan
Hazard communication program	01.B.06	Yes	Master Health and Safety Plan
Health hazard control program	06.A.02	Yes	Master Health and Safety Plan
Respiratory protection plan	05.E.03	No	

Site Layout and Support Facilities	EM 385 Reference	Required Yes/no	If Required, Location or Reference
Public safety requirements	04.A.04	Yes	Master Health and Safety Plan
Site layout plans	04.A.01	Yes	Master Health and Safety Plan
Site sanitation plan	Sec. 02	Yes	Master Health and Safety Plan

Emergency Preparedness	EM 385 Reference	Required Yes/no	If Required, Location or Reference
Emergency phone numbers	01.E.05	Yes	Master Health and Safety Plan
Emergency route to the hospital	01.E.05	Yes	Master Health and Safety Plan
Emergency response procedures	01.E.01	Yes	Master Health and Safety Plan
Fire prevention plan	09.A.01	Yes	Master Health and Safety Plan

1.0 Site Description

Site History and Description:

McClellan has documented use as a military training area since 1912, when the Alabama National Guard used it for artillery training. However, the Choccolocco Mountains may have been used for artillery training by the units stationed at Camp Shipp in the Blue Mountain Area during the Spanish American War as early as 1898. The 29th Infantry Division used areas of McClellan for training prior to being ordered to France during World War I. In 1917, Congress authorized the establishment of Camp McClellan, and in 1929, the camp was officially designated as Fort McClellan. Prior to World War II, the 27th Infantry Division assembled at McClellan for training, and during the war, many other units used the site for various training purposes. Following World War II, in June 1947, McClellan was put in inactive status. McClellan was reactivated in January 1950 and the site was used for National Guard training and was selected as the site for the Army's Chemical Corps School.

The history of McClellan, as described in the Archives Search Report (ASR) Findings [U.S. Army Corps of Engineers (USACE) 1999a] and ASR Conclusions and Recommendations (USACE 1999b), includes training activities and demonstrations that used conventional weapons (i.e., mortars, anti-tank guns, and artillery pieces). McClellan was recommended for closure under the BRAC Program and was closed in September 1999.

A location map of the area is provided in Master Health and Safety Plan.

Scope of Work:

The work required under this Scope of Work (SOW) requires the removal of Munitions and Explosives of Concern (MEC) that exist on property formerly owned or leased by the Department of Army.

MEC is a safety hazard and may constitute an imminent and substantial endangerment to the local populace and site personnel. The work associated with this action will be performed in accordance with plans approved by the Alabama Department of Environmental Management (ADEM) under a memorandum of agreement with the Department of the Army.

All activities involving work in areas potentially containing explosives hazards shall be conducted in general compliance with Department of Defense (DoD), Department of Army, US Army Corps of Engineers (USACE), state and local requirements regarding personnel, equipment, and procedures. 29 CFR 1910.120 shall apply to all actions taken at this site.

McClellan may contain chemical warfare material (CWM). If MES identifies or suspects CWM, personnel shall immediately withdraw upwind from the work area and contact the Transition Force. The contractor shall secure the area and provide two personnel located upwind of the suspect CWM to secure the site.

CONTRACTORS

Company	Scope of Services
NAEVA Geophysics, Inc.	Geophysical Investigation
L.I. Smith and Associates, Inc.	Surveying
Harmon Engineering	Brush removal
MES	MEC demilitarization

2.0 Hazard Assessment

- AHAs for this task** are listed below and can be found in the Master Health and Safety Plan and Attachment 2.
- General site work
 - Vegetation Clearing
 - Intrusive Operations Using Manual Tools and Methods
 - UXO Demolition Activities

MES SOPs

SOPs applicable to this project are provided in Appendix I of the Work Plan.

UXO known or suspected to be present?	UXO support and plans provided:
Yes X No <input type="checkbox"/>	Yes X No <input type="checkbox"/>

Crane Lifts Yes <input type="checkbox"/>	No X
Items to be lifted: None	Lift plan: N/A

Excavations	Yes X	No <input type="checkbox"/>
The Utilities Location Plan will be provided by the local utilities company. MEC investigation and mitigation procedures are included in the Work Plan Chapter 2 – Technical Management Plan and in the site ESS.		

Biological Hazards Anticipated biological hazards are included in the APP, Section 13.

CHEMICAL HAZARDS						
Site Contaminants						
Chemical	Media [water or soil]	Conc. [range or max.] [mg/kg or ug/l]	PEL [mg/m³ or ppm]	TLV [mg/m³ or ppm]	Route of Entry	Symptoms & Fire/reactivity Hazards
There are no known chemical hazards associated with the scope of work.						
Hazardous Materials to be Used						
Material	Hazardous Constituent	Physical Form	PEL [mg/m³ or ppm]	TLV [mg/m³ or ppm]	Route of Entry	Symptoms & Fire/reactivity Hazards
No hazardous materials are used on this project.						

3.0 Staff Organization		
KEY PERSONNEL		
Names and Titles	Contact Information	
Program Manager Steve Young	Phone: 719-575-0100	
Project Manager Richard Satkin	Phone: 404-414-7054	
UXO Safety Officer Cecil Taylor	Phone: 256-847-0780	
UXO Quality Control Specialist Jason Soth	Phone: 256-847-0780	

4.0 Training

In addition to the general training requirements addressed in Section 7 of the APP, the following site specific requirements are required:

General Training Requirements

40-hour OSHA off-site hazardous waste site instruction. Off-site instruction must comply with the 40-hour training requirements in OSHA standards 29 CFR 1910.120 and 29 CFR 1926.65.

8-hour annual refresher training. Refresher training must comply with the requirements in OSHA standards 29 CFR 1910.120 and 29 CFR 1926.65.

3 days of field experience under the direct supervision of a trained, experienced supervisor.

Supervisory training.

On-site supervisors must comply with the 8-hour supervisory training requirements.

Project-specific training. The following project-specific training shall be provided to workers before on site work begins:

- Training specific to Section 6 of the APP.
- Training covering each element of the master health and safety plan.
- Site specific MEC hazards.
- MES will maintain copies of the required training certificates on site and will make them available for inspection upon request.

5.0 Personal Protective Equipment

Unless otherwise approved by HSM, all non-UXO activities will be performed in OSHA Level D Modified PPE and will include at least ANSI approved hard hats, safety-toe footwear, and safety glasses with side impact protection. PPE Exceptions for UXO activities are listed

	General Site Activities	UXO Activities	Brush Cutting	
Respiratory Protection Type:	None required	None required	See the AHA	
Body protection	Standard work clothing Hard hats not required Steel-toed Work Boots	Work boots without steel toes	See the AHA	
Hand protection	Leather gloves when using hand tools	Leather gloves	See the AHA	
Eye/face protection	Safety glasses	Safety glasses	See the AHA	
Hearing protection	None required	None required	See the AHA	
Other (e.g. Personal Fall Arrest)	None required	None required	See the AHA	

6.0 Medical Surveillance

In addition to requirements stipulated in Section 11 of the APP the following site specific requirements must be adhered to:

All personnel performing on-site work will be enrolled in a medical surveillance program that complies with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65 (f). Minimum specific exam content and frequency based on probable site conditions, potential occupational exposures, and required protective equipment shall be specified. Certification of medical surveillance program participation is included in attachment 3 of the master health and safety plan for McClellan and includes: employee name, date of last examination, and name of examining physician. The required written physician's opinion is included and will be made available upon request. All medical records will be being maintained by MES in accordance with 29 CFR 1910.1020.

7.0 Exposure Monitoring/Air Sampling Program

Real Time (Air, noise, heat, radiation, light)

Instrument / Contaminant	Frequency	Action Levels	Actions/Upgrade and Rationale
--------------------------	-----------	---------------	-------------------------------

Real time air monitoring will not be required in the scope of this project.

Integrated Personal

Contaminant	Frequency (# of samples)	Duration
-------------	--------------------------	----------

Integrated personal monitoring will not be required in the scope of this project.

Perimeter

Contaminant	Locations and Frequency	Duration
-------------	-------------------------	----------

Perimeter monitoring will not be required in the scope of this project.

Special Medical Monitoring (list tests, frequency, criteria levels and any medical removal/physician consultation requirements):

- Special medical monitoring will not be required in the scope of this project.

8.0 Heat and Cold Stress Monitoring

Heat stress monitoring may be required depending upon the duration of the project. Procedures contained in SOP HS-016 – Heat Stress Monitoring Program are available upon request.

9.0 Site Control Measures, (See Section 13 of APP)

Work Zones:

- Site access will be controlled using barrier tape and/or fence.
- Specific Minimum Separation Distances (MSDs) will be established based on the approved explosives safety submission for the site.

Decontamination Procedures: None required.

Engineering and Special Work Practices to control site contaminants: Miniature Open Front Barricade (MOFB) and Sand bag mitigation techniques will be incorporated when investigating suspected MEC and during disposal by detonation activities where necessary due to MSD.

MEC Waste Materials Management (Contaminated soils, debris, scrap, PPE, decon fluids, etc.): Specific packaging and inspection criteria for MEC-related scrap and non-MEC-related scrap are included in the Work Plan (WP), Chapter 2 Technical Management Plan.

10.0 Personnel Hygiene and Decontamination

Personnel Decontamination

Personnel Decontamination will not be applicable for this project.

Sanitation

- Drinking Water: Potable bottled drinking water will be provided.
- Toilet Facilities: Portable toilets will be provided in close proximity of the daily assigned work area.
- Washing/Shower Facilities: Hand and face cleaning supplies will be available at each portable toilet.
- Food Service: Will not be required in this task order
- Vermin Control: Will not be required in this task order

11.0 Equipment Decontamination

Equipment Decontamination will not be applicable for this project.

12.0 Emergency Equipment and First Aid

Specific requirements are in the master health and safety plan for McClellan and this APP for medical emergencies.

THIS LIST WILL BE POSTED NEAR ALL PHONES AND LOCATED IN ALL PROJECT VEHICLES.

EMERGENCY CONTACTS

Fire Department (off post)	9-1-1
Ambulance (off post)	9-1-1
Police (emergency)	9-1-1
Regional Medical Center	(256) 235-5121
Anniston Police Department (non-emergency)	(256) 238-1800
National Response Center & Terrorist Hotline	(800) 424-8802
Poison Control Center	(800) 462-0800
EPA Region IV	(404) 562-8725
Joint Powers Authority (Miki Schneider)	(256) 236-2011 ext 24 (o) (256) 310-0267 (c)
Matrix Environmental Services Office (AL)	(256) 847-0780 or (256) 847 0806
Matrix Environmental Services Office (CO)	(303) 572-0200
Matrix Environmental Services (Michelle Klomp) – PM	(303) 579-1044
Matrix Environmental Services (Cecil Taylor) – SHSM	(256) 310-8004 (c)
Matrix Environmental Services (Bo Bohannan) – MEC	(850) 832-7155 (c)
Matrix Design Group (Jennie Keys) – HSC	(720) 280-7237
723 rd EOD Fort Gillem	(404) 469 54367
Scott Bolton – Transition Force	(256) 848-3847

KEY PROJECT PERSONNEL ARE TO HAVE THIS LIST READILY AVAILABLE AT ALL TIMES

Conditions potentially leading to emergency:

- Slips trips and falls
- Contact with mechanized equipment and vehicles
- Fires
- Contact with underground utilities
- Unplanned detonation of UXO

Evacuation and Rally Points:

To be determined for each location. A standard site location map will be used to address evacuation routes and rally points at the daily tail gate safety briefing.

Spill or Release Potential (Describe): Limited to fuels and normal mechanical fluids.

Spill Supplies Needed: Those necessary for the above.

Directions to Hospital (Post Attachment 4 – Hospital Route Map in each site vehicle):

Directions will be briefed on a daily basis at the daily tailgate safety briefing using the hospital route map.

Exit McClellan via the Summerall Gate and go south approximately 3 miles on Hwy 21. Turn east onto East 10th Street and go to 400 E. 10th Street to the Regional Medical Center.

Directions to the clinic to be used for non-emergency cases will also be available and posted.

Rescue Plan(s) Complete if workers will be working 1) alone; 2) in geographically remote sites; 3) at elevations; 4) using personal fall arrest systems; 5) in confined spaces; 6) in potentially IDLH atmospheres:

- Rescue plans will not be required in the scope of this project.

14.0 Emergency Response Team

See Section 13.0 for emergency contact information.

15.0 Confined Space Entry

Will not be required in the scope of this project.

16.0 Logs, Reports and Record Keeping

Specific requirements are addressed in the applicable portions of the Work Plan. Required forms are included in Attachment 7 of this document and in Appendix F of the Work Plan.

- Training logs, daily safety inspection logs, employee/visitor registers, medical surveillance records and certifications, will be kept on site and become part of the final report.
- All personal exposure and medical monitoring records will be maintained in accordance with (IAW) applicable OSHA standards, CFR 1904, 1910, and 1926 and will be maintained at MES's Corporate office.
- All visitor registration logs, training logs, and daily safety inspection logs (as part of the daily Quality Control [QC] Reports) will be retained on site, and will be submitted as part of the final report,
- Should any unforeseen hazard become evident during the performance of work, the SHSM will bring such hazard information to the attention of the operations manager, PM, and the JPA- (both verbally and in writing) for resolution as soon as possible. In the interim, MES will insure that necessary action will be taken to re-establish and maintain safe working conditions.
- Accidents/incidents will be reported IAW the master health and safety plan for McClellan
- The Safety Exposure Report, a tabulation of field labor hours, lost workday accidents, and number of lost workdays shall be submitted monthly.

Attachment 2 – Activity Hazard Analysis

Note: Due to the complexity and constant change of investigation projects, this table is in no way a comprehensive list of all potential hazards that may harm Site personnel, the community, or the environment. This table is meant to be used in conjunction with the text in Section 8 of this HASP.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities	Access/egress hazards	<ul style="list-style-type: none"> • Utilize good housekeeping practices. • Keep aisle ways, pathways, and work areas free of obstruction. • Clean ice or snow off of walkways and workstations. • Use appropriate footwear for the task assigned. • All potentially hazardous work Sites will be properly signed and taped-off. Access will be restricted.
	Cuts and abrasions	<ul style="list-style-type: none"> • Use cotton or leather work gloves for material handling. • Ensure loads to be handled are free of sharp edges and points.
	Extension cords	<ul style="list-style-type: none"> • Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (e.g., doorways), and vehicular traffic. • Within occupied offices or trailers, only UL-approved electrical extension cords may be used. When outdoors, only double-insulated or grounded electrical power tools may be used. <ul style="list-style-type: none"> - Do not string cords together. • Use only for temporary purposes.
	Falling objects	<ul style="list-style-type: none"> • Stay alert and clear of materials suspended overhead (keep 360° awareness). • Wear a hard hat in any area where falling objects are possible. • Remove unsecured tools and materials before raising or lowering the derrick. <ul style="list-style-type: none"> - Ensure that scaffolding has toeboards.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Fire	<ul style="list-style-type: none"> • Smoking or open flames prohibited except in designated smoking areas. • Vehicles/Equipment will not be left unattended while idling. • Power Equipment/Vehicles will travel/park on pavement whenever possible. • Contact 9-1-1 in the event of fire or explosion. • Fire Extinguisher in the MES field offices and field vehicles. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition. • Mechanized equipment shall be shut down prior to and during fueling operations. • Only approved safety containers shall be used for handling and storage. • Storage cans for flammable materials shall not be stored in direct sunlight. • Exits, aisleways, and other means of egress shall not be used for storage. • All non-bulk materials shall be stored in a flammable materials cabinet. Stored quantities will not exceed 60 gallons per cabinet. No more than three cabinets will be placed in a single area. Cabinets will not be placed within 10 feet of exits. • Outdoor portable tanks shall be separated by a 5-foot clear area. • A 12-foot wide access will be maintained for fire equipment to reach outdoor storage areas. • Outdoor storage areas will be maintained free of weeds, debris, and other fuel sources. • Outdoor storage tanks will have adequate venting capacity. • The MES Hazard Communication requirements apply to the storage and use of flammables and combustibles. • Refueling areas will be located at least 25 feet from other operations. • Spill containment, collection, and clean-up materials will be provided in refueling areas. • Transfer containers will be electrically bonded together. • All spark producing equipment in the immediate vicinity of flammable liquid dispensing operations will be shut down. Adequate cool down time for generators, pumps, and other portable equipment will be provided prior to refueling. • Pressure buildup in portable fuel cans will be relieved away from hot surfaces and spark producing equipment. • Dispensing nozzles will have an automatic shut-off and no "latch open" devices. • Disconnect switches for refueling equipment will be located away from refueling operations. • Smoking and spark producing equipment or tools are prohibited in the fueling area. • A fire extinguisher rated no less than 20 pounds, type ABC, will be securely placed between 25 and 75 feet of each refueling operation.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> • Wear safety glasses/goggles. • Ensure that eyewash is in proper working condition.
	Chemical Hazard Communication	<ul style="list-style-type: none"> • Label all containers as to contents and dispose of properly. • Ensure MSDS are available for each hazardous chemical used on Site. • MSDS's shall be obtained prior to chemicals being brought on Site.
	Heavy Lifting, back strain, overexertion	<ul style="list-style-type: none"> • Use best ergonomically designed shovels. • Don't load shovel with more weight than you can handle. • Do not twist when throwing spoils. <ul style="list-style-type: none"> - Avoid twisting/turning while pulling on tools and when moving equipment. • Use mechanical lifting devices whenever possible. <ul style="list-style-type: none"> - When mechanical lifting devices are not available, use 2-person lift. • Lifts greater than 40 pounds require assistance or mechanical equipment. • Never carry a load that he or she cannot see around or over. • Observe/evaluate the size, shape, and weight of the object to be lifted. • Clear your path of travel before lifting. • Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear. • Use proper lifting techniques (bend knees, straight back, load close to body). • Fingers must be kept away from points that could crush or pinch them, especially when putting an object down. • Gloves must be used, and the object inspected for metal shavings, jagged edges, burrs, rough, or slippery surfaces. • The hands and the object should be free of dirt or grease that could prevent a firm grip. • The load should be kept as low as possible, close to the body with the knees bent. • To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible. • When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.
	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Use mechanical drum handlers. • Keep feet and hands clear of areas between drums. • Wear gloves.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Portable electric tools	<ul style="list-style-type: none">• Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (e.g., “do not use”) and removed from service.• Portable electric tools and all cord and plug connected equipment shall be protected by a ground fault circuit interrupter (GFCI) device.• Electrical tools shall be inspected daily prior to use.• Tools shall be used only for their intended purpose.• Ensure guards are in place.• Wear ANSI-approved safety glasses. In addition to safety glasses, wear face protection for electric or pneumatic grinding, chipping, abrasive saw metal cutting, chain saw and brush cutter work.• Do not use electrical power tools in wet environments.• Where tool is necessary on a continuous or repetitive basis, frequent rest breaks will be taken. Heavy tools will not be used over the shoulder.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Sanitation	<ul style="list-style-type: none"> • An adequate supply of potable water will be provided at each work Site. • Portable containers used to dispense drinking water shall be capable of being tightly closed, and shall be equipped with a tap dispenser. Water shall not be drunk directly from the container. • Containers used for drinking water shall be clearly marked “potable water” and not used for any other purpose. • Disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups shall be provided. • Outlets for non-potable water shall be identified to clearly indicate that the water is unsafe and is not to be used for drinking, washing, or cooking purposes. There shall be no cross connection (open or potential) between potable and non-potable water systems. Non-potable and potable water systems shall be separated so as to minimize confusion and possible cross contamination. • Toilet facilities shall be available for employees. If permanent toilet facilities are not available (i.e., the work Site is more than 500 feet from a building with an accessible toilet), and mobile crews do not have access to a vehicle, then portable chemical toilet(s) will be provided. • Trash collected from the Site will be segregated into potential hazardous waste or construction debris. Labeled trash receptacles will be set up in the CRZ and in the SZ. • A refrigerator for food and beverages is available in the MES office. • At no time should shall any environmental samples be placed in the same refrigerator for food and beverages. Environmental samples shall be places in chilled coolers or in a separate labeled refrigerator designated by the On-Site PM or SHSM.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Avoid placing any rod, drill rod, hoses, and supplies in immediate high traffic area. • Continually inspect the work area for slip, trip, and fall hazards. • Determine best access route before transporting equipment. • Employees required to wear fall protection shall be trained in its use. • Flag or cover inconspicuous holes to protect against falls. • Look before you step; ensure safe and secure footing. • Personnel are not allowed to work off of machinery or use them as ladders. • Practice good housekeeping; keep work area picked up and clean. • Provide adequate lighting in all work areas, to aid in the identification of hazards. • Tools and accessories will be properly maintained and stored. • Use fall protection when working above 6 feet or when exposed to a fall of 6 feet or greater. • Whenever possible, avoid routing cords and hoses across walking pathways. • Work areas and floors will be kept free of dirt, grease, and slippery materials. • Wear high traction footwear.
	Traffic hazards	<ul style="list-style-type: none"> • Prepare a traffic control plan whenever necessary. • Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. • If working adjacent to roadways, have workers wear fluorescent vests with reflective stripes. • Use warning signs or lights to alert oncoming traffic. • Assign flag person(s) if necessary to direct local traffic. • Set up temporary parking locations outside the immediate work area. • Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits. • Pedestrians have the right-of-way. • Wear seat belts when vehicles are in motion. • Wear high visibility safety vest in all traffic areas.

Activity	Potential Hazards	Recommended Controls
General Site-Wide Activities (cont.)	Unattended worker	<ul style="list-style-type: none"> • All crew personnel on Site must use the "buddy system" (working in pairs or teams). If protective equipment or noise levels impair communications, then prearranged hand signals shall be used for communication. • Visual contact shall be maintained between crewmembers at all times, and crewmembers must observe each other for signs of toxic exposure. Indication of adverse effects includes, but are not limited to: <ul style="list-style-type: none"> - Changes in complexion and skin coloration - Changes in coordination - Changes in demeanor - Excessive salivation and papillary response - Changes in speech pattern. • Never work alone in an isolated area. <ul style="list-style-type: none"> - Always have a means of communication (e.g, radio, cell phone)
Natural Hazards	Cold stress	<ul style="list-style-type: none"> • Workers should wear insulated clothing when temperatures drop below 40°F. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing. • The signs of cold stress disorders are given below: <ul style="list-style-type: none"> - Hypothermia can be a serious medical condition. Symptoms include: <ul style="list-style-type: none"> - Confusion - Dizziness - Exhaustion - Severe shivering - Frostbite can be a serious medical condition. Symptoms include: <ul style="list-style-type: none"> - Gray, white or yellow skin discoloration - Numbness - Waxy feeling skin • If someone exhibits signs of hypothermia or frostbite, get them out of wet clothes immediately and warm the core body temperature with a blanket or warm fluids like hot cider or soup. Do not administer caffeine or alcohol. Call 9-1-1 if necessary. (www.redcross.org, 2004).

Activity	Potential Hazards	Recommended Controls
Natural Hazards (cont.)	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Symptoms include: <ul style="list-style-type: none"> - Red or pink dots on the body under areas covered by clothing - Dots may look like tiny pimples • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids - even when not thirsty including water and sports drinks. • Provide cool fluids for work crews. • Symptoms include: <ul style="list-style-type: none"> - Muscle spasms - Pain in hands, feet, and abdomen • Move victim to rest in shaded, cool area and a comfortable position. If the person is fully awake and alert, give a half glass of cool water every 15 minutes. Do not let him or her drink too quickly. Do not give liquids with alcohol or caffeine in them, as they can make conditions worse. Remove or loosen tight clothing and apply cool, wet cloths such as towels or wet sheets. Call 9-1-1 if the person refuses water, vomits or loses consciousness (www.redcross.org, 2004).
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks. • Symptoms include: <ul style="list-style-type: none"> - Pale, cool, moist skin - Heavy sweating - Dizziness, nausea, fainting • If someone exhibits signs of heat exhaustion, get the person to a cooler place and have him or her rest in a comfortable position. If the person is fully awake and alert, give a half glass of cool water every 15 minutes. Do not let him or her drink too quickly. Do not give liquids with alcohol or caffeine in them, as they can make conditions worse. Remove or loosen tight clothing and apply cool, wet cloths such as towels or wet sheets. Call 9-1-1 if the person refuses water, vomits or loses consciousness (www.redcross.org, 2004).

Activity	Potential Hazards	Recommended Controls
Natural Hazards (cont.)	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks as needed. • Wear body cooling devices. • Symptoms include: <ul style="list-style-type: none"> - Red, hot, unusually dry skin - Lack of, or reduced, perspiration - Nausea - Dizziness and confusion - Strong, rapid pulse - Coma • If someone exhibits signs of heat stroke, help is needed fast. Call 9-1-1. Move the person to a cooler place. Quickly cool the body. Wrap wet sheets around the body and fan it. If you have ice packs or cold packs, wrap them in a cloth and place them on each of the victim's wrists and ankles, in the armpits and on the neck to cool the large blood vessels. (Do not use rubbing alcohol because it closes the skin's pores and prevents heat loss.) Watch for signals of breathing problems and make sure the airway is clear. Keep the person lying down (www.redcross.org, 2004).
	Sunburn	<ul style="list-style-type: none"> • Wear long-sleeved shirts, hats and sunscreen. • Symptoms include: <ul style="list-style-type: none"> - Red skin that may hurt when touched - Blistering may occur with a more severe burn - Sun poisoning may result in fever, chills, nausea, vomiting, or headache Home remedies may be used in most cases.
	Lightning	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than lying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Remain 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people.

Activity	Potential Hazards	Recommended Controls
Natural Hazards (cont.)	Thunderstorms, floodwaters, tornadoes	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado. • If you encounter floodwaters, don't try to cross them. Avoid them, and go to higher ground.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Snakes, insects and Spiders	<ul style="list-style-type: none"> • Avoid placing hands or feet into obscure areas (i.e., beneath rocks, well pads, bush piles). • Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms. • Keep a snakebite kit on Site. • If a snake bite occurs: <ul style="list-style-type: none"> - Victim should be immediately transferred to nearest hospital. - First Aid trained personnel may apply pressure to bandage. • Identify infested areas to the Site supervisor. • Keep work areas clear of vegetation and small bush. • Use the buddy system. • When walking through overgrown grass areas, watch for snakes (e.g., rattlesnakes, moccasins, copperheads). • Wear rubber or polyvinyl chloride (PVC) boots and snake chaps into vegetated areas possibly inhabited by poisonous snakes or animals. • Workers who are allergic or capable of allergic reactions to bee, wasp, or ant stings or bites shall notify their Supervisor(s). • Personnel bitten by snakes that are allergic to horses should notify emergency personnel of their allergy.

Activity	Potential Hazards	Recommended Controls
Natural Hazards (cont.)	Ticks	<ul style="list-style-type: none"> • Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellent. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area. • If you find a tick on your body, remove it by doing the following; <ul style="list-style-type: none"> - Using a pair of fine-tipped tweezers, grasp the tick as close to the skin as possible and pull slowly, steadily, and firmly. Avoid crushing the tick's body. - Once removed, clean the area with antiseptic, such as alcohol. • Save the tick in a jar of alcohol or tape it to a piece of cardboard so it can be identified by your local health department.
	Wildlife hazards	<ul style="list-style-type: none"> • Do not feed wildlife. • Avoid food stuff where accessible to animals. Seal food in air tight containers when possible. • Workers should be cautious when driving through the Site in order to avoid encounters with passing animals.
Heavy Equipment Operations	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> • All machinery or mechanized equipment will be inspected by a competent mechanic and be evaluated for safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and, if possible, locked out.
	Electrocution	<ul style="list-style-type: none"> • Maintain equipment and loads at least 10 feet from energized overhead power lines less than 50,000 V. • Increase buffer zone when the voltage is greater than 50,000 in accordance with Table 11-3 of EM 385-1-1, 2003 • Use non-conductive tag lines. • Shut down systems and implement Lockout/Tagout before performing maintenance or repairs.
	Forklift operations	<ul style="list-style-type: none"> • Use only qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Workers will never ride the forks. • Passengers are not allowed.

Activity	Potential Hazards	Recommended Controls
Heavy Equipment Operations (cont.)	Inexperienced operator	<ul style="list-style-type: none"> • Only designated personnel shall operate machinery and mechanized equipment. • Operators shall inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgment. • Manufacturer’s manuals shall accompany all heavy equipment. • Be familiar with operating controls associated with similar equipment produced by other manufacturers.
	Jacks/outriggers	<ul style="list-style-type: none"> • Ensure stabilizers are fully extended per manufacturer's specification. • Ensure proper footing and cribbing.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandates hearing protection. • Use quieter equipment whenever possible. • Monitor noise in the work area with a noise level meter. • Refuse use of equipment with faulty silencers, mufflers, etc. <ul style="list-style-type: none"> - Locate work stations as far from the noise source as possible.
	Overhead hazards	<ul style="list-style-type: none"> • Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines. • Do not work directly under suspended materials. • Secure tools if working at elevations where employees may pass. <ul style="list-style-type: none"> - Use spotters when objects are moved overhead.
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> • Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Aboveground and belowground utilities will be located prior to staging equipment. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work. • Obtain trenching/drilling permit prior to operation.

Activity	Potential Hazards	Recommended Controls
Heavy Equipment Operations (cont.)	Roll Over	<ul style="list-style-type: none"> • Ensure construction equipment has Roll Over Protection Structure (ROPS) and inspect ROPS daily. • Operate equipment up and down slopes whenever possible, with the load on the uphill side. • Operate across slopes following manufacturer’s recommendations. • Don’t turn or speed on slopes. • Keep loads as low as possible. • Park dump trucks on firm, level ground for dumping. Observe load from safe area behind to ensure even flow.
	Injury from quick-change buckets becoming detached from equipment.	<ul style="list-style-type: none"> • Visually inspect that the locking device is properly and completely engaged prior to equipment use.
	Slips, falls	<ul style="list-style-type: none"> • Use three points of contact during cab access and egress. • Keep steps clean and free of mud, snow, and ice.
	Spills	<ul style="list-style-type: none"> • Inspect hydraulic hoses and fittings daily. • Use only fuel filling nozzles with automatic shutoffs and do not use latch open dogs on nozzle handle.
	Fires	<ul style="list-style-type: none"> • Shut off engine during fueling. No smoking or open flames in fuel storage and dispensing areas. • Mobile construction equipment shall have a fire extinguisher.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Heavy equipment	<ul style="list-style-type: none"> ▪ Receipt by Equipment Supervisor ▪ Daily by operators 	Only qualified operators permitted to operate. Qualifications and competency reviewed by Supervisor. Licensed where required by state regulations.
Site vehicles	<ul style="list-style-type: none"> ▪ Receipt by Equipment Supervisor ▪ Daily by drivers 	Drivers must have current license.
Hand and Portable power tools	<ul style="list-style-type: none"> ▪ Receipt by Equipment Supervisor ▪ Daily by users 	Training in use of power tools by Supervisor and review of operating manual. Powder-operated tool users certified by vendor.
Temporary power supplies including GFCIs, extension cords, cord and plug operated tools	<ul style="list-style-type: none"> ▪ Outlets – weekly during site inspection ▪ GFCI – weekly during site inspection ▪ Extension cords and plugs on equipment – daily by users 	General electrical safe work practices training provided during site orientation. Only licensed electricians will install, repair and maintain electrical equipment and current carrying parts of electrically-supplied tools and equipment.
Fall protection	<ul style="list-style-type: none"> ▪ Daily site inspection for open-sided floor and floor hole hazards by HSM and site workers ▪ Personal fall arrest systems, restraint systems, warning systems – daily by users and Competent Person ▪ Excavations – daily by Competent Person ▪ Scaffolds – daily by Competent Person ▪ Guardrails – weekly during site inspections 	Training in the hazards and proper fall protection during site-orientation, AHA reviews and site briefings as appropriate. Personal fall arrest system training by Competent Person. Scaffold use training by Qualified Person. Scaffold inspection training by Competent Person. Aerial Lift training by vendor or other competent person.

PRINCIPAL STEPS	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
Cutting of brush/trees	Unintended detonation of UXO	<ul style="list-style-type: none"> ▪ Do not clear vegetation without escort of qualified UXO Technicians. ▪ UXO Technicians shall comply with all requirements of USACE EP 75-1-2.
	Struck by falling trees	<ul style="list-style-type: none"> ▪ Use heavy equipment with ROPS/FOPS and cab shields to fell trees where feasible. ▪ Felling trees using chain saws will be under the supervision of experienced feller or logger. ▪ Plan the tree felling carefully. ▪ Use notch cuts and backcuts for large trees, guy ropes where necessary. ▪ Clear all personnel from possible fall paths before felling.
	Struck by falling limbs and deadwood	<ul style="list-style-type: none"> ▪ Inspect work area carefully, look out for dead trees and limbs resting on limbs to be removed. ▪ Clear all personnel from area under limbs to be removed. Separate work teams by adequate distance. ▪ Do not climb trees to top or limb, unless approved by the Project Health and Safety Manager. ▪ Do not use chain saws over shoulder height. ▪ Wear ANSI approved hard hats and safety-toe footwear.
	Severe cuts and bruises from chainsaws and Brush Hogs.	<ul style="list-style-type: none"> ▪ Do not walk with chain engaged. ▪ Do not use chainsaws above shoulder. Do not use brush cutters above waist. ▪ Hold equipment with both hands during cutting operations. ▪ The engine shall be started and operated only when all co-workers are clear of the saw. ▪ The operator will shut off chain saw when carrying it over slippery surfaces. ▪ Shoulder harness required for use with brush cutter. ▪ Wear leather or Kevlar chaps, leather work gloves
	Struck by flying debris	<ul style="list-style-type: none"> ▪ Do not operate brush cutter without the debris shield in place and tightly secured. ▪ Do not operate the brush cutter without the safety clip in place. ▪ Wear safety glasses with side shields and full face shield.
	Slips/trips/falls on slopes. Falls from heights	<ul style="list-style-type: none"> ▪ Wear high traction work boots. ▪ Whenever possible, choose walking routes carefully to avoid steep slopes. ▪ Do not climb trees to top or limb, unless approved by the Project Health and Safety Manager. If a bucket truck or extensible boom lift is used, ensure operator is trained, wears harness, and attaches lanyard to designated attachment point on platform.
	Burns from hot exhausts	<ul style="list-style-type: none"> ▪ Wear long sleeves and leather gloves. ▪ Keep hands away from hot exhaust and engines.
	Fire/explosion of gasoline	<ul style="list-style-type: none"> ▪ Allow equipment to cool before refueling, and eliminate other sources of ignition. ▪ Use only approved safety cans for gasoline/bar oil. ▪ Cleanup spills immediately.
	Exposure to noise	<ul style="list-style-type: none"> ▪ Wear hearing protection.
	Contact with poisonous plants (e.g. poison ivy)	<ul style="list-style-type: none"> ▪ Inspect area before starting ▪ Wear long sleeve shirts, tuck sleeves and pant legs. Wear gaiters on ankles. ▪ If there is heavy growth, wear disposable coveralls and use barrier cream, e.g. Ivy Block. ▪ Have Tecnu or other poison ivy cleanser on hand, and wash immediately after contact.
Stung by bees/hornets, bit	<ul style="list-style-type: none"> ▪ Inspect areas for hives. 	

PRINCIPAL STEPS	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
	by ticks or snakes	<ul style="list-style-type: none"> ▪ Ensure allergic individuals have emergency medical kit and are committed to using it. ▪ Use insect repellent containing DEET on exposed skin, and Permethrin on clothing. ▪ Do not approach snakes. If bitten, seek medical attention.
	Repetitive stress injury	<ul style="list-style-type: none"> ▪ Switch equipment from one side to the other if possible. Take break or switch team positions if musculoskeletal fatigue is noticed.
Dragging/Stockpiling brush	Slips/trips/falls	<ul style="list-style-type: none"> ▪ Wear high traction safety-toe footwear. ▪ Keep loads manageable to not obstruct vision.
	Scrapes and cuts	<ul style="list-style-type: none"> ▪ Wear safety glasses, gloves and long sleeves.
	Back and/or leg strain	<ul style="list-style-type: none"> ▪ Maintain manageable loads and stretch prior to work.
Chipping brush	Excessive noise	<ul style="list-style-type: none"> ▪ Wear hearing protection.
	Eye injuries Being struck by debris	<ul style="list-style-type: none"> ▪ The chipper shall be free of obstructions prior to startup. ▪ All personnel shall be clear of the chipper exhaust chute prior to starting. ▪ Wear safety glasses with side shields while chipping. ▪ Stand to the side of the feed area and avoid the discharge area. ▪ Carefully inspect feed material and remove any non-vegetative material. ▪ Brush chippers shall be fed from the side of the centerline, and the operator shall immediately turn away from the feed table when the brush is taken into the rotor; chippers shall be fed from the curbside whenever possible.
	Caught in or between moving machinery parts	<ul style="list-style-type: none"> ▪ No loose clothing, gauntlet-type gloves, rings or watches shall be worn by employees operating chippers. ▪ Keep all body parts away from throat and discharge of chipper. ▪ Chippers shall be equipped with mechanical infeed system or shall have a flexible anti-kickback device installed in the infeed hopper for the purpose of protecting the operator and other persons in the machine area from the hazards of flying chips and debris. ▪ Mechanical infeed systems shall have a quick stop and reversing device on the infeed on disk-type tree or brush chippers. The activating mechanism for the quick stop and reversing device shall be located across the top, along each side of, and as close to the feed end of the infeed hopper as possible and within easy reach of the operator. ▪ The feed chute or feed table of the chopper shall have sufficient height on its side members to prevent operator contact with the blades or knives during normal operations. ▪ Push sticks made of materials which can be consumed by brush chipper will be used, if necessary. ▪ Shut down machinery and lock out to remove jams or make repairs.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Chain saws and brush cutters	Initial receipt. Daily by users.	Users trained in accordance with manufacturer’s training recommendations and operators manuals. (See downloadable Stihl Safety Manuals http://www.stihlusa.com/manuals/index.html). Experience and competency of tree fellers to be verified by Site Operations Manager.
Heavy equipment	Initial receipt. Daily by operators.	Competency evaluation by Superintendent.
Chipper	Initial receipt. Daily by operators.	Users trained in accordance with manufacturer’s training recommendations and operators manuals.

Note: This Activity Hazard Analysis covers the common hazards and controls that may be applicable to UXO Intrusive Operations at the McClellan project site. General site environmental conditions such as weather conditions, thermal stressors, and biological hazards are covered in detail in Section 2.0 of the SSHP. They will be addressed on the AHAs only if the activity itself poses unique or exacerbated hazards or exposures.

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
MEC Intrusive Operations Using Manual Tools and Methods NOTE: These operations are only to be performed by qualified UXO Technicians and are not to be used by anyone else.	MEC	<ul style="list-style-type: none"> ▪ Ensure Exclusion Zones are established to authorized Minimum Separation Distances for Non-Project Personnel and Team Separation Distances for Project Personnel. ▪ Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC/UXO. ▪ Ensure all personnel are qualified UXO Technicians. ▪ Conduct MEC operations in accordance with the approved explosives safety submission (ESS). ▪ UXO Technicians shall comply with all requirements of USACE EP 75-1-2. ▪ Observe general MEC/UXO hazards and precautions. ▪ Ensure compliance with the MEC/UXO Work Plan and relevant SOPs.
MEC/UXO Intrusive Operations Using Manual Tools and Methods (cont.) NOTE: These operations are only to be performed by qualified UXO Technicians.	Loud noise	<ul style="list-style-type: none"> ▪ Reduce the volume level of detection equipment used for anomaly reacquisition before donning headset and engaging power.
	Slips, trips and falls	<ul style="list-style-type: none"> ▪ Wear work boots with lug soles. ▪ Maintain awareness of hazards associated with uneven or wet terrain.
	Dangerous animals and insects	<ul style="list-style-type: none"> ▪ Maintain awareness of hazards associated with dangerous animals and insects. ▪ Observe task PPE requirements.
	Repetitive stress injury	<ul style="list-style-type: none"> ▪ Shift detection equipment from one arm to the other when fatigued. ▪ Take breaks when necessary.
	Back injury	<ul style="list-style-type: none"> ▪ Observe proper lifting techniques setting up or putting away equipment.
	Thermal Stress	<ul style="list-style-type: none"> ▪ Review Heat and Cold Stress SOPs.

PPE/SAFETY SUPPLIES	SAFETY INSPECTIONS	TRAINING
<p>Note: This Activity Hazard Analysis covers the common hazards and controls that may be applicable UXO Intrusive Operations at the McClellan project site. General site environmental conditions such as weather conditions, thermal stressors, and biological hazards are covered in detail in Section 2.0 of the SSHP. They will be addressed on the AHAs only if the activity itself poses unique or exacerbated hazards or exposures.</p>		
<p>Initial PPE will be modified Level D. Metal detector and related navigation and/or data-recording equipment</p> <p><u>Support Zone</u></p> <ul style="list-style-type: none"> ▪ Cell phone or Radio communication ▪ Eyewash station ▪ Fire extinguishers ▪ First Aid kit ▪ Drinking water ▪ 911 Air horn ▪ Spill containment supplies ▪ Air monitoring equipment ▪ Emergency decontamination supplies 	<p>Prior to use, ensure equipment is operational, calibrated according to operating manuals, and performing in accordance with required standards.</p> <p>General Site Safety (Daily)</p>	<ul style="list-style-type: none"> ▪ Ensure non-essential personnel observe general MEC hazards and understand the requirement to be escorted by qualified UXO Technicians when they are within an exclusion zone. ▪ Detection Equipment Refresher. ▪ General and local MEC hazards and precautions. ▪ Daily Tailgate Safety Meeting. ▪ Review “MEC Detection” AHA. ▪ Hazardous Waste Operations (HAZWOPER) Certification (40-hour, 8-hour). ▪ OSHA Supervisory (Required for Managers and Supervisors). ▪ First Aid and CPR (At least two employees). ▪ SSHP review and sign-off.

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Note: This Activity Hazard Analysis covers the common hazards and controls that may be applicable during MEC demolition activities at the McClellan project site. General site environmental conditions such as weather conditions, thermal stressors, and biological hazards are covered in detail in Section 2.0 of the SSHP. They will be addressed on the AHAs only if the activity itself poses unique or exacerbated hazards or exposures.		
Detonation of MEC	Accidental Detonation of MEC Slips, Trips, and Falls	<ul style="list-style-type: none"> ▪ Personnel wear modified level D PPE, Review Disposal plan, standard MEC and General EOD safety precautions for demo procedures. Review applicable item ID and disposal information. ▪ Demolition operations are to be suspended during electrical storms or other severe weather. ▪ No smoking, except in designated areas ▪ Personnel will remain up-wind of the demolition site during demolition operations. ▪ If possible, MEC will be moved from the area to a safe disposal area.
Handling of demolition explosives: <ul style="list-style-type: none"> ▪ Blasting caps ▪ Initiators ▪ Time Fuze ▪ Explosives ▪ Ordnance Items 	Accidental Detonation of MEC	<ul style="list-style-type: none"> ▪ Observe MEC safety precautions. Minimize personnel exposure to the MEC. Personnel will wear gloves when handling ordnance. ▪ No smoking, except in designated areas.

Attachment 3 – Site Layout Plan and Work Zones

Due to the nature of this project, MES will establish exclusion zones each day in the work area(s). Site maps are located in Appendix B of the Work Plan.

Attachment 4 – Emergency Contacts & Hospital route Map

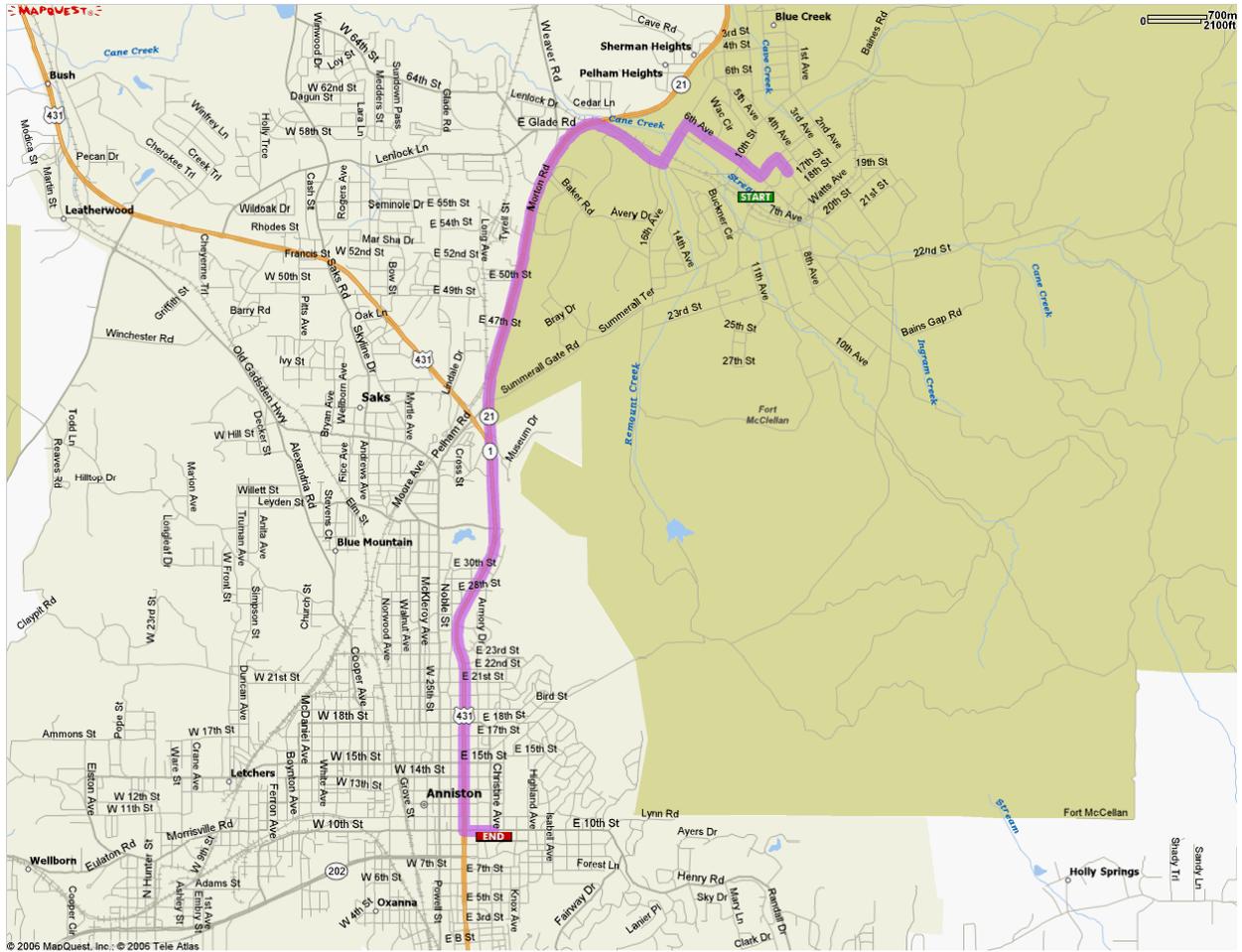
EMERGENCY CONTACTS

Fire Department (off post)	9-1-1
Ambulance (off post)	9-1-1
Police (emergency)	9-1-1
Regional Medical Center	(256) 235-5121
Anniston Police Department (non-emergency)	(256) 238-1800
National Response Center & Terrorist Hotline	(800) 424-8802
Poison Control Center	(800) 462-0800
EPA Region IV	(404) 562-8725
Joint Powers Authority (Miki Schneider)	(256) 236-2011 ext 24 (o) (256) 310-0267 (c)
Matrix Environmental Services Office (AL)	(256) 847-0780 or (256) 847 0806
Matrix Environmental Services Office (CO)	(303) 572-0200
Matrix Environmental Services (Michelle Klomp) – PM	(303) 579-1044
Matrix Environmental Services (Cecil Taylor) –SHSM	(256) 310-8004 (c)
Matrix Environmental Services (Bo Bohannan) – MEC	(850) 832-7155 (c)
Matrix Design Group (Jennie Keys) – HSC	(720) 280-7237
723 rd EOD Fort Gillem	(404) 469 54367
Scott Bolton – Transition Force	(256) 848-3847

In case of an emergency, dial 911.

From the Baltzell Gate turn left (south) onto Hwy 21, go 5.1 mi and turn left (east) onto East 10th Street.
Go to 400 East 10th Street to the Regional Medical Center

Appendix C – Accident Prevention Plan
Program-Level Work Plan – Revision 1
MEC Remediation, Alpha and Bravo Munitions Response Areas



Attachment 5 – Standard Operating Procedures

Project applicable SOPs are included in Appendix E of this Work Plan.

Attachment 6 – Supplemental Plans

Supplemental plans will not be required by this task order.

Attachment 7 – Site Safety and Health Forms

The following forms are to be used as instructed by the SHSM during operations at McClellan:

- AHA Training Documentation Form
- APP Compliance Agreement Form
- Health and Safety Site Inspection Form
- First Aid Log
- Daily Safety Meeting Sign-In Sheet
- Medical Data Sheet

MES		HEALTH AND SAFETY SITE INSPECTION FORM	
Project:		Date:	
Area(s) Inspected:			
Inspection Type: <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Corporate <input type="checkbox"/> Other:			
Inspector's Name	Affiliation	Inspector's Name	Affiliation

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
EQUIPMENT			
Daily Inspection Checklists (Heavy Equipment)	W		
Hand Portable Tools Inspections	W		
Machine/Equipment Guarding	W		
GFCI in use	W		
3-prong ext. cords, not damaged	W		
FALL PROTECTION/SCAFFOLDING Must be inspected daily when activity is ongoing.			
Anchorage, body belt, lanyard	D		
Less than 6 feet of freefall	D		
Guardrails	D		
Protection from falling objects	D		
Daily scaffold inspections	D		
HOISTING & RIGGING Must be inspected daily when activity is ongoing.			
Ordinary/Critical Lift Forms Used	D		
Competent Person Signoff	D		
Condition of Chains / Slings	D		
Properly Rated Chains / Slings	D		
EXCAVATION & TRENCHING ACTIVITIES Must be inspected daily when activity is ongoing. See detailed "Trench/Excavation Inspection"			
Excavation Control Measures	D		
Inspections by Competent Person	D		

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Entrance / Exit / Ladders	D		
Air Monitoring	D		
Warning Signs / Fences in place	D		
Shoring / Shielding	D		
Spoil Piles 2 Feet from Edge	D		
HAZARD CONTROLS			
Lockout/Tagout Systems	As needed		
Site Control (EZ, CRZ, SZ)	D		
Decontamination Procedures (equip and personnel)	W		
Safety Awareness/Warning Signage	M		
Site Security	M		
PERSONAL PROTECTIVE EQUIPMENT			
Hearing Protection	D		
Respiratory Protection / Storage	D		
Head Protection	D		
Foot Protection	D		
Eye Protection	D		
Hand Protection	D		
Body Protection	D		
MATERIALS			
Storing of Compressed Gases	W		
Storing of Flammable Liquids	W		
Area Free of Combustibles	W		
Housekeeping of Storage Room	W		
EMERGENCY SYSTEMS			
Fire Extinguisher Availability / Inspections	M		
Eye Wash & Shower	W		
First Aid Kits, First Aid Log	W		
Spill Containment Supplies	M		
Emergency Instructions	M		
Appropriate Communications Available	W		
GENERAL WORKPLACE			
Housekeeping	W		
Noise Exposure	W		
Lighting/Illumination	M		
Field/Office Ergonomics	M		

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Roadways / Traffic Control	W		
Sanitation / Toilet / Wash Facilities	M		
HAZARD COMMUNICATION			
List of Hazardous Materials	M		
Hazardous Materials Labeling	M		
Material Safety Data Sheets	M		
Employee Training	M		
RECORDKEEPING			
OSHA Postings	M		
Employee Safety Training	W		
Medical Surveillance Program	M		
Site Safety & Health Plan Sign-off	M		
Exposure Monitoring Records	M		
Daily Tailgate Safety Meetings	W		
Visitors Sign-Off	M		
Accident Investigation Reports	M		
Hazwoper Training Documentation	M		
Workers' Compensation Claims (Please indicate claimant's name/date of incident)	M		
OTHER			
Safety Field Logbooks	W		

Note: This form is only a guide for evaluation of workplace hazards. It is not intended to be inclusive, and inspection frequency may vary based on job conditions. Use of the form is optional for Daily Inspections. Corrective actions taken during Daily Inspections should be noted in the safety field logbook. Monthly includes weekly, weekly includes daily.

	MES	DAILY SAFETY MEETING SIGN-IN SHEET
--	------------	---

Date: _____ Project Name/Location: _____
 Company: _____ Person Conducting Briefing: _____

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

4. ATTENDEES (Print Name):

		MES	MEDICAL DATA SHEET
<p>This Medical Data Sheet should be completed by site personnel and kept in an accessible location during the length of project work. This data sheet is not a substitute for required medical surveillance or qualifications required for work at the site. Where possible, this data sheet should accompany personnel requiring medical assistance as a means of providing potentially important personal information to medical providers. Return completed form to project safety representative and update this medical data sheet as often as necessary to maintain its accuracy. This includes changes in medication, emergency contacts, or allergies and sensitivities.</p> <p>This form may contain confidential information of a personal nature and must be treated/secured accordingly.</p>			
Name:		Date:	
Address:		Age (optional):	
		Height (optional):	
Home Telephone:	Work Telephone:	Weight (optional):	
Emergency Contact Name and Telephone Number:			
Medications Currently Taking: (both prescribed and over-the-counter medication)			
Known Allergies or Sensitivities (such as allergic reaction to bee stings, food allergies, penicillin):			
Other Significant Medical Alerts or Precautions:			
Name of Physician (if known):		Telephone No.:	
Project:		Supervisor Name:	
Task:		Supervisor Title:	
Company/Department:		Telephone Number:	

Appendix D
Forms

	Matrix Environmental Services	PERSONNEL TRAINING AND QUALIFICATION TRACKING FORM
--	--------------------------------------	---

Employee Name: _____

Title/Job Function: _____

Project: _____

Company: _____

Training/Certification	Date Completed/Verified	Due Date*
Program Level Work Plan Reviewed		
Accident Prevention Plan Reviewed		
Project Level Work Plan Reviewed (if applicable)		
Resume meets job requirements specified in DID OE-025.01		
EOD certification on file		
OSHA 40-hr (or 24-hr, if applicable)		
3-Day Supervised Field Experience		
8-hr OSHA Refresher		
8-hr OSHA Supervisor		
Annual Physical/Medical Approval for Hazardous Waste Work		
First Aid/CPR Certification		
Bloodborne Pathogens training		
Pre-employment Drug Screen		
Medical Data Sheet filled out		
Project-specific Medical Tests (<i>specify</i>)		
Blood Lead/ZPP/FEP		
Medical Approval for Respirator Use		
Respirator Fit Test		
Hearing Conservation training		
Audiogram		
Hazard Communication training		
Fall Protection training		
Excavation Competent Person designation		
Commercial Driver's License		
Heavy Equipment / Lift Operator		
Forklift Operator		
Confined Space Entry training		
Asbestos Awareness		
Asbestos Worker		
Asbestos Supervisor		
Asbestos Inspector		
Rad Worker II		
Other (Describe)		

* Indicate "NA" if not applicable or if training is one-time only training.

NOTE: This form is NOT a substitute of proper training documentation. Personnel training and medical documentation must be maintained on-site in addition to this form.

MES QC Surveillance Report McClellan, Alabama

1 - Definable Feature of Work			
<input type="checkbox"/> Brush Cutting <input type="checkbox"/> Surface Sweep <input type="checkbox"/> DGM <input type="checkbox"/> Reacquisition <input type="checkbox"/> UXO ID & Demo <input type="checkbox"/> Scrap Handling/Demilitarization <input type="checkbox"/> Survey <input type="checkbox"/> Aggressive Surface / Near Surface Clearance <input type="checkbox"/> Intrusive Investigation <input type="checkbox"/> Mag/Dig <input type="checkbox"/> Data Management			
<input type="checkbox"/> Preparatory <input type="checkbox"/> Initial <input type="checkbox"/> Follow-up <input type="checkbox"/> General/Other			
3 - References			
4 - Observed Condition/Activities:			
5 - Comments:			
6 - Results of Surveillance			
<input type="checkbox"/> Acceptable	<input type="checkbox"/> Unacceptable	Deficiency #: NCR #:	
Conducted By:	Signature:	Date:	
7- Comments			
8 - UXOQCS			
<input type="checkbox"/> Concur <input type="checkbox"/> Non-Concur	Signature:		Date:
9 - Site Operations Manager Review			
<input type="checkbox"/> Concur <input type="checkbox"/> Non-Concur	Signature:		Date:
10 - Distribution			
<input type="checkbox"/> PM	<input type="checkbox"/> Operations Manager	<input type="checkbox"/> MATRIX QA	<input type="checkbox"/> Other

MES Geophysical Investigation QC Checksheet
(Preparatory, Initial, Follow-Up)

Team Information		
Geo Team #:	Location:	Date:
Geo Team Leader:		
Geo Team Members:		
Phase of Inspection: PREPARATORY (P), INITIAL (I), FOLLOW-UP (F)		

Checklist						
Item	Ref.	Inspection Point	Yes	No	N/A	Phase of inspection and comments
1	Previous Checklists	Have punch items from previous checklists (if any) been corrected?				(I) (F)
2	Work Plan 10.3.1	Program and Project Specific Work Plan(s) have been reviewed by all GEO team members and signed?				(P)
3	Work Plan 10.3.1	Have all team members completed Project Training Requirements?				(P)
4	Work Plan 10.3.1	Does the lead project geophysicist and lead site geophysicist meet the requirements listed in DID MR-025?				(P)
5	Work Plan 10.7.3.1.2	FCA area has been "cleaned" of metal debris and have seed items been placed at depths not exceeding that described in Table 10-1				(P)
6	Work Plan 6.3.3.2	Was the EM-61 warmed up for at least 5 minutes before use?				(P) (I) (F)
7	Work Plan 6.3.3.6	Were the morning QC equipment tests (EM-61 and GPS) conducted and documented in their logbook?				(P) (I) (F)
8	Work Plan 6.3.3.6	Were the evening QC equipment tests (EM-61) conducted and documented in their logbook?				(P) (I) (F)
9	Work Plan 6.3.3.6	Background noise within acceptable mV tolerance?				(I) (F)
10	Work Plan 2.5.1	Was the area to be investigated previously surface swept by UXO teams?				(I) (F)
11	Work Plan 6.3.3.1	Survey lanes are not more than 2.5 ft in width.				(I) (F)
12	Work Plan 6.3.3.5	Data spatial density is not less than every 20 cm meters in wheel mode or not less than 10Hz in automatic mode.				(P) (I) (F)
13	Work Plan 6.3.3.11	Are Geo teams logging cultural items properly (logbook or Attachment A of DID OE-005-05.01)				(I) (F)
14	Work Plan 6.3.3.11	Were 3 percent of all geophysical data resurveyed by the geophysical subcontractor for QC purposes?				(I) (F)
15	EM61 Manual	Battery Voltage is above 10.5V.				(P) (I) (F)
16	Work Plan 7.1.2	Are data files being tracked properly?				(I) (F)
17	Work Plan 6.3.3.13	Are data files being backed up on a regular basis?				(I) (F)
18	Work Plan 7.1.9	Are maps generated by the geophysical subcontractor in compliance with DID MR-005-05?				(I) (F)

Checklist						
Item	Ref.	Inspection Point	Yes	No	N/A	Phase of inspection and comments
19	General	All geophysical data to date has been put on CD (or FTP site) and has been made available to the GEOQCS (raw, xyz, and Geosoft files)				(I) (F)

Punch list Items	
Item #	Description:

Conducted by: _____

Approved by: _____

Title: _____

Title: Site Operations Manager

Signature: _____

Signature: _____

Date: _____

Date: _____

MES Intrusive Investigation QC Checksheet

(Preparatory, Initial, Follow-Up)

Team Information		
Team:	Location	Date:
Personnel Present:		
Phase of Inspection: PREPARATORY (P); INITIAL (I); FOLLOW-UP (F)		

Item	Inspection Point	Yes	No	N/A	Comments
1	Have all team members reviewed the Work Plan.				(P)
2	Is a current copy of the Work Plan available to the Team when conducting field operations?				(P),(I),(F)
3	Are team members familiar with the definitions in the Work Plan				(P)
4	Was the Coordination Meeting held prior to commencing field work?				(P)
5	Has the Project Manager or his representative completed the mandatory notifications prior to conducting field operations? I.e. <i>Medical, Fire, TFI, JPA</i> .				(P),(I),(F)
6	Was a copy of the Exclusion Zone information package for each Block provided to the Supervisor prior to conducting intrusive operations?				(P),(I),(F)
7	Do the UXO Teams meet the personnel requirements in the Work Plan?				(P)
8	Have all personnel assigned to the intrusive clearance team been GPO Certified.				(P), (I), (F)
9	Have all members of the intrusive OE/UXO clearance team attended site-specific orientation.				(P), (I), (F)
10	Were all the subjects in the training schedule covered during site-specific training				(P)
11	Has all the equipment utilized by the intrusive team been certified in the GPO?				(I) (F)
12	Has the UXO Team loaded out the necessary equipment to perform their tasks?				(P) (I) (F)
13	Did the Contractor conduct a tail-gate safety briefing?				(I), (F)
14	Was an Exclusion Zone established prior to conducting Intrusive MEC clearance operations?				(I), (F)
15	Were the procedures for anomaly reacquisition followed?				(I), (F)
16	Did the UXO Supervisor notify the MES Command Center prior to commencing intrusive operations?				(I), (F)
17	Were approved excavation procedures followed?				(I), (F)
18	Did the UXO Contractor complete data entries in the PDA?				(I), (F)
19	Were approved procedures for Located MEC followed?				(I), (F)
20	Was the proper disposition assigned to the located MEC?				(I), (F)
21	Were approved demobilization / site cleanup procedures followed at the end of each day's clearance operations?				(I), (F)
22	Were approved data collection and recording procedures followed?				(I), (F)

Punch list Items	
Item #	Description:

Conducted by: _____

Approved by: _____

Title: _____

Title: Site Operations Manager

Signature: _____

Signature: _____

Date: _____

Date: _____

FCR Form

FIELD CHANGE REQUEST (FCR) FORM McClellan

FCR #:	Date:	
LOCATION: McClellan	Matrix Representative:	
1. Description (Items involved, submit sketch, if applicable): (Use continuation sheet if necessary)		
2. Reason for Change (Use continuation sheet if necessary)		
3. Recommended Disposition (Submit sketch, if applicable): (Use continuation sheet if necessary)		
Preparer of FCR (Print name and sign)	Preparer's Title	Date
UXOQCS - Reviewed (Print name and sign)	Accepted (Y/N)	Date
Operations Manager- Reviewed (Print name and sign)	Accepted (Y/N)	Date
Matrix PM - Reviewed (Print name and sign)	Accepted (Y/N)	Date
ADEM - Reviewed (Print name and sign)	Accepted (Y/N)	Date

MES FIELD CHANGE REQUEST (FCR) LOG

FCR No.	DESCRIPTION OF CHANGE	DATE INITIATED	STATUS	DATE APPROVED BY ADEM
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

McClellan Project
QC/QA INSPECTION REPORT for MRS

1 - Grid Number		2 - QC State (Percentage) or MILSTD Based			3 - Date	
GRID		50%				
4 - Unit of Production (UoP)	5 - Grids in UoP	6 - Total Targets in UoP	7 - Total Targets in Grid	8 - Total Grid Targets Sampled	9 - Detectors used	
UoP ID	1 of 6	120	25	12	<input type="checkbox"/> EM61 MK2 <input type="checkbox"/> Schonstedt <input type="checkbox"/> Whites	
10 - Description of Inspection						
<p>Conducted by:</p>						
11 - Comments						
<p>Targets checked:</p>						
Reviewed by:			Signature:		Date:	
12 - MES/UXO QA Inspection						
<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	Comments:				
Conducted by:		Signature:			Date:	
13 - Inspection Results Acknowledged MES/PM						
<input type="checkbox"/> Accept	<input type="checkbox"/> Withhold	Comments:				
Reviewed by:		Signature			Date:	



Anniston, Alabama

Intrusive MEC Demolition Photo Collection

MRS-1 Grid 5AJ94

Original Target Information

Unique Target ID	Easting(ft)	Northing(ft)	Easting (SP)	Northing (SP)	GridValue (mV)
5AJ94003	47.5	39.9	675162.21	1167972.34	36.17

Reacquisition Information

Reac Team ID	Team Leader	Date of Reac	Delta Easting	Delta Northing	Pre-Dig Reading (mV)
Geo_Reac_1	JEL	1/18/2007 9:11:00 AM	0	0	36
Reacquisition Comments					
No Comments.					

Excavation Information

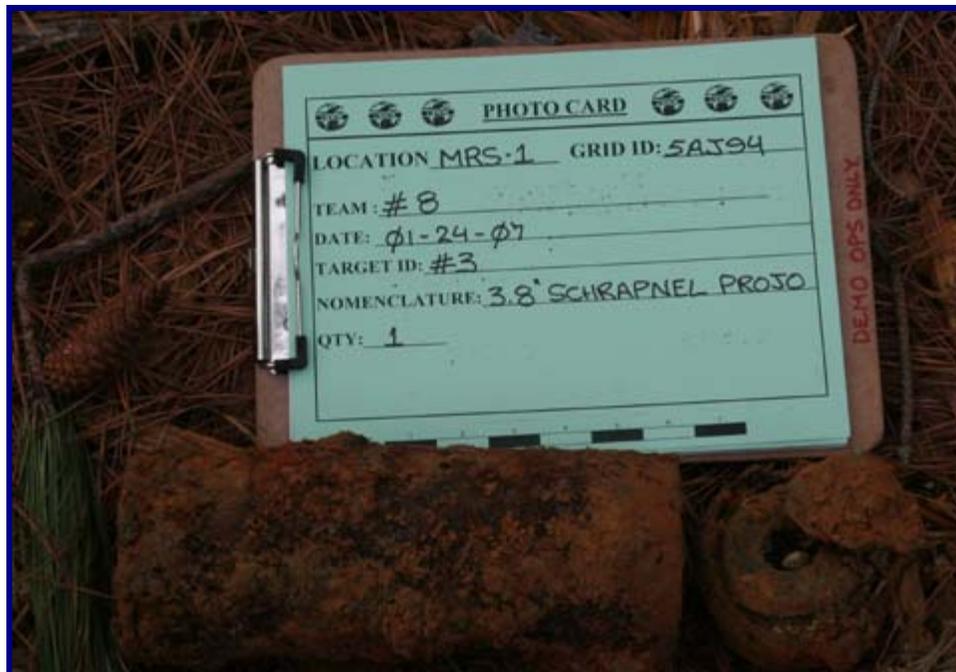
Dig Team	Team Leader	Date of Dig	Nature of Items	Orientation of Nose	Inclination of Nose
Dig_Team_8	CLS	1/24/2007 9:22:00 AM	A - *MEC	270	90
Depth of Items (in)	Fired or Unfired	Physical Condition		Ordnance Filler	
36	Fired	Unfuzed		Black Powder	

Digital Photo Taken?

Demolition Information

Date of Demolition	Disposal Method	Final Disposition	Destroyed By	Demolition Item
1/24/2007 7:22:00 AM	Consolidated	Live	Ray McManus	3.8" SHRAPNEL ROUND

Step Out Required?



MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

(Read Instructions before completing this form.)

This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.

1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER

SECTION 1 - DOCUMENTATION		ORIGIN		DESTINATION	
		a.		b.	
2. CARRIER/GOVERNMENT ORGANIZATION					
3. DATE/TIME OF INSPECTION					
4. LOCATION OF INSPECTION					
5. OPERATOR(S) NAME(S)					
6. OPERATOR(S) LICENSE NUMBER(S)					
7. MEDICAL EXAMINER'S CERTIFICATE*					
8. <i>(X if satisfactory at origin)</i>				9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	
a. MILITARY HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:	YES	NO	
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*			a. TRUCK/TRACTOR
c. ROUTE PLAN		f. COPY OF 49 CFR PART 397			b. TRAILER

SECTION II - MECHANICAL INSPECTION
All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.

10. TYPE OF VEHICLE(S)				11. VEHICLE NUMBER(S)						
12. PART INSPECTED <i>(X as applicable)</i>		ORIGIN (1)		DESTINATION (2)		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)
		SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	
a. SPARE ELECTRICAL FUSES										k. EXHAUST SYSTEM
b. HORN OPERATIVE										l. BRAKE SYSTEM*
c. STEERING SYSTEM										m. SUSPENSION
d. WINDSHIELD/WIPERS										n. COUPLING DEVICES
e. MIRRORS										o. CARGO SPACE
f. WARNING EQUIPMENT										p. LANDING GEAR*
g. FIRE EXTINGUISHER*										q. TIRES, WHEELS, RIMS
h. ELECTRICAL WIRING										r. TAILGATE/DOORS*
i. LIGHTS AND REFLECTORS										s. TARPULIN*
j. FUEL SYSTEM*										t. OTHER <i>(Specify)</i>

13. INSPECTION RESULTS *(X one)* ACCEPTED REJECTED
(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)

14. SATELLITE MOTOR SURVEILLANCE SYSTEM: *(X one)* ACCEPTED REJECTED

15. REMARKS

16. INSPECTOR SIGNATURE *(Origin)* _____ 17. INSPECTOR SIGNATURE *(Destination)* _____

SECTION III - POST LOADING INSPECTION

This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.

	ORIGIN (1)	DESTINATION (2)	COMMENTS (3)
	SAT	UNSAT	
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR			
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT			
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT			
21. PROPER PLACARDS APPLIED			
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS			
23. COPY OF DD FORM 626 FOR DRIVER			
24. SHIPPED UNDER DOT SPECIAL PERMIT 868			

25. INSPECTOR SIGNATURE *(Origin)* _____ 26. DRIVER(S) SIGNATURE *(Origin)* _____

27. INSPECTOR SIGNATURE *(Destination)* _____ 28. DRIVER(S) SIGNATURE *(Destination)* _____

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2)).

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II (Continued)

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with two serviceable fire extinguishers with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher(s) must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

INSTRUCTIONS

SECTION II (Continued)

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

SECTION II (Continued)

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR 172.201 and 202. For shipments transported by Government vehicle, shipping paper will be DD Form 836.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Special Permit 868, ensure that shipping papers are properly annotated and copy of Special Permit 868 is with shipping papers.

Explosives Accountability Log

Date: _____

Contractor: Matrix Environmental Services (MES)

Project Title and Location: McClellan, Alabama

Explosive	Lot Number	Quantities			Signatures	
		Issued	Used	Returned	Team Leader	Checker

Signature / Date:

_____ Demolition Supervisor

Date: ___/___/___

DAILY EXCAVATION / TRENCH INSPECTION

Location: _____ Date: _____ Time: _____

A daily inspection of each excavation / trench is required before the start of each shift involving work at that location; after every rainstorm; after other events that could increase hazards (snowstorm, rain, windstorm, thaw); when fissures, cracks, or sloughing occur; when there is a change in the size, location, or placement of the spoil pile; throughout the shift as needed; and prior to any individuals entering the excavation / trench.

Observation/Issue	Y / N / NA	Comments/Required Action
Has it rained or snowed since the last inspection?		
Are the sidewalls intact?		
Are there tension cracks in the sidewalls, slopes, or surfaces adjacent to the excavation?		
Are there creaking or popping sounds?		
Is equipment located a safe distance from the excavation?		
Has equipment caused sloughing of surface soils?		
Is there evidence of:		
Changes in wall slope?		
Bulges?		
Sloughing of soils?		
Seepage and piping of fine soils?		
Boiling of trench bottom?		
Is there standing water or water accumulation?		
Will personnel be entering the excavation?		
Is the excavation properly shored or benched for personnel protection?		
Are proper entrances and exits provided?		
Has the excavation been monitored for hazardous conditions? (Conduct periodic monitoring as directed by site safety officer.)		

Competent Person / Inspector's Signature: _____

Date _____

MES Non-Conformance Report

McClellan

NCR Number:	Project Name and Number:	Date:	Page of
<p>Nonconformance Description (include specific requirement violated):</p> <p>Identified by: _____ Date: _____</p>			
<p>Root Cause of Nonconforming Action:</p>			
<p>Corrective Action(s) to be Taken (include date when action(s) will be complete):</p> <p>To be Performed by: _____ Date: _____</p>			
<p>Action(s) to be Taken to Preclude Recurrence:</p> <p>To be Performed by: _____ Date: _____</p>			
<p>Acceptance by:</p> <p>Project Manager: _____ Date: _____</p> <p>UXO QC Specialist: _____ Date: _____</p> <p>Site Operations Manager: _____ Date: _____</p>			
Corrective Action(s) Completed by and Date:		Verification Completed by and Date:	

MES Deficiency Notice Report (DNR) McClellan

1 – D-N- Number	2 - Activity	3 - Date
4 - Describe Condition		
5 - Root Cause Analysis		
6 – Recommended Corrective Action		
Identified By:	Signature:	Corrective Action Due Date:
UXOQCS Review:	Signature:	Date:
Responsible Manager:	Signature:	Date:
7 - Corrective Action Taken		
Taken By:	Signature:	Date:
8 – Closeout Action		
Responsible Manager:	Signature:	Date:
Site Operations Manager Comments:		
Site Operations Manager Review: <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable	Signature:	Date:
Matrix PM Comments:		
Matrix PM Review: <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable	Signature:	Date:

Appendix E
SOPs

MEC OPERATIONS

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide procedures for intrusively investigating anomalies selected by geophysicists as representing buried Munition and Explosive of Concern (MEC). Site-specific procedures may vary, and this SOP is to be used in lieu of other requirements presented in project-specific work plans.

2.0 SCOPE

This SOP provides detailed information needed to reacquire, excavate, recover, and record MEC. MEC anomalies will be recovered from depths from surface to “depth of detection.” However, where an MEC anomaly has been identified for investigation UXO teams will excavate that anomaly. Specific requirements are defined for community notification/coordination, personnel requirements, training, equipment/material, and intrusive sampling activities. The intrusive MEC clearance section includes procedures for daily sector briefing/verification; exclusion zone establishment; anomaly acquisition, excavation, and recovery; locating MEC-related scrap; handling, transportation, and storage of MEC; disposition of non-MEC-related scrap; sector mobilization and demobilization; and data collection and recording.

3.0 NOTIFICATION/COORDINATION PROCESS

Coordination with all persons or working in the project area is essential for the safe and efficient working environment during intrusive MEC clearance operations. Assistance from all contractors of the area is encouraged to ensure intrusive MEC clearance operations are completed in the shortest possible time.

The MES Site Operations Manager will coordinate the UXO intrusive teams and supervise all on-site MEC activities. The coordination, notification, and verification activities are outlined below:

- **Coordination Meeting** – Before intrusive MEC clearance operations are scheduled to begin, a coordination meeting will be conducted to establish roles and responsibilities of the JPA contractors, MES support personnel. Topics will include:
 - Grid & Dig maps.
 - Personnel introductions and responsibilities.
 - Hazardous material characterization and handling.
 - Notifications.
 - Controls of exclusion zones.
 - Evacuation requirements.
- **Notifications** – The MES Site Operations Manager will notify Emergency Services (at a minimum) such that Medical Facility, Fire Department, and Police are informed of the schedule and prepared to respond as necessary for emergency assistance.

Demolition Operations Notification Listing

___Anniston Fire Dept.....	231-7647/7644/7645	
___Anniston Police Dept.....	238-1800	
___Calhoun County Sheriff's Dept.....	236-6600	
___Transition Force	Scott Bolton or Security	848-6561/3847

___Range Control	(for Aircraft Control)	847-3037/3038
___COBRA/Homeland Security	Bruce Greene	847-2061/310-2902
___JPA	Miki Schneider (Primary)	236-2011/ 310-0267
___Hospital – Regional Medical Center (RMC)		235-5121
___Matrix Environmental	Talmadge "Bo" Bohannon (QA) Cecil Taylor (OPS)	850-832-7155 310-8004
___US Fish & Wildlife	Steve Miller or Bill Garland	848-6833/310-9194

An MES representative will notify all organizations listed above, prior to conducting Demolition operations and report notifications to the Site Operations Manager.

- **Exclusion Zone Information Package** – MES will provide one copy of the exclusion zone map for each intrusive MEC clearance contractor.

4.0 PERSONNEL REQUIREMENTS

The Operations Manager will have overall responsibility for all intrusive MEC clearance operations. Multiple UXO teams may be utilized to perform intrusive MEC clearance. Each UXO team will include:

- One UXO Supervisor UXO III, who will be the designated Team Leader, and at least one UXO Specialists UXO II.

UXO Assistant – The UXO Assistant when used, will assist qualified personnel (Unexploded Ordnance Specialist UXO II and above) in conducting reconnaissance and classification of MEC, and identifying all ordnance types and condition, armed or unarmed. The UXO Assistant's responsibilities may include:

- Locating subsurface MEC using military and/or civilian magnetometers (and related equipment).
- Performing excavation procedures on subsurface MEC.
- Locating surface MEC by visual means.
- Transporting MEC and demolition materials.
- Performing field maintenance on military and/or civilian magnetometers.

UXO Technician II – Must be able to perform all of the functions described for the UXO Assistant, plus:

- Properly store explosive materials in accordance with applicable guidance.
- Perform field maintenance on military and/or civilian magnetometers.
- Determine a magnetic azimuth using current navigational/location equipment.
- Perform field expedient procedures to identify contaminated soil.
- Prepare an on-site holding area for recovered MEC.
- Operate Digital Global Positioning System (DGPS) equipment.
- Operate modes of transportation for transporting MEC, when appropriate.
- Perform limited technical supervision of non-technical personnel.

UXO Technician III – Must be able to perform all of the functions described for the UXO Assistant and UXO Technician II, plus:

- Supervise and perform the on-site disposal of recovered MEC and demolition materials.
- Prepare an explosive storage plan in accordance with all applicable guidance.

- Prepare required MEC administrative reports.
- Prepare standard operating procedures for applicable site and project conditions.
- Perform risk hazard analysis.
- Conduct daily site safety briefings.
- Supervise the conduct of all on-site surface and intrusive MEC clearance operations.

SUXOS – Must be able to perform all of the functions described for the UXO Assistant, UXO Technician II, UXO Technician III, plus:

- Plan, coordinate, and supervise all MEC activities.
- Supervise multiple UXO teams performing:
 - Reconnaissance and classification of MEC and demolition materials.
 - Location of surface and subsurface MEC.
 - Destruction of MEC by burning and detonation.
 - Transportation and storage of MEC.
- Prepare SOPs for intrusive MEC clearance operations ensuring compliance with Department of Defense (DoD) directives as well as local, state, Federal statutes and codes.
- Certify MPPEH as ready for disposal or turn-in in accordance with current policies.

UXO teams may be supported by a team of laborers to assist in the delivery and maintenance of machinery and equipment.

5.0 TRAINING REQUIREMENTS

All personnel assigned to the intrusive MEC clearance teams require an initial certification. Each team member must demonstrate his ability to reacquire targets selected for intrusive MEC clearance activities with the equipment in the GPO. In addition, intrusive teams are required to go thru the FCA each day.

If the equipment requires repair, it must be recertified prior to field use. All new or spare equipment will also be certified prior to field use. Newly assigned personnel must complete an initial certification at the GPO.

All personnel assigned or involved with intrusive MEC clearance operations will attend a site-specific orientation. The purpose of this orientation will be to review site-specific and emergency response procedures. The topics to be covered during the orientation are listed below. Course attendance sheets with attached curriculums will be used to document completion of each orientation session.

5.1 Training Schedule

A. Introduction

1. Project summary.

B. Presentation

1. *Site-Specific Health and Safety Plan (SSHSP)* review.
2. SOP and administrative review.
3. Equipment training.
 - a. Differential global positioning system (DGPS) training.
 - b. Metal locator training.
 - c. UXO intrusive form training.

- d. Logbook training.
 - e. MEC surface finds and MPPEH procedures.
 - f. UXO Level I, II, and III training.
 - g. Ordnance types, functions, and hazards.
4. Safety
- a. MEC specific.
 - b. First aid/CPR.
 - c. Review emergency response equipment.
 - d. Talk/walk-through of emergency procedures.
 - e. Emergency drill.

The site-specific training will include step-by-step review of all SOPs including data recording forms to ensure that all UXO team members clearly understand the procedures for operation of equipment, reacquisition of targets in the field, intrusive investigation, map interpretation, and data recording. Additional training may be required during the course of the field program as specific needs are identified.

6.0 EQUIPMENT/MATERIAL REQUIREMENTS

All equipment utilized by the intrusive UXO clearance team requires an initial certification. Each team member must demonstrate his ability to reacquire targets selected for intrusive investigation with the equipment.

- Project-approved hand-held geophysical instruments.

6.1 Other Equipment

- Logbook.
- Communication radio (2-way).
- Dig packages (maps, electronic coordinate files).
- Digital data recording device.
- Pin flags.
- Fiberglass probe.

Each UXO Team Leader (UXO Technician III) will inspect the equipment to be used prior to commencing operations each day to ensure that proper tools and equipment are available. The Team Leader will complete an Intrusive Equipment Checklist (Attachment 1) to verify successful completion of the inspection. This checklist will be submitted to the contractor supervisor at the close of each working day to document compliance with the required inspection criteria. The completed forms will be incorporated into project files.

As part of the required equipment, the following documents must be carried with each UXO team during intrusive UXO clearance operations:

- This approved SOP.
- Approved dig sheets for the areas of planned intrusive activities, if required.
- Utility locate information, if required.

7.0 INTRUSIVE INVESTIGATION

Intrusive investigation of all valid target anomalies will be performed to identify MEC items. The following procedures describe the specific activities required for intrusive investigation of

anomalies, including daily sector briefing/verification; exclusion zone establishment; anomaly acquisition, excavation, and recovery; locating MPPEH debris; handling, transportation, and storage of MEC disposition of non-MEC related anomalies; sector mobilization and demobilization; and data collection and recording.

7.1 Daily Briefing/Verification

At the beginning of each working day, the MES Site Operations Manager will hold a daily briefing. At a minimum, this briefing will include:

- Review of emergency procedures.
- Discussion of previously located MEC.
- Description of any known utilities in work areas.

Other topics that may be discussed, as necessary, include quality control (QC), safety, changes to the work schedule, equipment maintenance, and any issues that may affect the activities being performed that day (or in the near future).

During the daily briefing, the Operations Manager will also assign grid or dig packages to each of the UXO teams for intrusive MEC clearance. Dig packages contain the necessary information and maps to perform the assigned work. After arriving at the work site, team leader(s) will conduct a tailgate safety meeting at the work location. The team leader will brief their team on potential hazards in the area where they will be working and document the briefing in their logbook.

7.2 Exclusion Zone Establishment

An exclusion zone will be established around work area prior to conducting intrusive MEC clearance operations. Road barricades will be utilized to block road access, and warning signs will restrict access areas, as required. A minimum distance of 200 feet should be maintained between each UXO team. Before intrusive activities begin, the exclusion zone control point will be established. The control point will be the established location of the emergency evacuation point, should an incident occur. The exclusion zone setup at the start of the day and the breakdown of the exclusion zone at the close of intrusive activities is the responsibility of the UXO Team Leader.

7.3 Anomaly Reacquisition

The Geophysical Contractor will reacquire all geophysical anomalies using an EM61 MK2 and place a flag at the location. UXO Team Leaders will be provided with digital dig packages on the PDA and hard copies of the reacquisition team comments and maps of the reacquired target geophysical anomalies to be cleared at the beginning of each workday.

- The area of the target anomaly will be searched using geophysical instruments to determine the exact location of any anomalies in proximity to the target. A radius of 30 inches around the anomaly location will be searched in order to locate the anomaly.
- All anomalies located within the 30 inch radius will be intrusively investigated and cleared.

7.4 Excavation Procedure

Prior to intrusive operations, the UXO Team Leader will advise the Operations Manager that intrusive operations have started. A hand-held metal detector will be used to locate the boundaries of the anomaly. If possible, the boundary area will be gently probed with a fiberglass probe to determine the depth and location of each anomaly. A shovel or trowel will then be used in conjunction with the fiberglass probe to excavate each anomaly while continuing to probe, as appropriate, to ensure that the anomaly is not struck with the shovel/trowel. When it is determined that the bottom of the excavation is near the anomaly, a

small trowel will be used to finish the excavation. Each anomaly will be investigated and the results recorded in the PDA.

During excavation operations, only those personnel absolutely necessary for the operation will be within the exclusion zone. UXO teams in the general vicinity of each other will maintain at least 200 feet separation while intrusive investigations are being conducted. Each contractor's UXO team will maintain radio communications with each other team in order to coordinate team locations and exclusion zones. All other nonessential personnel will remain outside the exclusion zone during the excavation activity.

If, at any time during the excavation, water begins pooling in the bottom of the hole and prevents uninterrupted inspection, a portable manual hand pump or other appropriate (i.e., scoop bail) may be used to extract the water.

The specific intrusive MEC clearance procedures are presented below:

- Set up an appropriate exclusion zone for intrusive work.
- Investigate each anomaly by first locating the boundaries of the anomaly and then using a shovel or trowel and a fiberglass probe to pinpoint and unearth the anomaly source. The perimeter of the anomaly will first be probed using a fiberglass probe, if possible, to pinpoint the depth of the anomaly. The shovel or trowel will then be used with the probe to carefully excavate four-inch lifts of soil until the bottom of the excavation nears the anomaly source. The final excavation will be performed carefully using the trowel.
- If the anomaly is located and is neither MEC nor MPPEH, it will be removed (if possible) and placed at a corner stake and removed from the grid when intrusive operations have been completed.
- Once the anomaly is removed, the UXO team leader will verify that the anomaly has been completely removed and bend the pin flag.
- If the anomaly is located and found to be neither MEC nor MPPEH and is too large to be removed, it will be left in place and the operations manager will be notified. The UXO team may move to another target until further decisions have been made regarding the item that was left in place. A backhoe or similar equipment may be used to excavate the anomaly.
- The UXO Team Leader will ensure that the anomaly was properly and completely removed and that the hole is electronically cleared. It is the responsibility of the UXO team leader to decide whether to continue excavation or move to a new target.
- Upon completion of the excavation, the hole must be electronically cleared or noted "not electronically cleared" and the reason (i.e., rust fragments) noted in the PDA.
- Data will be recorded by the UXO Team Leader in PDAs. All required information must be entered at the time of the MEC clearance. The PDA is used to record data for every anomaly that is investigated by the UXO Team(s). The Team Leader will complete all information required in the PDA forms.
- After completing the excavation and completing the data entry, the UXO team will then depart the excavation for the next target location to be investigated.
- Upon completion of the daily excavations, the UXO Team Leader will notify the Operations Manager that intrusive activities have been completed for the day.
- All teams may be subject to QC inspection at any time during the workday.

NOTE: UXO items located on the surface (i.e., without excavation) will be treated in the same manner as subsurface finds (i.e., assign reacquisition coordinates, record all required data and information in the PDA).

7.4.1 Anomaly Characterization

The recovered anomaly will be categorized to provide data to support the field MEC clearance objectives. The categories for anomaly type are contained in the drop-down menus in the PDA. Non-MEC-related scrap will be inspected for signs of hazardous waste residue and disposed of according to the requirements defined in the approved project plans. MEC-related scrap (e.g., frag, fins, expended munitions) will be inspected and recorded. The main criteria used to determine the proper category include whether or not the item was fired and whether or not the item contains or ever contained energetic material.

MEC that is not intact upon discovery (i.e., exposed HE or filler) will be noted in the PDA. If the MEC item is safe to transport, it will be placed in a sand-filled bucket or other container that will prevent loss of filler. All visible energetic material (filler) will also be collected and placed in the bucket. If the MEC item is unsafe to move, the item will be identified, the site location will be marked and demolition supervisor notified of item and location. The MEC will be left in place and guarded until it is disposed of by the demolition team.

Any suspected non-MEC hazardous material will also be logged into the PDA. Material will be suspected to be hazardous if it emits a chemical odor, has caused soil staining or is contained in a drum or other container commonly used (or marked) for storage of hazardous materials. If in doubt, the UXO team leader will contact the operations manager for further direction.

If recovered MEC is identified as Recovered Chemical Warfare Material (RCWM), all intrusive activities will cease, and the site will be evacuated and secured following procedures in the project work plan. MES personnel will not participate in any RCWM disposal.

7.4.2 Anomalies Other than MEC

It is anticipated that hazardous material other than MEC will be located during intrusive investigations, including underground utilities, chemicals, and other hazards.

- **Underground Utilities** – The Schonstedt and Vallon locators will be used during intrusive activities to detect energized power lines. Indication from a locator or uncovering a telltale tape will require immediate suspension of intrusive activities.
- **Chemicals** – During intrusive activities, if any evidence of chemical contamination is detected, all intrusive activities will cease, and the operations manager notified.
- **Other Hazards** – If sealed drums, contaminated soils, or other suspect materials or conditions that would indicate a potential health or safety hazard are encountered during the intrusive MEC clearance, work efforts will stop, and the operations manager notified. Work will not continue until the operations manager and SHSM evaluate the situation. Operations will continue only when it is safe to proceed.

7.5 Located MEC Procedures

After an MEC item has been positively identified, the UXO Supervisor will determine if the MEC is safe to move/transport. If the MEC item has been fired, it will remain marked at its location and guarded until it is moved or disposed of by UXO demolition team. If the MEC item has been unfired and is safe to move/transport, it will be removed from the grid and transported to the designated collection point / magazine.

The following procedures will be initiated when MEC items are located:

- The UXO Team Leader will:
 1. Notify the demolition supervisor of the location of the item.
 2. Notify the SHSM who will expand the exclusion zone as required.
 3. Identify the item, measure the length and width, and determine condition. This information will be recorded on the PDA.

4. Determine if the item is safe to transport. If the item is safe to transport, contact the demolition supervisor to arrange transport to magazine. If item is not safe to transport, contact the demolition supervisor for further disposition instructions.
 5. Photograph UXO item by the demolition supervisor.
 6. Attempt to identify MEC fragments by munitions type and size, if possible. This information will be recorded in the PDA.
- Demolition Supervisor will:
 1. Verify MEC item identification.
 2. Document anomaly number and location.
 3. Notify other teams working in the vicinity of the hazard.
 4. Notify fire, medical, and police in case emergency assistance is needed.
 5. Items safe to move will be transported to the collection point/magazine. If the UXO is not safe to move, it will be guarded until the item is disposed properly by UXO personnel.

7.6 Disposition of Located MEC

Anomalies identified, as MEC will be divided into three categories:

- Safe to transport.
- Unsafe to transport, but the area can withstand a detonation.
- Unsafe to transport and the area cannot withstand a detonation.

UXO items that have been fuzed and fired are normally considered too hazardous to move. UXO located in accessible areas and deemed safe to transport will be taken to the collection point/magazine for storage and later disposal at the intentional detonation site. UXO that is unsafe to move and can safely be blown-in-place will be disposed on site. UXO that is unsafe to move and in an area that cannot withstand a detonation will be appropriately marked and guarded; appropriate engineering controls will then be implemented for disposal.

MEC-related scrap that has been in direct contact with energetic materials (e.g., expended rocket motors, shell casings, and warhead fragments) will be visually inspected by UXO personnel, and will be transported to the designated collection point/magazine and evaluated for proper disposal.

7.7 Handling, Transportation, and Storage of MEC

If the MEC is in an accessible area and is identified as “safe to transport,” the demolition supervisor will transport MEC in a vehicle that meets the requirements of 49 Code of Federal Regulations (CFR) 100-199 for transporting explosive materials to the collection point/magazine or safe disposal site.

All handling of MEC will be in accordance with accepted safety precautions. Persons responsible for MEC accountability will track and document using a PDA.

7.8 Demobilization

Following intrusive MEC clearance operations each day, all MEC scrap and non-MEC scrap will be collected, inspected, and transported to collection area. Barricades and exclusion zone signs will be left in place unless directed otherwise by the Operations Manager. UXO team supervisor is responsible for notification of all MEC/UXO items located to the demolition supervisor prior to demolition from the work area at end of work day.

7.9 Data Collection and Recording

The UXO Team Leader will record all data on the PDA at the time of the MEC clearance of each target. The UXO Team leader will submit their digital data recording device to the data manager at the end of each day. The data manager will download the PDA into the database. The data manager will then provide a paper copy of all the data to the Operations Manager. The Operations Manager will review and correct any errors found in the forms, initial any corrections, and return a copy of the corrected data forms to the database manager. The database manager will then make the appropriate corrections to the database. The completed data that document MEC finds are the responsibility of the operations manager and will be placed in a binder labeled the Ordnance Accountability Inventory. Digital photographs recorded each day will be turned over to the database manger along with a copy of the daily photo log and a photocopy of the UXO teams field logbook. These photocopies will be placed in a designated notebook for storage in the data files. These copies will serve as backup in case logbooks are damaged or lost.

All electronic and manual data, including PDAs and digital photographs, will be turned over to the specified manager/technician at the end of each working day without exception. It is critical that data not be lost or compromised through loss or improper handling. Data will be entered into the database as soon as possible. A quality control check will also be performed on all database entries at any time.

Attachment 1 – Typical Intrusive Equipment Checklist

Date Team Inventoried by

		QTY	DESCRIPTION
		1	Air horn
		2	Blankets
		1	DGPS unit, where applicable
		1	Emergency eye wash
		2	Fiberglass probes
		1	Fire extinguisher
		1	First-Aid / Trauma Kit
		1	Flashlight
		5pr	Gloves, leather
		150	Pin flags
		2	Radios
		1	Schonstedt locator
		3	Shovel, round point
		1	Stretcher
		2	Tape, duct
		2	Tape, plastic
		1	Toolbox, general hand tools
		1	Tow Strap (if conditions warrant)
		1	Trowel
		1	Vallon Detector
		5	Water Bottle, 1 liter
		1	Water, drinking, 5 gal (if required)

MEC: Military munitions that are (1) UXO, as defined in 10 United States Code (USC) 101(e)(5); (2) abandoned or discarded, as defined in 10 USC 2710(e)(2); and (3) munitions constituents [e.g., Trinitrotoluene (TNT), RDX, etc.] present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard. MEC will be disposed of on-site by detonation.

- **UXO:** Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remain unexploded either by malfunction, design, or any other cause [10 USC 101(e)(5)].
- **Other MEC:** MEC as described above, other than UXO.

MEC (Related) Scrap: Scrap, components, parts, fragmentation, or other materials associated with MEC, that have been determined to pose no explosive safety hazard. MEC scrap will be managed in accordance with state and federal solid waste and recycling requirements, as well as DoD and Defense Logistics Agency trade security, demilitarization, and inert certification requirements (DoD Demilitarization Program Bulletin No. 99-005, DoD Manual 4160.21-M-1, and DoD Directive 2030.8).

- **MEC Fragmentation:** Produced by ordnance designed to kill by detonation of HE and fragmentation of the delivery vehicle casing. These are generally thick cased munitions.
- **Other MEC (Related) Scrap:** MEC scrap as described above, other than MEC fragmentation (tail fin, cartridge case, etc.).

Non-MEC (Related) Scrap/Material: Scrap metal or other materials, which may be discovered in the study area, that are not MEC scrap as described above (tin can, gate hinge, barbed wire, etc.). Non-MEC scrap and other materials will be managed in accordance with state and federal solid waste and recycling requirements.

- **Scrap Metal:** Bits and pieces of metal parts, or metal pieces that may be combined together with bolts or soldering that, when worn or superfluous, can be recycled [40 Code of Federal Regulations (CFR) 261.1(c)(b)]. U.S. Environmental Protection Agency (EPA) guidance states that the material “must have a metal content of at least 50%” [Office of Solid Waste and Emergency Response (OSWER) Directive 941.1990(09a)] and that it be in “solid, nondispersible form” (61 Federal Register 2362, 25 January 1996).

Other Material: Non-MEC-related material other than scrap metal as described above.

Small Arms Ammunition: Ordnance that is .50 caliber and smaller are considered small arms for the purposes of ordnance projects. The determining factor is that caliber .50 and smaller rarely contain explosive projectiles and presents a very low risk to the public (CEHNC-OE-CX 200-1c, April 21, 1999).

UNEXPLODED ORDNANCE (UXO) SAFETY PROGRAM

(General Guidelines)

1.0 OBJECTIVE

MES recognizes that there are no "safe" procedures for dealing with UXO, merely procedures that are considered least dangerous. The objective of this Standard Operating Procedure (SOP) is to establish guidelines for maximum safety in all UXO operation. This can be achieved through strict adherence to applicable safety precautions, a planned approach, and intensive supervision. Only those personnel absolutely essential to the operation are allowed in the restricted/exclusion area during UXO operations. Safety is a firmly established habit when working with UXO. Safety is the leading edge of quality.

MES's UXO section has established several specific Standard Operating Procedures (SOPs) for UXO work activities.

2.0 UXO TRAINING

MES requires that all UXO qualified personnel be US citizens who have graduated from the following schools: U.S. Army Bomb Disposal School, Aberdeen, MD, or the U.S. Naval Explosive Ordnance Disposal (EOD) School, Indianhead, MD. Graduates of the EOD Assistant Course, Redstone Arsenal, AL, or Elgin AFB, FL.

3.0 UXO/EXPLOSIVE HAZARD RECOGNITION

Before starting work, all field personnel will attend Site-Specific UXO/Explosive Hazard recognition and safety briefing, provided by the UXO Operations Manager. Any additional UXO information gained during work on the site is incorporated into daily tailgate safety briefings, and given to all site personnel. Prior to the start of any work, zones will be established and clearly identified to delineate work activities. As zones are identified, UXO clearance activities will begin.

4.0 BASIC SAFETY PRECAUTIONS

- a. MES UXO operations are not conducted until a complete UXO safety plan for the operation involved is prepared and approved. This site-specific plan is based upon limiting exposure to a minimum number of personnel, for a minimum time, to the minimum amount of UXO consistent with safe and efficient operations.
- b. Only UXO qualified personnel are involved in UXO procedures. Non-UXO qualified personnel are utilized to perform UXO-related procedures only when supervised by UXO qualified personnel. All MES personnel engaged in operations are thoroughly trained in explosive safety and is capable of recognizing hazardous explosive exposures.
- c. When operations involving UXO-containing electro explosive devices (EEDs) are being accomplished in a suspect electromagnetic radiation (EMR) field, insure proper (EMR) precautions are taken. In addition, do not wear outer or undergarments made of materials that have high static generating characteristics when working on UXOs. Materials of 100 percent polyester, nylon, silk, or wool are highly static-producing, and insure any person handling a UXO suspected of containing EEDs ground themselves prior to touching the UXO.

The following safety precautions are applicable to all UXO personnel:

- Suspend all operations immediately upon approach of an electrical storm.
- Observe the hazards of EMR precautions and grounding procedures when working with, or on, electrically initiated or susceptible OE.

- Chemical munitions will not be disturbed, handled or disposed of. MES personnel will only provide assistance to the client, if required.
- Do not dismantle, strip, or handle any UXO unnecessarily.
- Avoid inhalation and skin contact with smoke, fumes, dust and vapors of detonations and OE residue.
- Do not attempt to extinguish burning explosives or any fire that might involve explosive materials.
- Do not manipulate external features of ordnance items unless specifically called for in UXO procedures.
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting OE operations.
- Do not subject OE to rough handling or transportation. Sand bag, chock and block appropriately.
- Carry explosives in an appropriate container.
- Hand carry no more than two items (one in each hand) at a time and then only as required by the operation being performed.
- Destroy shaped charge munitions by crushing the cone to prevent formation of the explosive jet.
- The preferred method for disposing of white phosphorous (WP) is to blow the munitions in a manner that disperses the WP into the air versus down into the ground.
- Do not transport damaged WP munitions unless fully submerged in water.
- Avoid unnecessary movement of armed or damaged UXOs.
- Avoid the forward portions of munitions employing proximity fusing.
- Assume unknown fuses contain cocked strikers or anti-disturbance features.
- Non-UXO personnel will not perform any activities on the sites without a UXO qualified individual with them.

5.0 GENERAL SAFETY PRECAUTIONS BY ORDNANCE TYPE

The following sub-paragraphs describe safety precautions for various types of munitions/disposal operations. As a general safety precaution, It is important that ordnance not be disturbed or moved without a positive identification.

5.1 Bombs

- Ensure fuze wells do not contain fuze components.
- Exercise caution when packing fuze wells of bombs.
- Bombs that have are considered to have mechanical or electrical impact/impact inertia tail fusing will be blown-in-place only.
- Igniters for fire bombs could possibly contain sodium and will not be allowed to come in contact with water.
- Igniters for Firebombs will not be subjected to any shock due to the all ways acting fusing employed.

5.2 Clusters, Dispensers, and Launchers

- Approach and work from the sides of a dispenser.
- Consider an intact dispenser as fully or partially loaded.
- Consider any payloads outside the container or dislodged inside as armed.
- Take precautions for the most hazardous payloads until positively identified.

5.3 Projectiles

- Determine if the projectile has been fired and, if so, consider it armed.

- Check for the presence of unburned tracers.
- Avoid the rear and front of rocket assisted projectiles.
- Handle projectile components such as powder increments, cartridges, and primers with caution.
- Seal the open ends of projectiles or sheared projectile components with tape or other suitable material before transporting.

5.4 Grenades

- Do not attempt to re-install safety pins in dud fired grenades.
- Do not attempt to withdraw impinged firing pins from the fuze of a dud fired grenade.
- Do not dispose of grenades by functioning them as designed.

5.5 Rockets

- Approach and work on rockets from the side.
- Do not dismantle or strip dud fired rockets or rocket motors.
- Do not expose electrically fired munitions to radio transmissions within 25 feet.
- Do not transport an unfired rocket motor until having shielded the motor igniter from EMR.
- Dispose of unfired rocket motors, with or without warheads, in such a manner as to prevent them from becoming propulsive.

5.6 Guided Missiles

- When found, restrict vehicular movement in the area of a guided missile.
- Avoid entanglement with guidance wires of wire guided missiles.
- Restrict radio communications in the vicinity of a dud fired missile.
- Approach and work on missiles from the side and rear quarter.
- Do not dismantle or strip dud fired missiles or missile motors.
- Do not transport an unfired missile motor until having shielded the motor igniter from EMR.
- Dispose of unfired missile motors, with or without warheads, in such a manner as to prevent them from becoming propulsive.

5.7 Submunitions

- Positive identification of submunitions must be obtained prior to entering the range.
- Obtain safety precautions pertaining to the specific submunition.
- Only approach those submunitions that are known to be safe to approach.
- Fused submunitions shall not be picked up, moved or touched.
- Fused submunitions shall be Blown in Place by countercharging.
- Only one person should be within the known frag radius of any submunition.

6.0 UXO SAFETY PRECAUTIONS FOR SITE CHARACTERIZATION

- a. Make every effort to identify the UXO. Visually examine the item for markings and other identifying features such as shape, size, and external fittings. However, do not move the item to inspect it. If an unknown UXO is encountered, proper authorities must be notified.
- b. Any time a suspected chemical munition is encountered, all personnel will withdraw upwind from the munition to a safe area, and the proper authorities will be notified.
- c. Avoid inhalation of, and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.
- d. Consider UXO that has been exposed to fire and detonation as extremely hazardous. Chemical and physical changes may have occurred to the contents that render it much more sensitive than it was in its original state.

- e. Do not rely on the color-coding of UXO for positive identification of contents. Munitions having incomplete or improper color-coding have been encountered.
- f. Avoid the area forward of the nose of a munition until it can be ascertained the item does not contain a shaped charge. The explosive jet can be fatal at great distances forward of the longitudinal axis of the item. Assume any shaped charge munitions to contain a piezoelectric (PZ) fusing system until the fusing system is positively identified. A PZ fuze is extremely sensitive, can function at the slightest physical change, and may remain hazardous for an indefinite period of time.
- g. Approach an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust.
 - (1) Do not expose rocket motors to any EMR source.
 - (2) If an unfired rocket motor must be transported, it shall be positioned in the direction that offers the least exposure to personnel in the event of an accidental ignition.
- h. Assume practice UXO contain live charges until determined otherwise. Expended pyrotechnic/practice devices may contain red/white phosphorus residue.
- i. Do not approach smoking WP UXO. Burning WP may detonate the burster or dispersal explosive charge at any time.

7.0 ORDNANCE AVOIDANCE FOR HTRW ACTIVITIES

- a. Investigative activities on potential ordnance contaminated sites are accomplished using approved MES ordnance avoidance procedures.

8.0 RESTRICTED/EXCLUSION UXO AREA OPERATIONS

- a. On Ordnance and Explosives sites, MES's site safety personnel shall establish a restricted/exclusion area for each UXO team operating on the site. Default safety distances (EZ) shall be initially set to the worst case (or most expected item) default frag distance as a starting point, then to the actual distance for the specific item as it is exhumed. The purpose of the area is for the protection of the public and other personnel from the blast and fragmentation hazards of an accidental detonation.

The area is established based on the following minimum factors:

- (1) Previous site use that caused the contamination: impact area, open burn/ open detonation, burial, etc.
 - (2) Project type: surface clearance, subsurface clearance, sifting operation, sampling, etc.
 - (3) Known ordnance contamination, distances to public exposure, terrain, etc.
- b. When multiple UXO teams are operating on a site, the restricted/exclusion area and team separation distances shall never be less than 200 feet.
 - c. During the time frame that UXO operations are being accomplished, only personnel necessary for the UXO operation shall be within the restricted/exclusion area. When non-essential personnel enter the restricted/exclusion area, all UXO operations must cease. MES.
 - (1) Plans for, provides, and knows the measures to be taken in the event of an accident.
 - (2) Provides a designated emergency vehicle in the area in case of an accident or other emergency.
 - (3) Coordinates with the appropriate airspace representative and assure appropriate notification procedures are arranged.

- (4) When non-essential personnel must enter the restricted/exclusion area, the following are accomplished: a) The individual/individuals receive a safety briefing, b) Are escorted by a MES UXO qualified individual; and c) All UXO operations must cease within the established restricted/exclusion area.
- d. Before any movement of a UXO, the fuze condition must be ascertained. If the condition is questionable, consider the fuze to be armed. The fuze is considered the most hazardous component of a UXO, regardless of type or condition.
 - (1) Do not dismantle or strip any UXO.
 - (2) Do not depress plungers, turn vanes, or rotate spindle, levers, setting rings, or other external fittings on UXOs.
 - (3) Do not subject mechanical time fuses to any unnecessary movement.
 - (4) Do not remove fuses from UXO.
 - (5) Positively identify and review all safety precautions prior to handling any ordnance.
- e. All MES personnel working within the restricted/exclusion area shall comply with the following:
 - (1) Do not conduct operations without an approved Site-Specific Safety and Health Plan and an approved Work Plan.
 - (2) Do not smoke, except in authorized areas.
 - (3) Do not have fires for heating or cooking, except in authorized areas.
 - (4) Do not conduct explosive operations during electrical, sand, dust, or snow storms.
 - (5) Explosive operations are conducted during daylight hours only.
 - (6) During magnetometer operations, UXO teams shall not wear safety shoes or other footwear that would cause the magnetometer to present a false indication.
- f. If records search indicated WP munitions were fired or destroyed in the area, extra care shall be taken when uncovering a buried UXO.

9.0 EXCAVATION OPERATIONS

- a. Hand excavation is the most reliable method for uncovering UXO. Hand excavation will be accomplished only by UXO qualified personnel.
- b. Earth moving machinery (EMM) may be used to excavate buried UXO, if the UXO is deeper than 12 inches. EMM shall not be used to excavate within 12 inches of a UXO. When excavation gets within approximately 12 inches of a UXO, hand excavation shall be used to uncover the UXO. Non-UXO personnel, under the direct supervision of UXO personnel, may operate EMM.
 - (1) If more than one EMM will be used on the same site, the same separation distances required for multiple teams on that site will separate them.
 - (2) During excavation operations, only those personnel absolutely necessary for the operation shall be within the restricted area/exclusion zone.
 - (3) Excavation and trenching shall comply with the provisions of 29 CFR 1926 subpart P.

10.0 DISPOSAL OPERATIONS

The following sub-paragraphs outline the procedure MES personnel will use to perform both electric and non-electric demolition operations.

- a. As a general rule, UXO will be detonated in place when the situation allows. All detonation-in-place operations are conducted by electrical means to assure maximum

control of the site, except in situations where static electricity or EMR hazards are present, in this case non-electrical means can be used.

- (1) The Two-man rule is in effect during and MES disposal operation.
- (2) Exercise extreme care in handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, and friction.
- (3) Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
- (4) WP UXO shall not be detonated into the ground. The UXO shall be counter-charged bottom centerline when possible.

b. The following safety rules will be adhered to at all times:

- (1) Carry blasting caps in approved containers, out of the direct rays of the sun, and located at least 25 feet from other explosives, until they are needed for priming.
- (2) During the approach or progress of an electrical storm, all operations will cease and all personnel will retire to a place of safety.
- (3) Do not use any explosives or accessory equipment that is obviously deteriorated or damaged.
- (4) Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
- (5) Use only the equivalent of a commercial No. 8 blasting cap or greater.
- (6) When using more than one cap in a demolition operation, insure they are of the same manufacturer.
- (7) Do not bury blasting caps.
- (8) Test electric-blasting caps for continuity at least 25 feet from any other explosives prior to connecting them to the firing circuit. The wires will remain shunted until ready to be connected to the firing circuit.

c. In the event of a misfire, do not approach the disposal site for at least 30 minutes after the expected detonation time. When conducting non-electric procedures, the wait time shall be 30 minutes plus the fuse burn time.

d. A post-search of the detonation site shall be conducted to assure a complete disposal was accomplished.

e. If the situation dictates, protective measures to reduce shock, blast, and fragmentation shall be taken.

f. Inert ordnance will not be disposed of or sold for scrap until the internal fillers have been exposed and unconfined. Venting or exposure may be accomplished in any way necessary.

11.0 UXO SWEEP OPERATIONS

Before sampling operations or non-UXO personnel entering the site, the UXO team will perform visual and magnetometer sweeps of the work areas ensuring they are free of UXO or that all UXO encountered is clearly marked. Non-UXO personnel will remain off-site until completion of the initial visual and magnetometer sweep.

An appropriate detector will be used to quickly screen surface and near-surface areas for OE hazards. An audio signal is provided to the operator when a ferrous metal object is encountered. During magnetometer sweeps the UXO team will wear work boots with lug soles to eliminate interference with the magnetometer's sensitivity.

During sweep operations, the UXO personnel may investigate magnetic anomalies. If the anomaly is located in a non-critical area, the UXO Supervisor may choose to clearly mark the anomaly and only minor excavations, one foot or less, may be accomplished to identify or confirm UXO. If the anomaly is more than one foot deep, it is considered to be UXO and is clearly marked.

12.0 TRANSPORTATION

If UXO must be transported for disposal, the provisions of 49 CFR 100-199, DA Pam 385-64, state and local laws shall be followed.

Electric Demolition Operations

1.0 PURPOSE

To establish Standard Operating Procedures (SOPs) and guidelines to be followed while conducting disposal of unexploded ordnance (UXO) using the electric firing system at sites contaminated with UXO and explosive material.

2.0 SCOPE

The following procedures are applicable to all MES employees, clients, and visitors entering an MEC contaminated work site where explosive ordnance or related material may be present and disposal by detonation, using the electrical firing system, is being conducted.

3.0 DEFINITIONS

Detonating Cord – A flexible cord containing a center core of high explosive that when detonated will have sufficient strength to detonate other cap-sensitive explosives with which is in contact.

Explosive – A substance that upon ignition, undergoes very rapid decomposition (as combustion) with the production of heat and gases that exert extreme pressure as they expand.

MEC – Military munitions that are (1) UXO, as defined in 10 United States Code (USC) 101(e)(5); (2) abandoned or discarded, as defined in 10 USC 2710(e)(2); and (3) munitions constituents [e.g., Trinitrotoluene (TNT), RDX, etc.] present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard. MEC will be disposed of on-site by detonation.

Misfire – An explosive charge that failed to detonate.

Ordnance and Explosive (OE) – Items or material is anything related to munitions designed to cause damage to personnel or material through explosive force, incendiary action or toxic effects. OE includes explosive soils if the explosive constituents are sufficiently concentrated to be reactive.

Site Control Procedures – Procedures, which will be used to minimize any potential contamination of workers, protect members of the public from the hazards posed by the site and to prevent vandalism.

Site Safety and Health Plan (SSHP) – A written plan which describes the site-specific methods, by which the responsible agencies, will meet the safety and health requirements the detailed in the regulatory framework for MEC contamination sites.

Site Work Zones – Areas identified for differing work activities and hazards established to reduce the accidental spread of hazardous substances from a contaminated to an uncontaminated area and to control exposure of personnel to MEC and/or HTRW hazards.

Unexploded Ordnance (UXO) – An item of explosive ordnance which has failed to function as designed or has been abandoned, discarded, or improperly disposed of and is still capable of functioning causing damage to personnel and material.

4.0 RESPONSIBILITIES

The Corporate Health and Safety Manager has the responsibility to ensure that the continued health and welfare of all MES employees remains the priority. He/She provides the guidance to personnel conducting disposal by detonation of ordnance, using electrical firing system, recovered from within the work site.

The Demolition Supervisor is responsible to ensure all MES employees and visitors to the work site are provided with the procedures and safety precautions used on the work site where UXO disposal by detonation, using the electrical firing system.

The Site Health and Safety Manager (SHSM) shall provide the pre-entry briefing to personnel entering the contaminated work site. The briefing will include the site controls and exclusion zone procedures in use at the site during disposal operations using the electrical firing systems. The SHSM is responsible to ensure all hazardous locations are properly marked and safeguards are in place to prevent accidents/incidents as part of the UXO disposal procedures.

The Demolition Supervisor will ensure proper safe guards are in place and personnel are trained on the procedures for using the electrical firing system. Demolition Supervisor shall ensure all personnel are provided a daily safety briefing detailing the nature of the materials handled, the hazards involved, and the safety precautions necessary.

MES employees will be alert to conditions that may be come hazardous due to changing site conditions and reports the situation to their immediate supervisor. Personnel will comply with the UXO disposal procedures and exclusion zone procedures in effect at the site. All personnel directly or indirectly engaged in UXO operations will be thoroughly trained and capable of recognizing hazardous explosive exposures. All personnel are required to read, become familiar with, and adhere to the requirements contained in this SOP to assure that all general safety regulations and safe work practices are observed at all times.

5.0 PROCEDURES

Before using the procedures outlined in this SOP for the electrical firing system, responsible individuals will review and comply with the provisions of MES's Site-Specific Work Plan, the Accident Prevention Plan (APP), and the Master Health and Safety Plan (HASP) for McClellan.

The following procedures are developed to assure a safe and efficient UXO disposal operation is conducted at project sites where UXO and related material must be disposed of by detonation using the electrical firing system. Absence of a written safety requirement does not indicate that safeguards are not required.

Specific requirements for each site, i.e., emergency contact numbers, evacuation routes, points of contact, etc., will be detailed in the SSHP.

Insure that personnel accomplishing demolition operations are properly licensed in the country and/or state where they are being conducted. All requirements of the site-specific work and health and safety plans must be being met.

5.1 Pre-operational Procedures

The following procedures will be accomplished before conducting disposal operation, using the electrical firing system on the designated UXO disposal range.

5.1.1 Weather Conditions

Prevailing weather condition information will be obtained. This data will be logged before each on-site detonation. Demolition charges will not be primed or connected for electrical firing during the approach or presence of a thunderstorm.

Other weather conditions (high winds, dust storms, snow storms, temperature inversions, low altitude clouds, or a cloud coverage of more than 50%) may adversely impact planned demolition operations. The demolition supervisor will consider these conditions when determining whether to conduct demolition operations.

5.1.2 Communication System

Telephone or radio communication will be established using two independent systems, cellular phone and radio, with emergency response personnel. No radio transmissions or phone calls will take place during positioning or connecting of electrical initiating devices.

A warning system of red flashing lights, red flag, siren, horn or combination of methods, will be used to give positive notice of planned demolition shots. The demolition supervisor will assure the area is clear of personnel and equipment before permitting attachment of the initiation devices to the priming charge.

Observers/road guards shall be assigned to a location where there is a good view of the air and surface approaches to the demolition range. It will be the responsibility of these observers to notify the demolition supervisor to suspend firing if any aircraft, vehicle, or personnel are sighted approaching the general demolition area.

5.2 Disposal Operation

Conducting a disposal operation requires specific steps or actions to be taken to insure a safe and efficient operation, using an electrical firing system, is conducted. The following guidelines are provided:

5.2.1 Safety Briefing

The SHSM or demolition supervisor will conduct a safety briefing, including the following subjects, as a minimum:

- Sequential phases of the operation to be conducted.
- Individual task assignments to support the detonation operation.
- Review of explosive handling and EMR precautions.
- Location of safe area.
- Emergency notification procedures and location of emergency contact phone numbers.
- Site-specific characteristics (road conditions, possible access by unauthorized personnel, topographical).
- Type of MEC/UXO being destroyed.
- Code for safety signals, warning signs and flags.
- Placement and quantity of counter charge.
- Misfire procedures (electrical).
- Personal hygiene (hand washing, etc.).
- Two person rule (no one works alone).
- Potential trip/fall hazards specific to the site.
- Location of range vehicle (keep engine running).
- Wind direction (toxic fumes).
- Location of first aid kit(s) and fire extinguisher(s).

5.2.2 Notification Procedures

The following agencies, as a minimum, must be notified by the SHSM or demolition supervisor, prior to conducting a disposal by detonation operation, on the demolition range. Agencies will be notified that detonation operations are planned and at what time they will commence.

- Fire department (may be required to standby on-site).
- Security (if present).
- Emergency medical support.
- Local air traffic control (if aircraft over flights are a possibility).
- Client Representative (if on site).

A list of current telephone numbers will be on hand at the MES Operations I Center and in the possession of the demolition supervisor.

5.2.3 Conducting the Operation

The following will be actions are to be accomplished during the MEC disposal to assure a safe and efficient operation is conducted:

- SHAM will insure the appropriate calls have been completed before commencing the operation.
- All personnel who are not essential to disposal operations must evacuate to a safe area.
- A designated vehicle will be positioned near the detonation point *with engine running* and direct toward the emergency escape route.
- A minimum of two qualified personnel, one of which will be the demolition supervisor, will conduct disposal operations.
- All demolition shots will be dual primed.
- The demolition supervisor will direct placement of the initiating explosive. Charges will be placed in such a manner to take full advantage of the effect of the initiating explosive and contribution from the explosive content of the UXO being detonated.
- Blasting caps or detonators will not be inserted into explosive materials which do not have a cap well without first making a hole with a non-sparking punch of proper size, or the appropriate pointed handle of a blasting cap crimper.
- The demolition supervisor and one other fully qualified UXO person will remain at the detonation point to affix the electrical firing system to the initiating explosive material. All other personnel will move to the safe area at the firing point.
- All operation involving detonation of explosives will use the following safety signals. The code for safety signals will be posted at all access points and employees will be made familiar with the signals and actions to be taken.
- WARNING SIGNAL – a 1-minute series of long audible signals or radio to all teams 5 minutes warning before blast signal.
- BLAST SIGNAL – A series of short audible signals or radio call to all teams 1 minute prior to the shot followed by three audible “Fire In The Hole” prior to detonation.
- ALL CLEAR SIGNAL – Following the inspection of the detonation site, a prolonged audible signal or radio call to all teams.

5.2.4 Electrical Firing System

An electrical firing system provides better control of the demolition activities. Specific sites situations, based on the terrain, vegetation, and other site parameters may dictate control of the exact detonation time by use of the electrical firing system. Control of initiation devices will remain with the demolition supervisor until attachment to the firing circuit.

Procedures for the electrical system follows:

- All demolition shots will be dual primed.
- In order to prevent electric misfires, one UXO technician must be responsible for all electrical wiring in the circuit.
- Radio transmissions and cellular telephone use will be suspended during positioning or connecting of electrical initiating devices.
- With the firing device in his/her possession, the demolition supervisor will direct the continuity checkout of the firing line while on the reel and again after laying out the wire. Industry standard procedures of alternating opening and closing the circuit will be used.

- The firing line will be shunted on both ends while the blasting caps are continuity tested using an approved tester. Blasting cap leads will be shunted after check-out until ready for attachment to the firing wire.
- Confirm firing wire is shunted at the firing point by checking continuity with the galvanometer.
- Blasting caps or detonator leads will be attached to the firing wire, all connections are isolated or insulated.
- After insuring the area is clear, the blasting cap or detonator will be inserted into the priming explosive.
- The demolition supervisor and the UXO specialist will move to the firing point area.
- Conduct a head count to insure all team members are present.
- Check blasting machine for operation.
- Check firing circuit continuity using the galvanometer.
- Connect firing wires to blasting machine.
- Demolition supervisor will insure everyone is clear of the range and instruct the blaster to fire the shot.
- Sound the warning and blast series of safety signals.
- The Blaster will yell "Fire In The Hole" three times (or an equivalent warning).
- All personnel will take cover.
- Initiate charge.
- All personnel will remain in designated safe area until the demolition supervisor announces "All Clear" and the all clear safety signal is sounded.

5.3 Misfires

In the event of a misfire or suspected low order detonation of the priming charge, personnel will remain clear of the blasting site for a period of 60 minutes after expected detonation.

The following misfire procedures will be followed:

- The SHSM will be notified of the time of the misfire.
- The SHSM or Operations Manager will notify the client representative. All other personnel will be notified of the event by radio and instructed to hold their positions until the "ALL CLEAR" is given.

If a misfire does occur, it must be cleared with extreme caution. The responsible technician will investigate and correct the situation. The following steps will be used to correct a misfire:

- The responsible technician will re-enter the area to inspect the misfire or suspected low order detonation; a second person, remaining clear of the danger area and taking advantage of natural barriers. This individual will act as a safety back up to aid the person correcting the misfire should an accident occur.
- Check connections and make a second attempt to initiate charge.
- If unsuccessful, disconnect and connect to another blasting machine (if available) and attempt to initiate charge.
- Check firing wire continuity.
- After the check, the responsible technician will proceed down range to inspect the firing system; a safety observer must watch from a protected area.
- Disconnect and shunt the firing wires.
- Check continuity of new blasting caps or detonators.
- Connect the new blasting caps or detonator to the firing circuit and prime the charge without disturbing the original blasting caps or detonators.
- Follow normal procedures for initiation of the charge.

5.3.1 Detonating Cord Misfires

If detonating cord fail to function properly, the following procedures will be followed:

- New blasting caps or detonators will be attached to the remaining length of the detonating cord, or branch lines, with care taken to fasten them properly, and the charge detonated.

If detonating cord leading to the charge detonates but fails to function the charge, the following actions will be taken:

- The charge will be re-primed and detonated.
- Scattered explosives and charges, not containing caps or detonators, may be gathered and placed on a single shot.
- Charges containing detonators will left in place and re-primed with a new cap or detonator, leaving the original cap or detonator in place.

5.4 Safety

General safety requirements relating to a disposal by detonation procedure are outlined as follows:

- Demolition of any kind is prohibited without the express permission from the Project Manager (PM) and/or Operations Manager.
- All demolition explosives will be stored in ATF approved Class II rated explosive storage magazines when storage is required.
- Portable fire extinguishers will be on site during the treatment of UXO or explosive compounds.
- Insulation on all firing wires will be adequate and in good condition.
- The total number of caps in the circuit will not exceed the capacity of blasting machine or power source.
- Insure the power circuit used for firing electric caps is not grounded.
- Blasting caps or detonators used for initiation of explosive charges will not be buried.
- Personnel working with electric blasting caps or other electro-explosive devices will not wear static producing clothing such as nylon, silk or synthetic hair.
- Blasting caps will be carried in approved containers and kept out of direct rays of the sun.
- If explosive charges are to be covered or tamped with earth, charges will be fitted with detonating cord leads that protrude 1.8 meters (6 feet) through the earth.
- Only sufficient explosives or initiators to meet the requirement of the operation involved will be transported to the disposal site.
- Electric blasting caps will be connected to the firing circuit before connection to the main charge.
- Electric blasting caps or detonators of different manufacture or type will not be used in the same system.
- Electric blasting caps or detonators will be continuity tested with a galvanometer before connecting to the firing circuit. Manufacturer's shunt will not be removed from the wires until the individual performing operation has been grounded.
- After testing, the cap wires will be twisted to shunt the wires until moment of connection to the firing line or another cap to complete a series circuit.
- Before making connection with the electric blasting cap, the firing circuit will be continuity tested, after being grounded to dissipate potential static electric buildup.
- For series-in-parallel circuits, each series will be "balanced" i.e., have the same resistance.
- Blasting machine or activating device will not be surrendered to individual designated to fire the shot until the demolition supervisor is assured area is clear.

- All personnel will wear required PPE as specified in the SSHP.
- Deny entry to unauthorized personnel.
- Do not allow anyone to touch hazardous material unless qualified to do so.

5.5 Equipment

The following is the proposed equipment list. Supervisors may make adjustments to meet changing site conditions:

- "DANGER - Explosive Clearance Operation - Keep Out" Signs, as required.
- White phosphorus Personal Protective Equipment kit, as required.
- Personal Protective Equipment, as required.
- Excavation tools, as required.
- Sandbags, as required.
- Blasting machine/remote firing device (electrical).
- Type II temporary, explosives storage magazine and cap.
- Vault, as required.
- Demolition explosives, as required.
- Water Container/Cups, as required.
- Binoculars, as required.
- Portable Toilet, as required.
- Galvanometer.
- Electric blasting caps or detonators.
- Firing Wire.
- Caution and Danger tape.
- Audible alarm devices, as required.
- Range Flag (red).
- First aid equipment and supplies.
- Emergency eyewash station and shower as per ANSI Z-358.1.
- Non-sparking shovels and other hand tools.
- Personal Protective Equipment (EPA level A, B, C, or D).
- A minimum of two fire extinguishers (Type ABC, 10 LB capacity).
- A vehicle designated for emergency response.
- Communication system consisting of hand held radios and cellular phones.
- Hand Tools.
- Hard hats (if overhead hazard exists).
- Safety toed boot/shoes.
- Safety Glasses.

6.0 RECORDS

Exposure Records Health and Safety Field Log Books MES Training Records, MES Incident Report and Investigation Form OSHA Form 200 (Log of Occupational Injuries and Illnesses) Visitor Control Log Explosive Accountability Log.

7.0 REFERENCES

EM 385-1-1 – Safety and Health Requirements Manual DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards NAVSEA OP 5 Volume 1, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping ETL-385-1-1 CEHNC Safety Concepts and Basic Considerations for Unexploded Ordnance (UXO) Operations 60A 1-1-31.

8.0 ATTACHMENT

None.

NON-ELECTRIC DEMOLITION OPERATIONS

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes guidelines to be followed while conducting disposal of unexploded ordnance using the non-electric firing system at sites contaminated with unexploded ordnance and explosive material.

2.0 SCOPE

The following procedures are applicable to all MES employees, clients and visitors entering a Munitions and Explosives of Concern (MEC) contaminated work site where explosive ordnance or related material may be present and disposal by detonation, using the non-electric firing system, is being conducted.

3.0 DEFINITIONS

Detonating Cord: A flexible cord containing a center core of high explosive that when detonated will have sufficient strength to detonate other cap-sensitive explosives with which it is in contact.

Explosive: A substance that upon ignition undergoes very rapid decomposition (as combustion) with the production of heat and gases that exert extreme pressure as they expand.

MEC: Military munitions that are (1) UXO, as defined in 10 United States Code (USC) 101(e)(5); (2) abandoned or discarded, as defined in 10 USC 2710(e)(2); and (3) munitions constituents [e.g., Trinitrotoluene (TNT), RDX, etc.] present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard. MEC will be disposed of on-site by detonation.

Misfire: An explosive charge that failed to detonate.

Ordnance and Explosive (OE): Items or material is anything related to munitions designed to cause damage to personnel or material through explosive force, incendiary action or toxic effects. OE includes explosive soils if the explosive constituents are sufficiently concentrated to be reactive.

Site Control Procedures: Procedures, which will be used to minimize any potential contamination of workers, protect members of the public from the hazards posed by the site and to prevent vandalism.

Site Safety and Health Plan (SSHP): A written plan which describes the site-specific methods by which ECC and its subcontractors will conduct business to meet requirements the requirements of the OSHA and EM 385-1-1-USACE DID MR-005-06 (1 Dec 2003).

Site Work Zones: Areas identified for differing work activities and hazards established to reduce the accidental spread of hazardous substances from a contaminated to an uncontaminated area and to control exposure of personnel to MEC and/or HTRW hazards.

Unexploded Ordnance (UXO): An item of explosive ordnance which has failed to function as designed or has been abandoned discarded or improperly disposed of and is still capable of functioning causing damage to personnel and material.

4.0 RESPONSIBILITIES

The Corporate Health and Safety Manager have the responsibility to ensure that the continued health and welfare of all MES employees remains the priority. He or she provides the guidance

to personnel conducting disposal by detonation of ordnance, using non-electric firing system, recovered from within the work site.

The demolition supervisor is responsible to ensure all MES employees and visitors to the work site are provided with the procedures and safety precautions used on the work site where UXO disposal by detonation, using the non-electric firing system, is being conducted.

The site safety and health manager shall provide the pre-entry briefing to personnel entering the contaminated work site. The briefing will include the site controls and exclusion zone procedures in use at the site during disposal operations using the non-electric firing system. The SHSM is responsible to ensure all hazardous locations are properly marked and safeguards are in place to prevent accidents/incidents as part of the UXO disposal procedures.

The demolition supervisor will ensure proper safe guards are in place and personnel are trained on the procedures for using the non-electric firing system. This individual will ensure all personnel are provided a daily safety briefing detailing the nature of the materials handled, the hazards involved, and the safety precautions necessary.

MES employees will be alert to conditions that may be come hazardous due to changing site conditions and report the situation to their immediate supervisor. Personnel will comply with the UXO disposal procedures and exclusion zone procedures in effect at the site. All personnel directly or indirectly engaged in unexploded ordnance operations will be thoroughly trained and capable of recognizing hazardous explosive exposures. All personnel are required to read, become familiar with, and adhere to the requirements contained in this SOP to assure that all general safety regulations and safe work practices are observed at all times.

5.0 PROCEDURES

Before using the procedures outlined in this SOP for the non-electric firing system, responsible individuals will review and comply with the provisions of MES's Site-Specific Work Plan, the Accident Prevention Plan (APP), and the master health and safety plan for McClellan.

The following procedures are provided to assure a safe and efficient UXO disposal operation is conducted at project sites where UXO and related material must be disposed of by detonation using the non-electric firing system. Absence of a written safety requirement does not indicate that safeguards are not required.

Specific requirements for each site i.e., emergency contact numbers, evacuation routes, points of contact etc. will be detailed in the Site-Specific Health and Safety Plan (SSHP)

Insure that personnel accomplishing demolition operations are properly licensed in the country and/or state where they are being conducted. All requirements of the site-specific work plan and health and safety plans will be complied with.

5.1 Pre-Operational Procedures

The following procedures shall be accomplished before conducting disposal operation, using the non-electric firing system on the designated UXO disposal range:

5.1.1 Weather Conditions

Prevailing weather condition information will be obtained. This data will be logged before each on-site detonation. Demolition charges will not be primed or connected for non-electric firing during the approach or presence of a thunderstorm.

Other weather conditions (high winds, dust storms, snow storms, temperature inversions, low altitude clouds, or a cloud coverage of more than 50%) may adversely impact planned

demolition operations. The demolition supervisor will consider these conditions, when determining whether to conduct demolition operations.

5.1.2 Communication System

Telephone or radio communication will be established using two independent systems, cellular telephone and radio, with emergency response personnel.

A warning system of red flashing lights, red flag, siren, horn or combination of methods, will be used to give positive notice of planned demolition shots. The demolition supervisor will assure the area is clear of personnel and equipment before permitting attachment of the initiation devices to the priming charge.

Observer/road guards shall be assigned to a location where there is a good view of the air and surface approaches to the demolition range. It will be the responsibility of the observers to notify the demolition supervisor to suspend firing if any aircraft, vehicle, or personnel are sighted approaching the general demolition area.

5.2 Disposal Operation

Conducting a disposal operation requires that specific steps or actions be taken to insure a safe and efficient operation, using a non-electric firing system. The following guidelines are provided.

5.2.1 Safety Briefing

The SHSM or demolition supervisor shall conduct a safety briefing, including the following subjects, as a minimum:

- a. Sequential phases of the operation to be conducted.
- b. Individual task assignments to support the detonation operation.
- c. Review of explosive handling and EMR precautions.
- d. Location of safe area.
- e. Emergency notification procedures and location of emergency contact phone numbers.
- f. Site-specific characteristics (road conditions, possible access by unauthorized personnel, topographical).
- g. Type of MEC/UXO being destroyed.
- h. Placement and quantity of counter charge.
- i. Code for safety signals, warning signs and flags.
- j. Misfire procedures (non-electric).
- k. Personal hygiene (hand washing etc.).
- l. Two person rule (no one works alone).
- m. Potential trip/fall hazards specific to the site.
- n. Location of range vehicle (keep engine running).
- o. Wind direction (toxic fumes).
- p. Location of first aid kit(s) and fire extinguisher(s).

5.2.2 Notification Procedures

The following agencies, as a minimum, must be notified by the SHSM or demolition supervisor prior to conducting a disposal by detonation operation on the demolition range. Agencies will be notified that detonation operations are planned and at what time they will commence.

- a. Fire department (may be required to standby on-site).
- b. Security (if present).
- c. Emergency medical support.
- d. Local air traffic control (if aircraft over flights are a possibility).

e. Client Representative (if on-site).

A list of current telephone numbers will be on hand at the MES Operations center and in the possession of the demolition supervisor.

5.2.3 Conducting the Operation

The following actions will be completed during the MEC disposal to assure a safe and efficient operation is conducted:

- a. SHSM will insure the appropriate calls have been completed before commencing the operation.
- b. All personnel who are not essential to disposal operations must evacuate to a safe area.
- c. A designated vehicle will be positioned near the detonation point, *with engine running* and direct toward the emergency escape route.
- d. A minimum of two qualified personnel, one of which will be the demolition supervisor will conduct disposal operations.
- e. All demolition shots will be dual primed.
- f. The demolition supervisor will direct placement of the initiating explosive. Charges will be placed in such a manner to take full advantage of the effect of the initiating explosive and contribution from the explosive content of the UXO being detonated.
- g. Blasting caps or detonators will not be inserted into explosive materials which do not have a cap well without first making a hole with a non-sparking punch of proper size, or the appropriate pointed handle of a blasting cap crimper.
- h. The demolition supervisor and one (1) other fully qualified UXO person will remain at the detonation point to affix the non-electric firing system to the initiating explosive material. All other personnel will move to the safe area at the firing point.
- i. All operation involving detonation of explosives will use the following safety signals. The code for safety signals will be posted at all access points and employees will be made familiar with the signals and actions to be taken.
 - **Warning Signal** – a 1-minute series of long audible signals or radio call to all teams 5 minutes warning before blast signal.
 - **Blast Signal** – A series of short audible signals or radio call to all teams 1 minute prior to the shot followed by three audible fire in the hole prior to detonation.
 - **All Clear Signal** – Following the inspection of the detonation site, a prolonged audible signal or radio call to all teams.

5.2.4 Non-Electric Firing System

Specific sites situations, based on the terrain, vegetation and other site parameters, may permit use of the non-electric system when exact detonation time is not critical. Control of initiation devices will remain with the demolition supervisor until ready to prime the charges. Procedures for the non-electric system follow.

5.2.4.1 Preparing for Non-Electric Initiation

The following procedures will be followed to prepare explosive charges using a non-electric firing system:

- a. Preparation of the non-electric initiation system will be accomplished at least 25 feet from other explosive materials.
- b. In order to prevent non-electric misfires, one UXO technician must be responsible for all non-electric setups.
- c. All demolition shots will be dual primed.

- d. Cut 6 inches from roll of safety fuse being used; (Dispose with first detonation).
- e. Test burn 3 feet of the safety fuse from this roll.
- f. Determine safe distances and compute travel times to safe area.
- g. Cut safety fuse to length required to meet travel times (not less than 6 feet of fuse will be used).
- h. Attach fuse lighters to both lengths of safety fuse.
- i. Visually check blasting cap for debris.
- j. Holding blasting cap between thumb and forefinger, lower cap onto safety fuse, insure fuse butts up into cap. **Do not twist cap onto fuse.**
- k. Pointing cap away from body, crimp cap to safety fuse.
- l. After insuring the area is clear, prepare the explosive charge to accept blasting cap, and place explosive charge.
- m. Demolition Supervisor will conduct a head count to insure all team members are accounted for and non-essential personnel informed to evacuate the site.
- n. Demolition Supervisor will insure everyone is clear of the range and instruct the blaster to fire the shot.
- o. Blasting cap will be inserted into the priming explosive.
- p. Sound the warning and blast series of safety signals.
- q. The Blaster will yell "Fire in The Hole" three times (or an equivalent warning) and initiate the non-electric system.

5.3 NOTE

If after attempting to fire the firing device and it does not fire, re-cock the device and attempt a second time. If the device cannot be reset or does not fire, cut it from time fuse, attach a new one.

- a. Confirm ignition of time fuse.
- b. Place firing device on ground.
- c. Insure burning safety fuse is secure so that it does not roll upon itself.
- d. The demolition supervisor and UXO specialist will move to the firing point area.
- e. All personnel will take cover and remain there until the detonation takes place.
- f. All personnel will remain in designated safe area until demolition supervisor announces "All Clear" and the all clear safety signal is sounded.
- g. Prepare detonating cord if required by:
 - Cut detonating cord to desired length (not less than 6 feet).
 - Sensitize one end of detonating cord using a non-electric cap, using procedures for capping time fuse.
 - Insert cap into explosive charge.

5.3.1 Misfires

In the event of a misfire, or suspected low order detonation of the priming charge, personnel will remain clear of the blasting site for a period of 60 minutes, plus the calculated burning time of the safety fuse.

Under no circumstances will the personnel leave the safe area or approach the shot before the waiting time has elapsed.

The following misfire procedures will be followed:

The SHSM will be notified of the time of the misfire.

The SHSM or Operations Manager will notify the client representative. All other personnel will be notified of the event by radio and instructed to hold their positions until the “ALL CLEAR” is given.

If a misfire does occur, it must be cleared with extreme caution. The responsible technician will investigate and correct the situation. The following steps will be used to correct a misfire:

- a. The responsible technician will re-enter the area to inspect the misfire or suspected low order detonation; a second person, remaining clear of the danger area and taking advantage of natural barriers. This individual will act as a safety backup to aid the person correcting the misfire should an accident occur.
- b. After the check the responsible technician will proceed down range to inspect the firing system; a safety observer must watch from a protected area.
- c. A primed charge is prepared and placed next to the misfired charge and detonated.
- d. Scattered charges that contain blasting caps will not be touched, but destroyed in place using these procedures. Scattered explosives and charges not containing caps may be gathered and placed on a single shot.
- e. Follow normal procedures outlined above for initiation of the charges.

5.3.2 Detonating Cord Misfires

If detonating cord fail to function properly, the following procedures will be followed:

- a. New blasting caps or detonators will be attached to the remaining length of the detonating cord, or branch lines, with care taken to fasten them properly, and the charge detonated.

If detonating cord leading to the charge detonates but fails to function the charge, the following actions will be taken:

- a. The charge will be re-primed and detonated.
- b. Scattered explosives and charges, not containing caps or detonators, may be gathered and placed on a single shot.
- c. Charges containing detonators will be left in place and re-primed with a new cap or detonator, leaving the original cap or detonator in place.

6.0 SAFETY

General safety requirements relating to a disposal by detonation procedure are outlined as follows:

- a. Demolition of any kind is prohibited without the express permission from the Project Manager (PM) and/or Operations Manager.
- b. Demolition Teams will be composed of no less than 2 personnel, One UXO Demolition Supervisor and one UXO Specialist.
- c. Demolition Teams will not exceed 7 personnel.
- d. No smoking, open lights or fire of any kind within 15m (50ft) of any area where explosives are being handled.
- e. Demolition operations will not be conducted during low light or inclement weather.
- f. All demolition explosives will be stored in ATF approved Class II rated explosive storage magazines when storage is required.
- g. Portable fire extinguishers will be on-site during the treatment of UXO or explosive compounds.
- h. During dry conditions, fire department support will be positioned on-site, in a safe area, or prepared to respond to the site within five minutes of notification.
- i. Blasting caps used for initiation of explosive charges, will not be buried.
- j. Blasting caps will be carried in approved containers and kept out of direct rays of the sun.

- k. Non-electric blasting caps will only be handled by their open ends to prevent heating of the explosive contents, rendering them more sensitive.
- l. Capped safety fuses will be handled to prevent blasting caps from contacting each other.
- m. If explosive charges are to be covered or tamped with earth, charges will be fitted with detonating cord leads that protrude 1.8 meters (6 feet) through the earth.
- n. Only sufficient explosives or initiators to meet the requirement of the operation involved will be transported to the disposal site.
- o. Initiation charges will not be made up in excess of immediate need for shots to be fired.
- p. Non-electric setup will not be affixed to the explosive charge until all non-essential personnel are clear of the area.
- q. All personnel will wear required PPE as specified in the Site-Specific Health and Safety Plan (SSHP).
- r. Deny entry to unauthorized personnel.
- s. Do not allow anyone to touch hazardous material unless qualified to do so.

7.0 EQUIPMENT

The following is the proposed equipment list. The supervisors may make adjustments to meet changing site conditions:

- a. "DANGER – Explosive Clearance Operation – Keep Out" signs, as required.
- b. White phosphorus Personal Protective Equipment kit, as required.
- c. Personal Protective Equipment, as required.
- d. Excavation tools, as required.
- e. Sandbags, as required.
- f. Safety Fuse.
- g. Non-electric blasting caps.
- h. Approved "cap" box.
- i. Fuse lighters.
- j. Type II temporary, explosives storage magazine and cap vault, as required.
- k. Demolition explosives, as required.
- l. Water Container/Cups, as required.
- m. Binoculars, as required.
- n. Portable Toilet, as required.
- o. Caution and Danger tape.
- p. Audible alarm devices, as required.
- q. Range Flag (red).
- r. First aid equipment and supplies.
- s. Emergency eyewash station and shower as per ANSI Z-358.1.
- t. Non-sparking shovels and other hand tools.
- u. Personal Protective Equipment (EPA level A, B, C, or D).
- v. A minimum of two (2) Fire extinguishers (Type ABC, 10 LB capacity).
- w. A vehicle designated for emergency response.
- x. Communication system consisting of handheld radios and cellular phones.
- y. Hand Tools.
- z. Hard hats (if overhead hazard exists).
- aa. Safety toed boot/shoes.
- bb. Safety Glasses.

8.0 RECORDS

Exposure Records Health and Safety Field Log Books MES Training Records MES Incident Report and Investigation Form OSHA Form 300 (Log of Work-Related Illnesses and Injuries) Visitor Control Log Explosive Accountability Log.

9.0 REFERENCES

EM 385-1-1 – Safety and Health Requirements Manual DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards NAVSEA OP 5 Volume 1, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping ETL-385-1-1 CEHNC Safety Concepts and Basic Considerations for Unexploded Ordnance (UXO) Operations.

10.0 ATTACHMENTS

The following attachments are associated with this SOP.

Attachment 1: Remote Firing Device (RFD) NONEL Demolition Procedures

Attachment 2: Scorpion Blasting Unit NONEL Demolition Procedures

Attachment 1: Remote Firing Device (RFD) NONEL Demolition Procedure

DEMOLITION SUPERVISOR WILL CONTROL THE REMOTE FIRING DEVICE ARMING KEYS

REMOTE RECEIVER Set Up Procedures

- Remove the Remote Receiver from the Controller Unit case.
- Place the Remote Receiver at least 50 feet from demolition shot.
- Attach the antenna to the Remote Receiver.
- Insert the Shock Tube Igniter Tip into the outside of the Remote Receiver.
- Pay out 50 feet of NONEL Lead Line from Remote Receiver to Demo Shot area.
- Cut and position 6 feet of NONEL Lead Line at Remote Receiver.
- Remove Detonator Assembly from Day Box and sandbag.
- Set up Demolition Shot IAW Disposal Plan.
- Splice NONEL Lead Line to Detonator Assembly.
- Attach Detonator to Detonating Cord.
- Move to the Remote Receiver.
- Insert Key to Remote Receiver and turn fully Clockwise.
- Check battery meter to ensure it reads above 12 Volts.
- Verify the SELECT Switch is on SHOCK TUBE.
- Verify SHOCK TUBE READY Indicator is **Green**.
- Close lid on case.
- Insert 6 feet piece of NONEL Lead Line into the Shock Tube Igniter Tip.
- Splice the 6 feet and 50 feet NONEL Lead Lines together.
- Demolition Shot Set Up is complete.
- 5 Minute Warning Broadcast over Radio Net.
- Move to the designated Firing Point.

CONTROLLER UNIT Procedures

- Open the Controller Unit case.
- Attach the antenna to the Controller Unit.
- Insert Key to Controller Unit and turn fully clockwise.
- Check battery meter to ensure it reads above 12 Volts.
- Push the Status Button and ensure that the Ready Light is steady **Green** (If Steady Green Ready Light is not received, reposition Controller Unit, push Status Button and repeat this process until a steady **Green** Ready Light is received).
- 1 Minute Warning Broadcast over Radio Net.
- Verify Ready Light is still steady **Green**.
- Push Arming lever to the left and hold until the Armed light flashes **Red**, then release (It will flash for about 15 seconds).
- Ensure that the Armed Light is steady **Red** (Controller Unit is Armed and ready to Fire).

FIRING the RFD

- Demolition Supervisor will Broadcast Final Warning (3 Fire in the Holes) over the Radio Net.
- Confirm that the Armed Light is still steady **Red**.
- Lift the red cover on the Firing Switch.
- Push the Firing Switch and hold until the Detonation occurs.

CHECKING the DEMOLITION SHOT

- Confirm that the Controller Unit is Safe by verifying that the Ready Light becomes steady **Green**.
- Turn off the Controller Unit power by turning key to counter clockwise and removing it.
- Return to the Demolition Site.
- Open the lid on the Remote Receiver case.
- Turn off the Remote Receiver power by turning key to counter clockwise and removing it.
- Check the Demolition Shot to verify success.
- Broadcast All Clear over the Radio Net when Demolition Operations are secured area is Safe.
- Pack the RFD, arming Keys, Antenna's and Shock Tube Igniter Tip inside its weather proof case.
- Clean up the Demolition Shot area.
- Deliver MEC scrap to the storage containers.
- Stow all Demolition Team Equipment.

Attachment 2: Scorpion Blasting Unit NONEL Demolition Procedure

DEMOLITION SUPERVISOR WILL CONTROL THE BLASTING UNIT

SCORPION Set Up Procedures

- Remove the Scorpion Blasting Unit from the Demolition Kit.
- Insert the Shock Tube Igniter Tip into the Scorpion.
- Pay out NONEL Lead Line from the Firing Point to the Demo Shot area.
- Remove Detonator Assembly from Day Box and sandbag.
- Set up Demolition Shot IAW Disposal Plan.
- Splice NONEL Lead Line to Detonator Assembly.
- Attach Detonator to Detonating Cord.
- Demolition Shot Set Up is complete.
- 5 Minute Warning Broadcast over Radio Net.
- Move to the designated Firing Point.
- Insert NONEL Lead Line into the Shock Tube Igniter Tip.
- 1-Minute Warning Broadcast over Radio Net.

FIRING the SCORPION

- Demolition Supervisor will Broadcast Final Warning (3 Fire in the Holes) over the Radio Net.
- Confirm that the NONEL is still inserted into the Shock Tube Igniter Tip.
- Depress the CHARGE Switch and hold.
- When the READY Light is illuminated, Continue holding the CHARGE Switch and Depress the DETONATE Switch, holding both switches until the Detonation occurs.

CHECKING the DEMOLITION SHOT

- Remove NONEL from the Scorpion.
- Return to the Demolition Site.
- Check the Demolition Shot to verify success.
- Broadcast All Clear over the Radio Net when Demolition Operations are secured area is Safe.
- Pack the Scorpion Blasting Unit and Shock Tube Igniter Tip inside the Demolition Kit.
- Clean up the Demolition Shot area.
- Deliver MEC scrap to the storage containers.
- Stow all Demolition Team Equipment.

HEAT STRESS MONITORING PROGRAM

1.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to control heat exposure to employees by conducting effective monitoring. The hazards of exposure to hot environments may cause a variety of illnesses including heat rash, muscle cramps, heat exhaustion, and heat stroke. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e., heat stroke) without early intervention.

2.0 HEAT STRESS

Heat stress is a hazard during warm weather or when personnel are wearing PPE that aggravates the heat stress hazard. Heat stress can occur even when temperatures are moderate if the body's physiological processes fail to maintain a normal body temperature. The resulting physical reactions that occur are fatigue, irritability, anxiety, and a decrease in concentration, dexterity, and/or movement. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e., heat stroke) without early intervention. In extreme cases, death can result if the patient is not given immediate treatment.

2.1 Symptoms of Heat Exhaustion

Heat exhaustion occurs when your body cannot sweat enough to cool you off. It generally happens when you are working or exercising in hot weather. Symptoms include:

- Fatigue, weakness, dizziness, or nausea.
- Cool, clammy, pale, red, or flushed skin.

2.2 Symptoms of Heat Stroke

Heat exhaustion can sometimes lead to heat stroke. Heat stroke requires emergency treatment. It happens when your body stops sweating but the body temperature continues to rise, often to 105 degrees or higher. Symptoms include the following:

- Confusion, delirium, or unconsciousness.
- Hot, dry, red or flushed skin, even under the armpits.

3.0 CONTROL MEASURES

To control the exposure to heat stress during any site activity, the following safety procedures shall be implemented:

- All employees shall be monitored for heat stress.
- Potable drinking water shall be available at all times.
- Frequent rest breaks shall be taken.
- A buddy system shall be utilized.
- Shade (i.e., fixed or portable canopy) shall be provided.
- Employees shall be encouraged to eat a normal diet and get proper rest.
- Employees shall be encouraged to refrain from consuming diuretics, including caffeine from coffee and tea beverages, or any form of alcohol. (Note: Consumption of alcohol is prohibited during work hours).
- To control exposure to heat stress hazard, monitoring shall commence when personnel are required to wear personal protective equipment greater than Level D. The American Conference Government of Governmental Hygienists (ACGIH) has set TLVs for heat extremes (presented in **Table 16.1**). This table presents levels for fully acclimatized, fully clothed (e.g., lightweight pants and shirt) workers and for workers wearing low permeability personal protective equipment (PPE).

Table 16.1 – Heat Threshold Limit Values for Different Work Schedules

Work/Rest Regimen	Light Street Clothing	Light PPE Clothing	Moderate Street Clothing	Moderate PPE Clothing	Heavy Street Clothing	Heavy PPE Clothing
Continuous Work	86°F	80°F	80°F	72°F	77°F	71°F
75% Work 25% Rest each hour	88°F	82°F	82°F	76°F	79°F	73°F
50% Work 50% Rest each hour	90°F	84°F	85°F	79°F	81°F	75°F
25% Work 75% Rest each hour	92°F	86°F	88°F	82°F	86°F	80°F

Note: Light moderate work includes operating heavy equipment. Heavy work includes hand shoveling or other manual labor activities.

4.0 MONITORING

Heat stress monitoring shall begin when ambient conditions exceed 85°F when working in Level D and 70°F when working in Modified Level C (see **Table 16.2**). For clear weather conditions (i.e., 100 percent sunshine), ambient temperatures shall be decreased by 5°F (i.e., 65°F and 80°F, respectively) to determine when to begin monitoring. Ambient conditions shall be determined by maintaining a properly calibrated outdoor thermometer in the shade at each work station, or by monitoring local weather reports throughout each work shift.

Table 16.2 – Heat Stress Monitoring Frequency Temperature

Temperature	Modified Level D	Modified Level C	Level C or B
> 90°F	every 45 minutes	every 30 minutes	every 20 minutes
85-90°F	every 60 minutes	every 45 minutes	every 30 minutes
80-85°F	every 90 minutes	every 75 minutes	every 60 minutes
70-80°F	every 120 minutes	every 105 minutes	every 90 minutes

4.1 Heart Rate

Heat stress exposure shall be evaluated by monitoring the heart rate. The radial pulse shall be taken for 30 seconds immediately upon beginning to rest (i.e., at the beginning of a rest break). This rate shall be multiplied by 2 to determine the heart rate at initial rest. This rate should not exceed 110 beats per minute (bpm). Following 3 minutes of rest, the heart rate shall be taken again (same procedure). The difference between the initial and third minute heart rate should be greater than 10 bpm.

If the initial rate exceeds 110 bpm OR the difference between the initial and third minute rate is less than 10 bpm, then the work period shall be shortened by 33 percent and the rest period increased by 33 percent.

The SSHO shall be responsible for taking all heart rates. All heart rate monitoring shall be recorded on an Exposure Monitoring Log. Monitoring shall begin at the first rest break. The first rest break shall be taken within the first hour of work when ambient conditions exceed 85°F if working in Level D, and within the first 30 minutes if ambient conditions exceed 70°F if working in Modified Level C.

4.2 Oral Temperature

Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).

If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.

If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.

Do not permit a worker to wear semipermeable or impermeable garment when his/her oral temperature exceeds 100.6°F (38.1°C).

COLD STRESS MONITORING PROGRAM

1.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to implement cold stress monitoring and preventative measures to control employee cold disorders.

2.0 COLD DISORDERS

Cold injury is classified as either localized, as in frostbite, or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness or metal, inadequate clothing, age, and general health. Physical conditions that worsen the effect of cold include allergies, vascular disease, excessive smoking and drinking, and specific drugs and medicines.

2.1 Hypothermia

Air temperature alone is not enough to judge the cold hazard of a particular environment. Most cases of hypothermia develop in air temperatures between 2-10°C (30-50°F). However, by the time you consider a factor such as the wind-chill, the effective temperature could be significantly lower.

Symptoms of hypothermia include the following: uncontrollable shivering and the sensation of cold, the heartbeat slows and sometimes becomes irregular, pulse weakens and the blood pressure changes. Other symptoms that can be seen before complete collapse are cool skin, slow, irregular breathing, low blood pressure, apparent exhaustion, fatigue, confusion and inappropriate behavior.

Sedative drugs and alcohol increase the risk of hypothermia. Sedative drugs interfere with the transmission of impulses to the brain. Alcohol dilates the blood vessels near the skin surface, which increases heat loss and lowers body temperature.

2.2 Frostbite

Frostbite can occur without hypothermia when extremities do not receive sufficient heat from the central body stores. This can occur because of inadequate circulation and/or because of inadequate insulation. Frostbite occurs when there is freezing of the fluids around the cells of the body tissues. This freezing is from exposure to extremely low temperatures. The condition results in damage to and loss of tissue. The most vulnerable parts of the body are the extremities (nose, cheeks, ears, and fingers).

2.2.1 Degrees of Frostbite

First degree: freezing without blistering or peeling.

Second degree: freezing with peeling and blistering.

Third degree: freezing with death of skin tissues and possibly of the deepest tissues.

2.2.2 Symptoms of Frostbite

1. Skin discoloration.
2. Pain may be felt at first, but subsides.
3. Blisters may appear.
4. The affected part is cold and numb.

2.3 Trench Foot

This condition may be caused by long, continuous exposure to cold without freezing, combined with persistent dampness or actual immersion in water. Edema (swelling), tingling, itching, and severe pains occur, and may be followed by blistering, death of skin tissue, and ulceration. When other areas of the body are affected, the condition is known as chilblains.

2.4 Frostnip

This occurs when the face or extremities are exposed to a cold wind, causing the skin to turn white.

3.0 EVALUATING COLD ENVIRONMENTS

Indices for evaluating cold environments include Threshold Limit Values (TLVs) for cold stress and wind-chill index (**Table 3-1**). The cold stress TLVs are intended to protect workers from the severest effects of cold stress (hypothermia) and cold injury and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects.

The TLV objective is to prevent the deep body temperature from falling below 36°C (96.8°F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body determined by conventional methods for rectal temperature measurements). For a single, occasional exposure to a cold environment, a drop in core temperature to no lower than 35°C (95°F) should be permitted. In addition to provisions for total body protection, the TLV objective is to protect all parts of the body with emphasis on hands, feet, and head from cold injury.

The wind-chill factor is a cooling effect of any combination of temperature and wind velocity or air movement. Everyone facing exposure to low temperatures and wind should consult the wind-chill index. The wind-chill temperature has no significance other than that expressed - the effect on the body.

The wind-chill index does not take into account the following:

1. The body part exposed to cold.
2. The level of activity with its effect on body heat production.
3. The amount of clothing worn.

Table 3-1 Wind-chill Index

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)

Estimated Wind Speed (in mph)	Actual Temperature Readings (F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	31	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speed greater than 40 mph have little additional effect	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security			INCREASING DANGER Danger from freezing of exposed flesh within one minute				GREAT DANGER Flesh may freeze within 30 seconds				
	Trench foot and immersion foot may occur at any point on this chart											

Blue, yellow and green hi-lights: Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F) per cold stress TLV.

4.0 COLD STRESS PREVENTION

In preventing cold stress, one must consider factors relating both to the individual and the environment.

Acclimatization, water and salt replacement, medical screening, continuing medical supervision, proper work clothing, and training and education will contribute to the prevention of cold stress and injury related to working in a cold environment.

Control of the environment involves engineering controls (i.e., heaters, warm air jets, spot heating, heated warming shelters), administrative work practice controls (i.e., rest breaks, assigning extra workers, enforcing frequent intake of warm drinks - no caffeine or alcohol, allowing new employees time to adjust to conditions before they work full-time in cold environments), work-rest schedules, environmental monitoring, and consideration of the wind-chill temperature. The buddy system is highly recommended while conducting work activities in cold environments.

4.1 Engineering Controls

- Spot heating should be used to increase temperature at the workplace.
- If fine work is to be performed with bare hands for 10 or 20 minutes or more, special provisions should be made to keep the worker's hands warm.
- Shield work area if increased air velocity (wind, draft, and ventilating equipment).
- Unprotected metal chairs should not be used.

- Implement heated warm shelters and make available for workers.
- At temperatures below -1°C (30°F), metal handles of tools and control bars should be covered with thermal insulating material.

4.2 Administrative Work Practices Controls

- A work-rest schedule to reduce the peak of cold stress.
- Enforce frequent intake of warm, sweet caffeine-free, non-alcoholic drinks or soup.
- Moving work to warmer areas whenever possible.
- Assigning extra workers to highly demanding tasks.
- Allowing new employees time to adjust to conditions before they work full-time in cold environments
- Arranging work to minimize sitting still or standing for long periods of time.
- Teaching workers the basic principles of preventing cold stress and emergency response to cold stress.

5.0 A CONTROL PROGRAM FOR COLD STRESS

A control program for cold stress should include the following elements:

- Medical supervision of workers.
- Employee orientation and training on cold stress.
- Employee acclimation to cold temperatures.
- Work-rest regimens, with heated rest areas and enforced rest breaks.
- Scheduled drink breaks for recommended fluids.
- Environmental monitoring to determine wind chill.
- Reduction of cold stress through engineering and administrative controls, and the use of personal protective equipment.

EXCAVATION AND TRENCHING SAFETY PROGRAM

1.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to eliminate employees from serious hazards associated with excavation and trenching activities. All work shall be performed in accordance with 29 CFR 1926 Subpart P – Excavations (1926.650 – 1926.652).

1.1 Definitions

Excavation – Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Trench – A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of the trench (measured at the bottom) is not greater than 15 feet (4.6 m).

If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Competent Person – A Competent Person is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

2.0 PURPOSE

Working in and around excavations poses a serious risk to workers. To reduce the likelihood of OSHA violations, specific procedures must be followed.

2.1 Notification Procedures

A line locating company (i.e., Underground Service Alert) is to be notified at least 2 days prior to the start of any excavation/trenching activities.

Certain states (i.e., California) require that notification from OSHA be given at any time a worker descends into an excavation/trench 5 feet or deeper.

3.0 GENERAL REQUIREMENTS

A “competent person” must be present during excavation/trenching activities.

The Competent Person is to classify the soil type, select protective systems, and perform daily inspections.

Notify Cal-OSHA (California) if workers will be entering excavations/trenches 5 feet or deeper.

4.0 PROTECTION

Workers entering an excavation/trench 5 feet or deeper shall be protected by one of the following:

- Shoring.
- Sloping.
- Benching.
- Other protective systems.

Once the protection method is selected, the specific requirements for each type of protection is dependent on the soil type.

5.0 SOIL CLASSIFICATION

Soil shall be classified by a competent person as stable rock, type A, B or C soil.

Type A = Very cohesive (indented by thumb with great effort).

Type B = Semi-cohesive.

Type C = Non-cohesive (easily penetrated by the thumb).

6.0 SLOPING REQUIREMENTS

A short-term (24 hours or less) maximum allowable slope of ½ H:1V (63 degrees) is allowed in excavations in Type A soil 12 feet or less in depth.

Simple slope excavations 20 feet or less in type A soil shall have a maximum slope of ¾ H:1V (53 degrees).

Simple slope excavations 20 feet or less in type B soil shall have a maximum slope of 1H:1V (45 degrees).

Excavations shall be sloped at an angle not steeper than 1 ½ H:1V (34 degrees) measured from the horizontal if the soil type is classified as type C or is unknown.

A registered professional engineer shall design sloping or benching when excavations are greater than 20 feet in depth.

7.0 HAZARDOUS ATMOSPHERE

The atmosphere in the excavation shall be tested before workers enter excavations/trenches greater than 4 feet.

Precautions shall be taken to prevent employee exposure to atmospheres with less than 19.5% oxygen.

Precautions shall be taken to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 % LFL/LEL.

When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

8.0 STRUCTURES

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

- The “rule of thumb” is that if a structure is located within distance equal to or less than the depth of the excavation, it is considered hazardous. When in doubt, or if the competent person determines that the structure poses a hazard, a registered civil engineer must be consulted.

Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

9.0 EXCAVATION SAFE WORK PRACTICES

Employees who are conducting work activities at depths greater than 4 feet must provide a ladder, runway, or an approved escape route.

Ladders shall extend 36 inches above the ground.

Excavated soil shall be a minimum of 2 feet from the excavation.

Established entry and egress routes from the excavation/trench; routes shall not be more than 25 feet (lateral) apart.

No employees shall be permitted underneath loads handled by lifting or digging equipment.

Employees shall not work in excavations in which there is accumulated water.

Vibration from heavy equipment, railroads, etc., shall be considered a hazardous increasing condition.

Walkways/bridges with standard guardrails shall be provided when employees or equipment are required or permitted to cross over excavations.

10.0 INSPECTIONS

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for:

- Indication of failure of protective systems,
- Evidence of a situation that could result in possible cave-in,
- Hazardous atmosphere, or
- Other hazardous conditions.

An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrences.

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

1.0 POLICY

MES's Personal Protective Equipment Program is prepared in accordance with 29 CFR 1910 Subpart I - Personal Protective Equipment (1910.132 to 1910.139) and Appendix B to 29 CFR 1910.120 and 29 CFR 1926.65.

2.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to isolate individuals from chemical and physical hazards. MES shall provide PPE to authorized site visitors and field personnel who require access to the Exclusion Zone and Contamination Reduction Zone. All visitors and employees shall be trained in the donning of PPE. Level of protection at any site will be selected on a site specific/task specific basis; however, Level D will be worn as minimum for all site activities. The equipment list given below includes information on all levels of protection. MES Personal Protective Equipment Program is in accordance with 29 CFR 1910 Subpart I PPE (1910.132 to 1910.139) and Appendix B to 29 CFR 1910.120 and 29 CFR 1926.65.

3.0 HAZARD ASSESSMENT AND PERSONAL PROTECTIVE EQUIPMENT SELECTION

MES shall assess the workplace to determine if hazards are present, or are likely to be present that necessitates the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, MES shall:

- Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment.
- Communicate selection decisions to each affected employee.
- Select PPE that properly fits each affected employee.

The level of protection may be upgraded or downgraded by the Project SHSM as condition changes at the site. Decisions for downgrading PPE requirements shall be approved by the client representative prior to implementation. The client representative should be notified by the SHSM of decisions for upgrading PPE requirements.

Reasons to upgrade include:

- Change in task that will increase contact or potential contact with hazardous materials.
- Action level is detected during monitoring.
- Request of the individual employee.

Reasons to downgrade include:

- New information indicated the situation is less hazardous than originally believed.
- Change in site conditions that decreases the hazards.
- Monitoring or lab analysis supports a decision to downgrade.

4.0 PERSONAL PROTECTIVE EQUIPMENT (LEVELS OF PROTECTION)

4.1 OSHA Level D

This is primarily a work uniform. Level D PPE is worn when no contaminants are reported on the site. Level D provides only minimal protection. The following PPE is required for Level D:

- Hard hat.
- Boots (steel toed).
- General work clothes.

- Safety glasses or safety goggles.
- High visibility vests.
- Ear Protection (heavy equipment operations).

4.2 OSHA Modified Level D

Same as Level D with an increase protection level for splash hazards. No air purifying respirator.

- Insulated coveralls that shall be oversized to allow several layers of wool or pile or polypropylene clothing inside (optional).
- Disposable overalls (tyvek and saranex).
- Chemically resistant boots with steel toe and shank (ANSI Z41-1983, Safety Toe Footwear, Classification 75). Boots shall be equipped with deep traction sole and be oversized to allow two to three layers of woolen or similar socks inside.
- Chemical gloves (PVC, Neoprene, Nitrile) that shall be oversized to allow two to three layers of wool or similar gloves inside.
- Safety glasses or goggles to guard against wind.
- Hardhat (ANSI Z89.1-1986, Class A, B, and C) supplemented with a hard hat liner.

4.3 OSHA Level C

This is to be selected when the type of airborne substance is known, concentration measured, criteria for using air purifying respiratory met, and skin and eye exposure unlikely. Please note that all the requirements for hard hat, coveralls, and boots apply here.

- Half-face/full-face air purifying respirator.
- Tyvek/saranex coveralls - refer to Modified Level D.
- Neoprene outer gloves - refer to Modified Level D.
- Cotton inner gloves - refer to Modified Level D.
- Hardhat with face shield - refer to Modified Level D.
- Steel toed rubber boots - refer to Modified Level D.
- Rubber boot covers (where applicable).
- Taped wrist and ankle joints.
- Chemical goggles (where applicable).
- Hearing protection (where applicable).
- Safety glasses (where applicable).

Protective clothing material must be compatible with the identified hazardous substances released. In an unknown situation, the material providing the highest overall protection will be utilized. No individual will enter an area where respiratory protective equipment is required unless the person has been trained in the selection, use, care and limitations of the respirator, and the proper respirator has been selected for the task.

Whenever respirators are required, only equipment approved for that purpose will be used. The National Institute for Occupational Safety and Health (NIOSH) must approve this equipment. Only parts approved for the specific respirator system are to be used for replacement. Only a person specifically trained should perform work with respirators.

Proper selection of respirators is to be made according to guidance provided by ANSI standard Z88.2-1980. The correct respirator is to be specified for each job.

4.4 OSHA Level B

Should be used when the type and atmospheric concentrations of substances have been identified or are estimated to be within tolerance parameters of PPE. Level B requires a high level of respiratory protection, but less skin protection. This involves atmospheres:

- With IDLH concentrations of specific substances that do not represent a severe skin hazard.
- That do not meet the criteria for use of air-purifying respirators.
- That contain less than 19.5 percent oxygen.

The PPE required for Level B work is the same as Level C except a higher level of respiratory protection (supplied air) is required:

- Polytyvek or saranex suit.
- Gloves (inner and outer).
- Chemical boots (steel toed).
- Hardhat.
- Supplied air (SCBA or airline).

4.5 OSHA Level A

Should be used when the chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either:

- Measured (or potential for) high concentrations of atmospheric vapors, gases, or particulates.
- Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact skin.
- Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

Level A offers the highest level of respiratory, skin, and eye protection. The following PPE is required:

- Fully encapsulated suit.
- Level B PPE/SCBA.
- Two-way radio communication.

5.0 PPE INSPECTION PROGRAM

Regular inspection of PPE, together with respiratory protective equipment, shall be performed. MES's SHSM shall ensure the following during PPE inspection:

- The wearer prior to use shall inspect all equipment.
- Respirator cartridges shall be disposed of daily (i.e., not reused).
- Respirator cartridges shall be changed during a work shift if the wearer experiences breakthrough, resistance, or uncomfortably warm inhaled air, or if the respirator/cartridges become wet or grossly contaminated.
- Disposable protective items may be reused during a work shift provided they are not damaged or obviously contaminated. Disposable items shall be disposed of daily.
- Reusable protective items shall be cleaned and inspected daily.

6.0 CARE OF EQUIPMENT

PPE offers a high degree of protection, yet the equipment must be maintained and inspected on a regular basis.

Gloves and full body coveralls – Gloves and full body coveralls will be inspected and replaced promptly if a tear develops.

Respirators – Respirators will be inspected and leak-checked each time they are put on. Respirator cartridges will be replaced daily or more frequently if excessive resistance or breakthrough develops. A trained technician will perform all respiratory maintenance. Respirators will be cleaned daily. Each individual will be assigned exclusive use of a respirator. These respirators will be stored in separate plastic storage boxes with individual names on them. Where employees provide their own protective equipment, MES shall be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

All PPE shall be of safe design and construction for the work to be performed. Defective or damaged PPE shall not be used.

7.0 TRAINING

MES shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

- When PPE is necessary.
- What PPE is necessary.
- How to properly don, doff, adjust, and wear PPE.
- The limitations of the PPE.
- The proper care, maintenance, useful life and disposal of the PPE.

Each affected employee shall demonstrate an understanding of the training specified in this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

Should MES have reason to believe that any affected employee who has already been trained does not have the understanding and skill required of this section, MES shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete; or
- Changes in the types of PPE to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

MES shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

ELECTRICAL SAFETY PROGRAM

1.0 POLICY

The OSHA Electrical Standards address the government's concern that electricity has long been recognized as a serious workplace hazard, exposing employees to such dangers as electric shock, electrocutions, fires and explosions. The objective of the standards is to minimize such potential hazards by specifying design characteristics of safety in use of electrical equipment and systems. MESs Electrical Safety Program complies with OSHA Standards 29 CFR 1926 (Construction) Subpart K - Electrical (1926.400 to 1926.449); 29 CFR 1910 (General Industry) Subpart S - Electrical (1910.301 - 1910.399).

2.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to control potential electrical hazards that may exist while conducting work activities at MES project sites.

3.0 SAFE WORK PRACTICES

- Always call an electrician in case of need of electrical work except for changing 110-volt A.C. light bulbs, resetting breakers or working on automotive type circuits.
- All electrical wiring of equipment must be considered "live" and dangerous. A shock from 110 volts can be fatal.
- All permanent electrical wires must be hung on insulators, messengers, in conduit or trays. All temporary electrical wires must be hung so they are not in mud or water. GFCIs will be used on all electrical wiring.
- Never handle electrical wires that are "hot" while standing or sitting in a wet place without taking extra precautions to obtain insulation from the ground. Be sure conditions are safe before starting work.
- Do not place electric bulbs where drops of water can hit them. Do not spray down electrical equipment.
- Electricians shall not touch, install, or attempt to repair any electrical equipment unless they are fully familiar with it; until it is locked and tagged out; and until they are positive it is safe. Never take your first chance with electricity.
- Always do your work so that you do not become a conductive path.
- Do not open a manual switch to disconnect power from a running motor except in cases of extreme emergency where the regular starter is not functioning.
- Cultivate the habit of turning your face away when opening or closing switched on circuit breakers or when doing anything that could cause an arc or flash. Never turn your face and then grope for a switch handle.
 - Never close an electrical switch slowly or hesitatingly. Close it quickly and positively.
 - Remember that arc burns may be severe.
 - Do not remove a fuse from any circuit until the switch has first been opened.
- In case of a blown fuse or tripped circuit breakers, do not restore power until a thorough check has been made of the equipment to prevent closing into a fault.
- All electrical equipment shall be installed in such a manner so as to be readily and safely accessible to authorized employees to maintain and repair. Rails, wooden platforms, insulating mats or electrically non-conductive material shall guard such equipment wherever necessary.
- Only qualified electricians shall perform all repairs or adjustments or other work on any type of electrical equipment.

- Electrical equipment and wiring shall be inspected systematically and documented at regular intervals to ensure a safe operating condition. Defective equipment shall be repaired or replaced at once.
- Fuses or equivalent protective devices of the correct type and capacity shall be installed on all electrical equipment to protect against excessive overloads or other failures.
- Switches and circuit breakers shall be installed so that they are readily accessible and can be operated without danger of contact with moving or "live" parts.
- Switchboard shall be well lighted for personnel operating in front of board and for maintenance and repair. The rear of the switchboards shall be so guarded as to prevent anyone getting near them and, if possible, shall be enclosed.
- All rooms or building that contain switchboards or control equipment shall be kept free of debris and refuse at all times.
- All junctions on switch boxes must have covers in place before starting operation.
- When repairs are finished or before an employee closes the switch, he shall make certain that the closing will not start a fire or endanger a fellow employee.
- Wire, pieces of wire, or other conducting materials shall not be used as a substitute for properly designed fuses. Where circuit breakers are used, they shall be maintained in proper operating condition and be properly adjusted.
- No employee working in an elevated position on electrical equipment shall do so without using an approved safety belt and lifeline, unless there are proper guardrails around such elevated positions.
- Handheld electric tools should not be operated at high potential voltages.
- All electrical installations, temporary or permanent shall comply with the applicable provisions of the national electrical safety code.
- Electrical wire, conduit, apparatus, and components of equipment shall be approved or listed by the Underwriters Laboratories, Inc., or factory mutual laboratories, for the specific application. Extension cords shall be 3-wire grounded types listed by the Underwriters Labs, Inc. The rated load shall not be exceeded.
- A ground-fault interrupter (GFI) program shall protect all 115-, 120-, and 220-volt, single-phase receptacle outlets used for construction operations. This requirement includes receptacles on stationary and portable systems.
- Always use a fiberglass or non-conductive ladder when doing electrical work.

4.0 GROUNDING

- "Grounding" means making an intentional permanent connection to the general mass of earth in such a manner as will insure at all times the immediate discharge of electric energy to the earth without danger.
- All equipment that may become accidentally charged with electric current shall be effectively grounded.
- Ground wire connections to the apparatus shall be made by means of an approved clamp or terminal soldered or welded to the ground wire and securely bolted to the apparatus, where its removal will be unnecessary for inspection or repairs.
- Wherever possible, ground wires shall be installed in such a manner that they may be inspected for continuity and be protected from mechanical injury.
- All fence enclosures surrounding switchgear, transformers, etc. shall be effectively grounded. Three feet clearance shall be provided between transformer and fence.
- Installation of electrical equipment is not to be considered complete until it has been properly and effectively grounded.

5.0 ELECTRICAL LOCKOUT PROCEDURES

This section is prepared in accordance with 29 CFR 1926.417 A Lockout and tagging of circuits.

All electrical equipment must be locked out according to the following procedure prior to maintenance activities:

- Inform operator and/or foreman of intent to shutdown equipment.
- Turn off equipment.
- Lockout equipment with lock, lockout hasp, and tag. Sign and date tag. Keep key.
- Attempt to start equipment; if equipment remains energized, report to foreman or electrician and do not proceed with maintenance activity. If equipment is de-energized, proceed with maintenance as planned.
- When maintenance is finished, clear area of tools and debris.
- Inform operator and/or foreman of intent to start equipment.
- Make sure personnel are clear of equipment.
- Test run.
- Replace tag and lockout on lockout board.